IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

Project Initiators:

Transaction Advisors:

Felak Concept Limited

People, Passion, Performance

Providing specific solutions and services to our clients through the use of Advanced Information Technology Framework.

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Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

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PROJECT DEFINITION

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Introduction – Objectives

Formerly known as "Ibaka Deep Sea Port & Free Trade Zone Project"

- Develop additional gateway deep sea port capacity in Eastern Nigeria
- Not cannibalising trade volumes through existing regional ports
- Initiative of the Federal Government & Akwa Ibom State Government
- Involve private sector for project funding, development and operations (PPP)
- Continued control by Nigerian Government through NPA (and ICRC)
- Balanced financial returns for project stakeholders reflecting risk exposure
- State-of-the-art contractual arrangements aimed at successful and timely project implementation and industry-standard assets and operations
- Competitive tender to select private PPP partner
- PPP contract implementation by 2015

Introduction – Main Project Characteristics

- Nigerian demand for deep sea port capacity currently exceeds supply and volumes are projected to continue to grow over the long term
- Deep sea port capacity required in the East to cope with increasing demand and to provide geographical balance to Western ports

- Ibom Deep Sea Port & Free Trade Zone project to be developed as Eastern Gateway of Nigeria
- Project to provide vital capacity for containers, vehicles, breakbulk, petroleum products and dry bulks
- Port also to be used as offshore supply base for the oil & gas cluster in the region
- Port to provide ample space for future expansions and other maritime business , including shipyards, LNG exports, and a navy base
- Free Trade Zone to complement port business and to create value through interaction and integration amongst industries and trades

- Greenfield project requiring substantial investments in infrastructure, superstructure and equipment
- Initial investment in the project estimated between USD 1.7bn and USD 2.6bn, depending on scope of the initial phase (bidding parameter)
- Federal Government and Akwa Ibom State each have committed to provide 20% of the initial investment capital in the project
- Port Development & Management Company (PDMC) structure is the only viable PPP structure for project implementation
- PDMC as Concessionaire to sign a Concession Agreement with the Nigerian Ports Authority (NPA, Landlord Port Authority, Concession Grantor)
- PDMC to Design, Build, Finance, Operate, Maintain and Transfer-back the entire project (incl. channel and road, but excl. nautical fleet)
- NPA as Landlord, monitoring Concession Contract; regulating tariffs; providing nautical services/fleet and Harbour Master tasks

- Private shareholding (60%) in PDMC to be secured through competitive tender (2013/14)
- NPA and Akwa Ibom State Government provide remaining Equity in PDMC (20% + 20%)
- Federal Ministry of Finance provides Government Funding Support (GFS) to the PDMC to reach 40% public funding contribution
- GFS structured as a loan to the PDMC and used to ensure private bankability and to kick-start the project
- Private Guarantees required to ensure private equity and debt
- Federal Guarantees required to ensure NPA & State capital contributions

- Majority of Port Dues, Fees and Charges collected by PDMC to cover their substantial investments in general port infrastructure
- Port Tariffs to be sustained by NPA in initial project period
- 50 year concession contract to ensure recovery of substantial investments in Greenfield port infrastructure and to ensure market appetite

Introduction – Critical Decisions, Positions & Approvals

The following steps are considered vital for successful and timely project implementation. These steps require immediate attention/action upon delivery of the OBC and the Procurement File

1. Approval of the Outline Business Case to advance to Phase 3
2. Approval of the Project Procurement File to advance to Phase 3
3. Approval to start Phase 3 of the project: *Transaction Implementation & FBC Phase*
4. Approval of programme for additional studies and surveys to be implemented immediately
5. Inclusion of the project in the NPA Ports Master Plan
6. Approval of the Site: Final Port Location (concession area), Proposed Channel Alignment, Proposed Road Connection
7. Transfer of Project Area to Concession Grantor (NPA)
8. Promulgation of the Port (concession area)
9. Approval of Project Structure: PDMC model with public shareholding (max 40%) and sub-concessioning by the PDMC allowed without public procurement
10. Approval of the NPA-PDMC Tariff Allocation: Port Dues
11. Approval of Phase 1 Investments: Containers, Breakbulk, RoRo, Petroleum Products, Offshore Supplies, Dry Bulk; Phase 1 Capex: USD 1.7b-2.6b; Design Vessel 13.5 - 15m draft; Quay length: 1,000m-2,150m
12. Approval of Public Budgets and Guarantees (Federal, State): USD 1.04b maximum public investment contribution (40% of max scope phase 1); structured as 40% equity injections and the balance as Government Funding Support (Viability Gap Funding)
13. Establishment of incentive-package: NEPZA regime (+) and other fiscal incentives
14. Approval of Phase 3 Implementation Proposal

Introduction – Project Organisation

The internal project organisation is structured in three separate parts that have their own specific role and function. The different entities and their roles and functions are:

Project Initiators:

The project is initiated by The Honourable Minister of Transport, Senator Idris A. Umar and The Executive Governor of Akwa Ibom State, His Excellency Chief Godswill Akpabio CON.

Project Supervisors:

The project development is supervised and supported by the Honourable Minister of Transport and the Ministerial Project Development and Steering Committee on Ibom Deep Sea Port, consisting of members from the Ministry of Transport, Akwa Ibom State, the Nigerian Ports Authority, the Infrastructure Concession Regulatory Commission and the Nigerian Export Promotion Council.

Project Transaction Advisors:

The project development is supported by the Transaction Advisors, being Felak Concept Limited from Abuja, Nigeria and Maritime and Transport Business Solutions B.V. (MTBS) from Rotterdam, The Netherlands.

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Overview – Ibom Deep Sea Port Project

Ibom Deep Sea Port serves as the South-Eastern gateway of Nigeria's economy

The Ibom DSP Project concerns the development of a Deep Sea Port and accompanying Free Trade Zone (FTZ) in Akwa Ibom State in South-Eastern Nigeria. The Port and FTZ are part of the proposed Ibom Industrial City that will be established on a 14,400 hectare site in the South-Eastern part of the State.

Both the Port and the FTZ are scheduled to be developed in a phased approach. The initial phase of the port is envisaged to consist of a container terminal, RoRo & Break-bulk terminal, an oil products import facility and an Offshore Supply Base. In later stages, terminals can be added, based on market demand. The FTZ will be developed on a site of up to 10 times the port's size. It is intended to accommodate logistics, manufacturing and light industry. Heavy industry will be located outside the FTZ under tailored customs regime in the Ibom Industrial City.

Figure 2.1 – Location of the Ibom DSP Project

Overview – Project Characteristics

The Ibom Deep Sea Port aims to become the Eastern Gateway of Nigeria, providing vital port capacity for the country. Lagos, the existing gateway, is situated at the Western part of the country and is severely congested from both the sea and landside, leading to delays for ships to enter the port and delays within the port due to capacity constraints on the terminals. Besides, there is no room for industrial developments which require direct access to deep-water for vital overseas import/export links. Ibom Deep Sea Port has two prime characteristics that enable it to provide vital port capacity: it is accessible for ships with drafts of up to 15 meters and it has an abundant availability of land in the port area and its surroundings.

Next to its focus on containers and break-bulk cargoes, the Ibom Deep Sea Port shall be able to handle petroleum products (import), vehicles (import) and bulk trade in natural resources (import and export). The Free Trade Zone and the Ibom Industrial City's industries will supply the port with additional imports and exports. The large oil and gas sector in Akwa Ibom and its surrounding states imply that the port could also function as a supply base for this off-shore sector. The main characteristics of the Ibom Deep Sea Port that are regarded as a minimum requirement in order to offer competitive port services in Eastern Nigeria are listed below:

Nautical:

- Site close to major international shipping routes
- Deep water in channel, turning circle and port basin (Chart Datum -16.5m in the port)
- Operations protected from waves, currents and winds

Terminals:

- Quay walls for Deep Sea berths initially starting at 1,000m to 2,150m and phased to 5,500m by 2035
- Port area for modern terminal operations (phased to 500 hectares)
- Modern jetties for safe and efficient liquid bulk operations

Hinterland:

- Free Trade Zone and Ibom Industrial City for local trade
- Project road connecting the port to the Federal Highway system, the artery for regional and national trade

Commercial:

- Port Commercial Centre near the port's entrance for different commercial activities
- Serving as a catalyst and stimulant for business and economic growth

Overview – Port Trades

Containers:

Providing additional container capacity to the Nigerian economy is expected to be required in the coming years due to due to projected population and GDP per capita growth. Besides, Ibom DSP might function as a transit or transhipment hub for the region.

Liquid Bulk:

The Nigerian economy remains a large importer of petroleum products. Economic growth and increased car ownership are primary drivers for continuous growth in this sector. Ibom DSP can provide significant economies of scale through its Deep Sea access, preventing any mid-stream lightering. LNG export from Ibom DSP is a potential port trade once investments in a natural gas liquefaction plant are made.

Offshore Supplies:

The large number of oil fields close to the Ibom Deep Sea Port implies that Ibom DSP serves as optimal location for an off-shore supply base.

RoRo:

Both new and second hand car imports into Nigeria is expected to grow at a significant rate due to projected population and GDP per capita growth.

Break-Bulk

Despite on-going containerisation, break-bulk markets remain strong, especially with respect to iron and steel products and project cargo.

Dry Bulk:

The dry bulk throughput at Ibom DSP is expected to be driven by agricultural production and industrial trades. Dedicated facilities with specialised operators are required to handle and store products such as cocoa and rubber (exports), fertilizer, grains and cement (imports).

Industrials:

Industrial trade at Ibom DSP depends largely on the developments in the Free Trade Zone and the Ibom Industrial City. The port shall serve their development (construction materials, project cargoes) and subsequently the port can function as the trading gateway for its tenants and producers.

Other activities:

- A commercial fishing port enables local communities to benefit further from the port, whilst creating additional economic activities in the IIC.
- A naval base that ensures security in and around the port is regarded as a catalyst for attracting international investors in a secure environment.
- A shipyard and dry dock facility that ensures maintenance of vessels and possibly shipbuilding activities as a potential viable business.

Overview – Free Trade Zone

The main activities envisaged for the Free Trade Zone are:

Logistics:

With its location in the proposed Ibom Industrial City and next to the Ibom Deep Sea Port, the Free Trade Zone is expected to attract large logistical operators that offer services such as freight (de-) consolidation, distribution and value-added logistics.

Manufacturing & Light Industry:

Manufacturers and light industrial operators could benefit from having a production facility at Ibom DSP for the same reasons as stated above (inside the IIC, close to the port). Furthermore, operating from a Free Trade Zone is attractive for manufacturers due to the favorable tax policy applicable.

Heavy industry will be located outside the Free Trade Zone under a tailored customs regime.

Overview – Project Market

The Ibom Deep Sea Port and Free Trade Zone will be located in Akwa Ibom State (Capital: Uyo). With a population of over 5 million and abundant reserves of crude oil and natural gas, Akwa Ibom is an economic powerhouse in South-Eastern Nigeria. The state ranks 3rd in total GDP of the Nigerian states. Many of the proposed industrial projects in the state have a relation with the oil and gas industry.

The port is expected to both strengthen developments in the oil/gas sector and to further differentiate the economic profile of the state by becoming the economic gateway to a region which shows strong economic activities.

State	Population *	GDP/Capita US$*
Abia	3.7m	546
Akwa Ibom	5.0m	5,103
Abuja FCT	0.7m	13,661
Anambra	5.3m	218
Benue	5.3m	1,920
Cross River	3.7m	809
Ebonyi	2.8m	265
Enugu	4.0m	412
Kogi	4.1m	197
Nassarawa	1.2m	1,642
Plateau	4.0m	260
Taraba	2.9m	190
Region	**42.7m**	**1,337**
Nigeria	**170m**	**1,500**
* Estimates based on 2007 U.N. Data		

Table 2.1 – Population & Economy behind the Ibom DSP Project

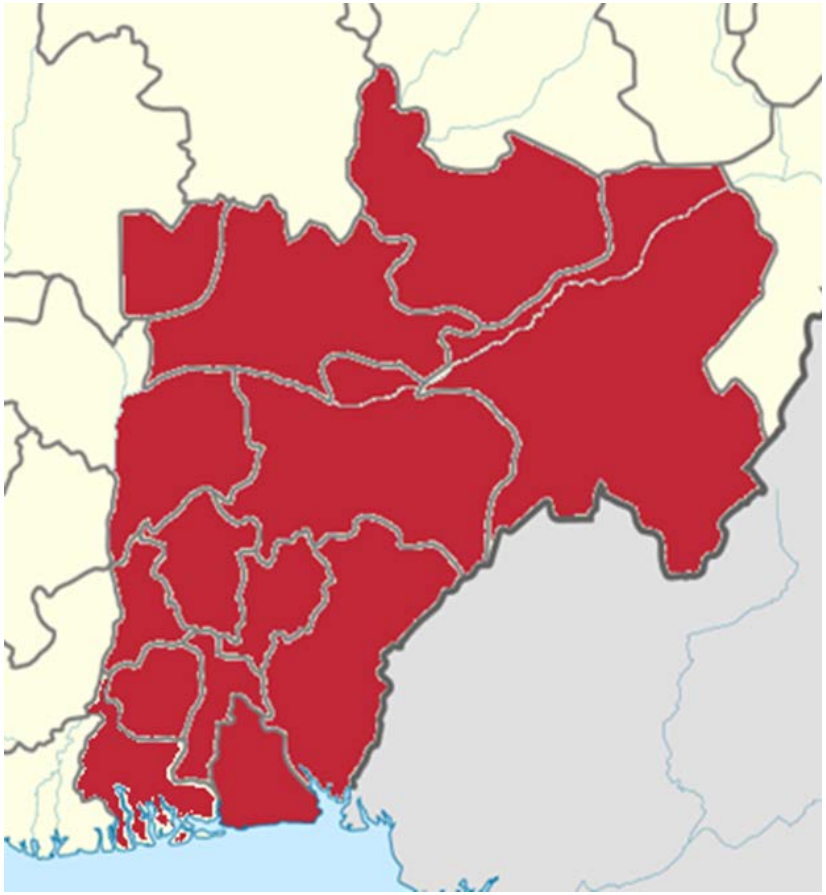


Figure 2.2 – Primary Market for the Ibom DSP Project

Overview – Nigerian Port Sector

Current focus on Western ports shows necessity for the development of a hub in the East

The Nigerian port sector is currently dominated by the port complex at Lagos (Apapa & Tin Can). Lagos is complemented by several regional ports: Warri, Port Harcourt and Onne in the Niger River Delta and Calabar in the South-Eastern part of the country. Due to the expected economic growth and the lack of capacity at Lagos, a number of greenfield port development projects have been initiated in recent years. These other greenfield projects are all located in the proximity of Lagos: Badagry, Lekki and Olokola. Their status varies, but so far, none has been implemented.

Figure 2.3 – Location of main seaports and Greenfield port development initiatives in Nigeria

Overview – Hinterland Competition

Port competition based on hinterland accessibility: East versus West

Once developed, Ibom DSP is the only Eastern gateway Deep Sea port project in Nigeria. It is therefore expected that Ibom DSP can become a port of significant importance for Eastern Nigerian economy. Based on the ports' locations in the country, a hinterland map has been developed showing the captiveness of markets vis-à-vis the Western ports.

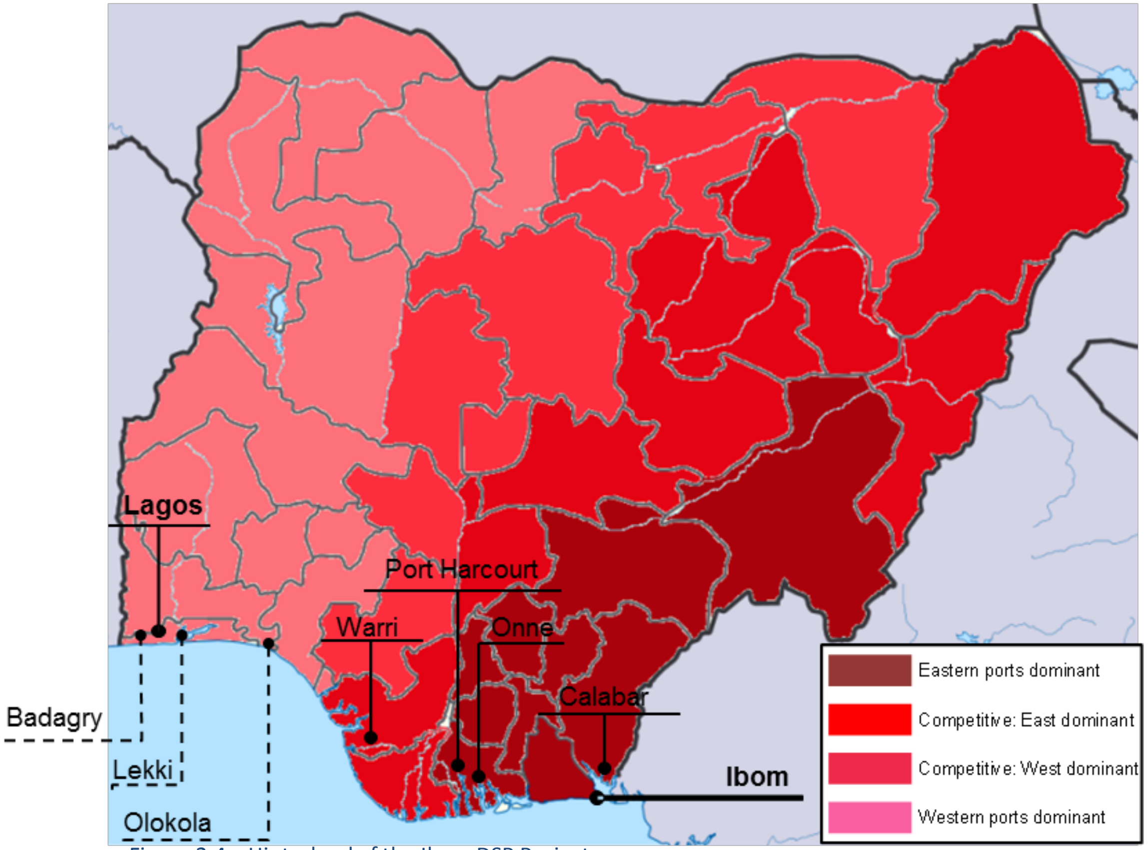


Figure 2.4 – Hinterland of the Ibom DSP Project

Section G of the Outline Business Case report covers an extensive traffic forecast for Nigeria's port sector that describes in detail how traffic at Ibom DSP and at the other Nigerian ports is expected to develop during the coming decades.

Overview – Nigerian Economy

The main reason for the development of greenfield port capacity is based on the country's impressive economic growth and its congested ports. The International Monetary Fund (IMF) provides high growth figures for the country (stable between 6.7 and 7.2 percent per annum from 2013 to 2018). The WorldBank supports the IMF's vision by stating that "Nigeria's short term macroeconomic outlook looks generally strong, with the likelihood of higher growth, lower inflation, and reserve accumulation". These positive outlooks will have a direct effect on port trade.

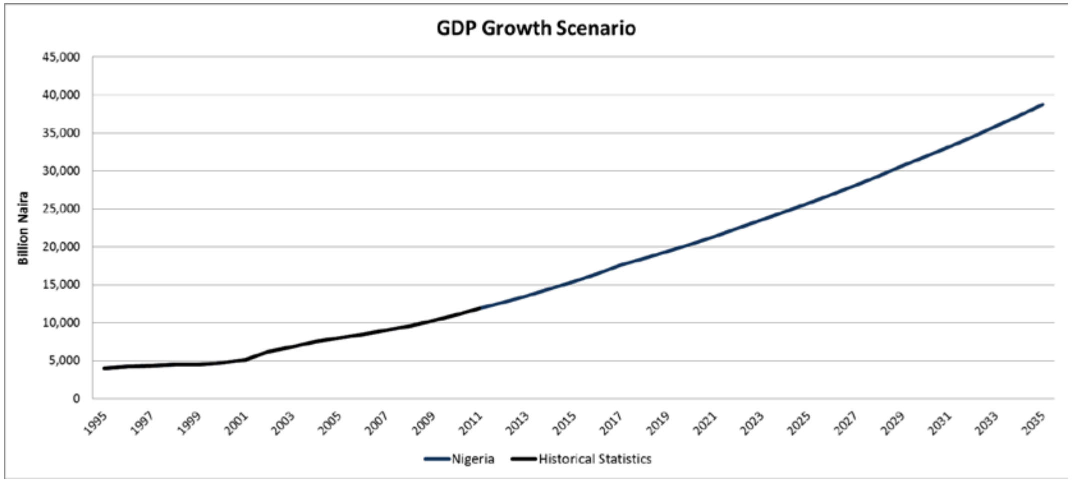


Figure 2.5 – Historic and Forecasted GDP development for Nigeria

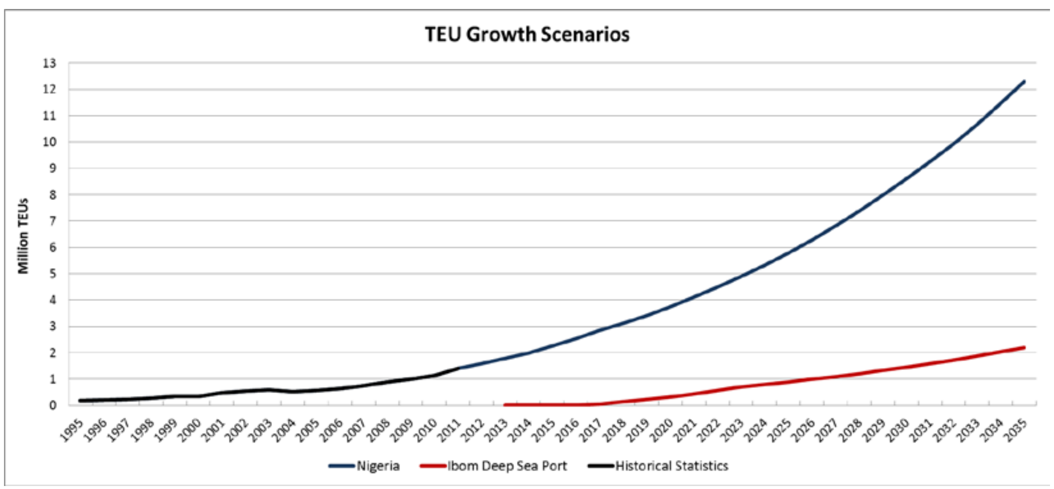
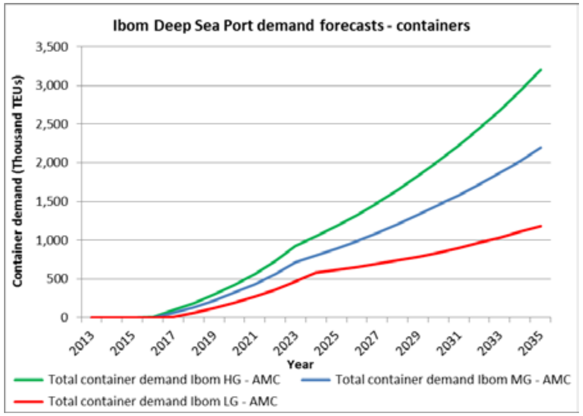
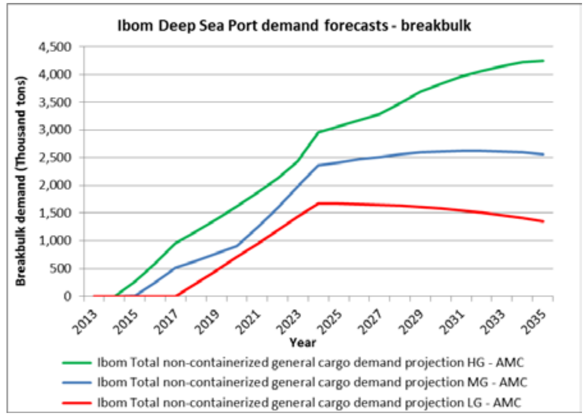
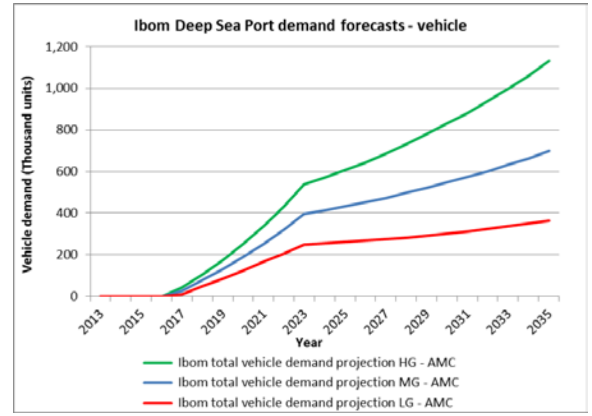


Figure 2.6 – Historic and Forecasted container throughput development for Nigeria and Ibom DSP

Overview – Traffic Projections

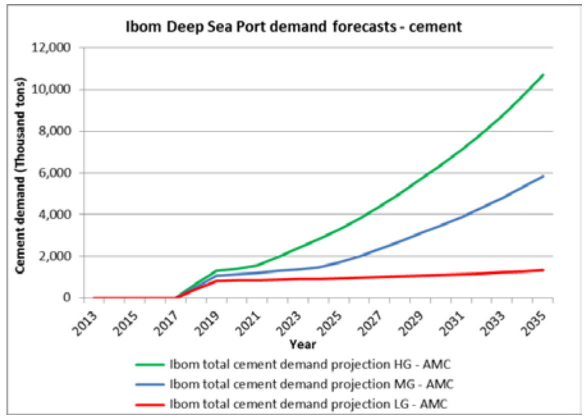


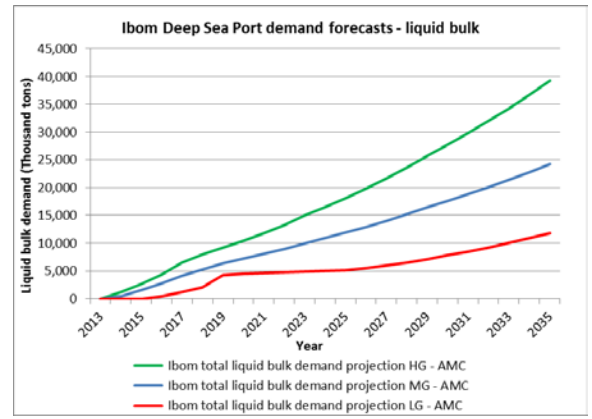




Demand projections for Ibom DSP up to 2035 are provided for five main cargo segments. The table below presents the projected volumes for selected years. As can be seen in the figures, Ibom DSP requires a build-up period to attain market share in the first ten years of operations. After this build-up period, volumes grow at a more stable pace.

The approach, methods and assumptions that are used to project the demand figures for Ibom DSP are elaborated in the Traffic Forecast document.





Port	2018	2020	2025	2030	2035
Containers (TEU)	134,108	321,658	890,424	1,452,851	2,194,840
Breakbulk (tons)	635,849	902,177	2,418,505	2,612,479	2,565,504
Cars (units)	77,405	190,352	431,559	547,631	698,759
Cement (tons)	518,645	1,148,793	1,708,321	3,477,759	5,849,536
Liquid bulk (tons)	5,311,303	7,176,755	11,897,932	17,624,500	24,218,425

Overview – Ibom Industrial City

Ibom Industrial City: industry, urban development & commercial port area

The Ibom Industrial City (IIC) Master Plan comprises of the development of a 14,400 hectare area in the south-eastern part of Akwa Ibom. The development includes urban development, heavy and medium-light industry and a large commercial port area. The latter has been detached from the original IIC plans as to increase the speed of implementation and to have the port function as an enabler for the IIC's development. The original Master Plan for the Ibom Industrial City has been developed in 2010 by Australian consultant and project engineer WorleyParsons. In this Master Plan, the Ibom DSP Project is incorporated as the commercial port area that supports the IIC.

The area of the IIC is provided in the figure on the right. The south and eastern boundaries of the IIC are determined by the sea, whilst on the northern side, the IIC's boundary is depicted by the Mbo Local Government area's border. The western side's boundary is depicted by Mbo's border as well, following a straight line to the sea.

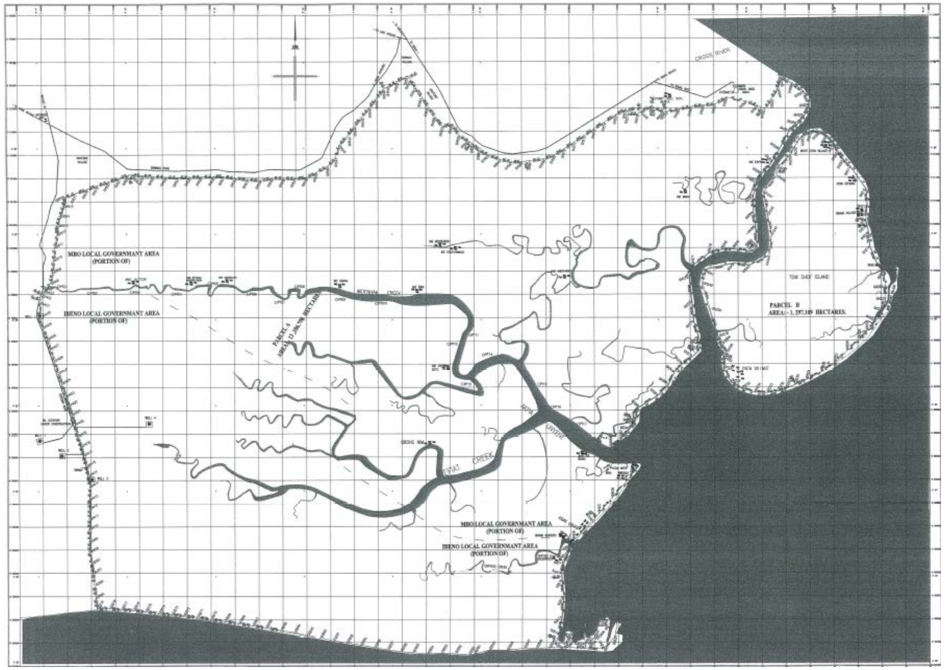


Figure 2.7 – Area of the envisaged Ibom Industrial City Development

Overview – Site Selection

Various locations have been considered for the development of the Project. Seaside location has been selected based on various factors in which is outperforms alternatives in the region.

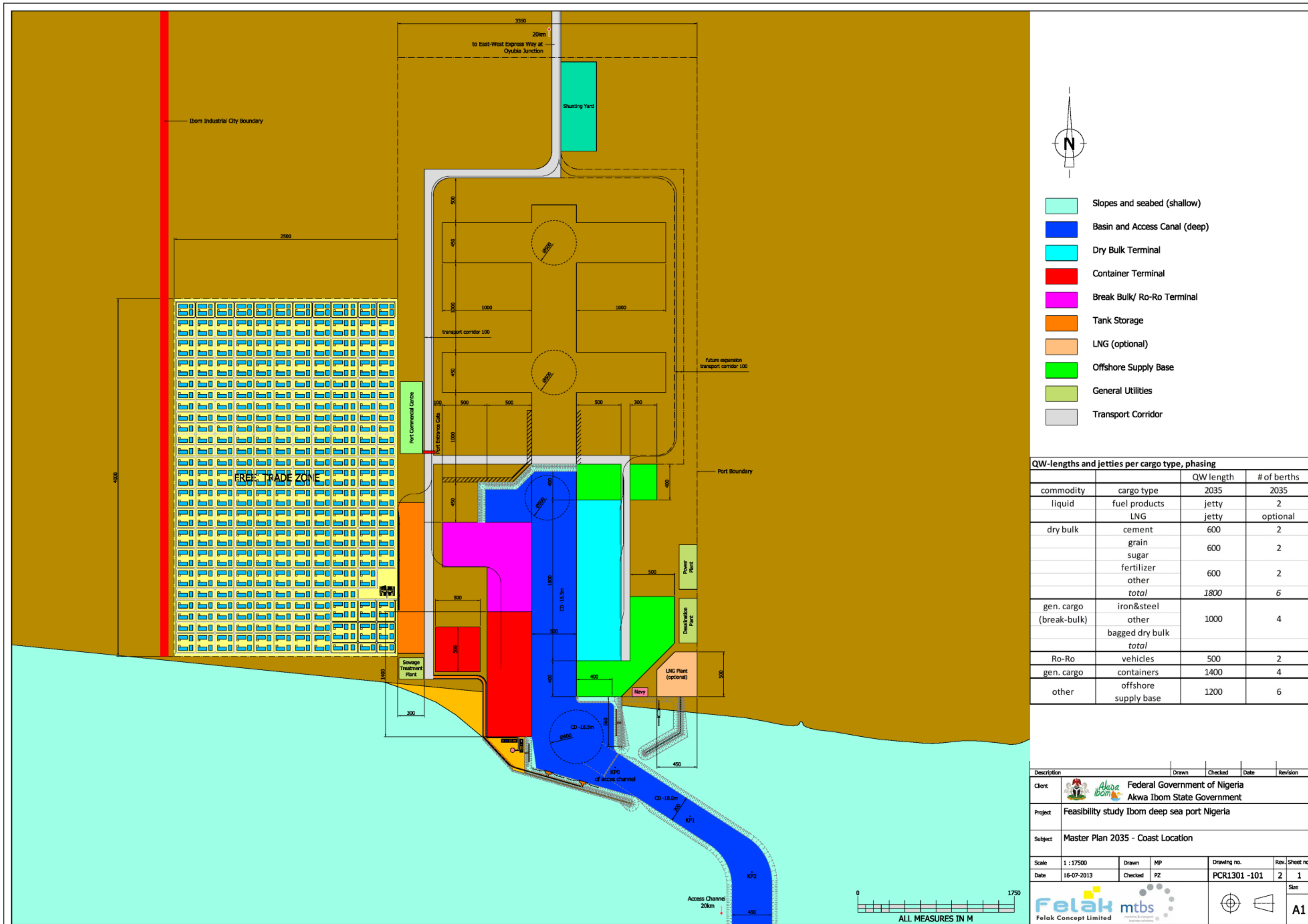
- Location should be part of the Ibom Industrial City (IIC, established in red on the right; location 5 not compliant)
- Location should comply to requirements as established in the Technical Programme of Requirements (1-4 compliant)
- Site needs to be close to deep sea trade routes (4 scores worst: distance from deep sea)
- Site needs to provide ample space for design variations by private investors (1 scores best: significant homogenous area; no creeks)
- Environmental impact at the site should be minimised (1 scores best: limited creeks and forest; basic vegetation).
- Social impact at the site should be minimised (1 scores best: limited population and limited existing activities).
- Investment size should be minimised (1 scores best: limited dredging; limited soil improvements; limited maintenance dredging)
- Time to market should be minimised (1 scores best: predictable natural conditions require less (lengthy) research and only basic technical solutions.
- Risks should be minimised (1 scores best: predictable natural conditions on and offshore)

Figure 2.8 – Location options for the Ibom DSP Project

	Location 1 (Seaside)	*Location 2 (West Point)*	*Location 3 (Okposo)*	*Location 4 (Tom Shot)*
Compliance with TPoR	0	0	0	0
Nautical accessibility	0	0	0	-
Flexibility of development	+	-	0	-
Environmental impact	+	0	0	--
Social impact	+	-	0	--
CAPEX 2035	+	0	0	-
Maintenance costs	+	0	0	-
Time to market	+	-	-	-
Risks & opportunities	+	0	-	--
(Total score)	(+7)	(-3)	(-2)	(-11)

Table 2.2 – Multi-Criteria Analysis for Location Selection

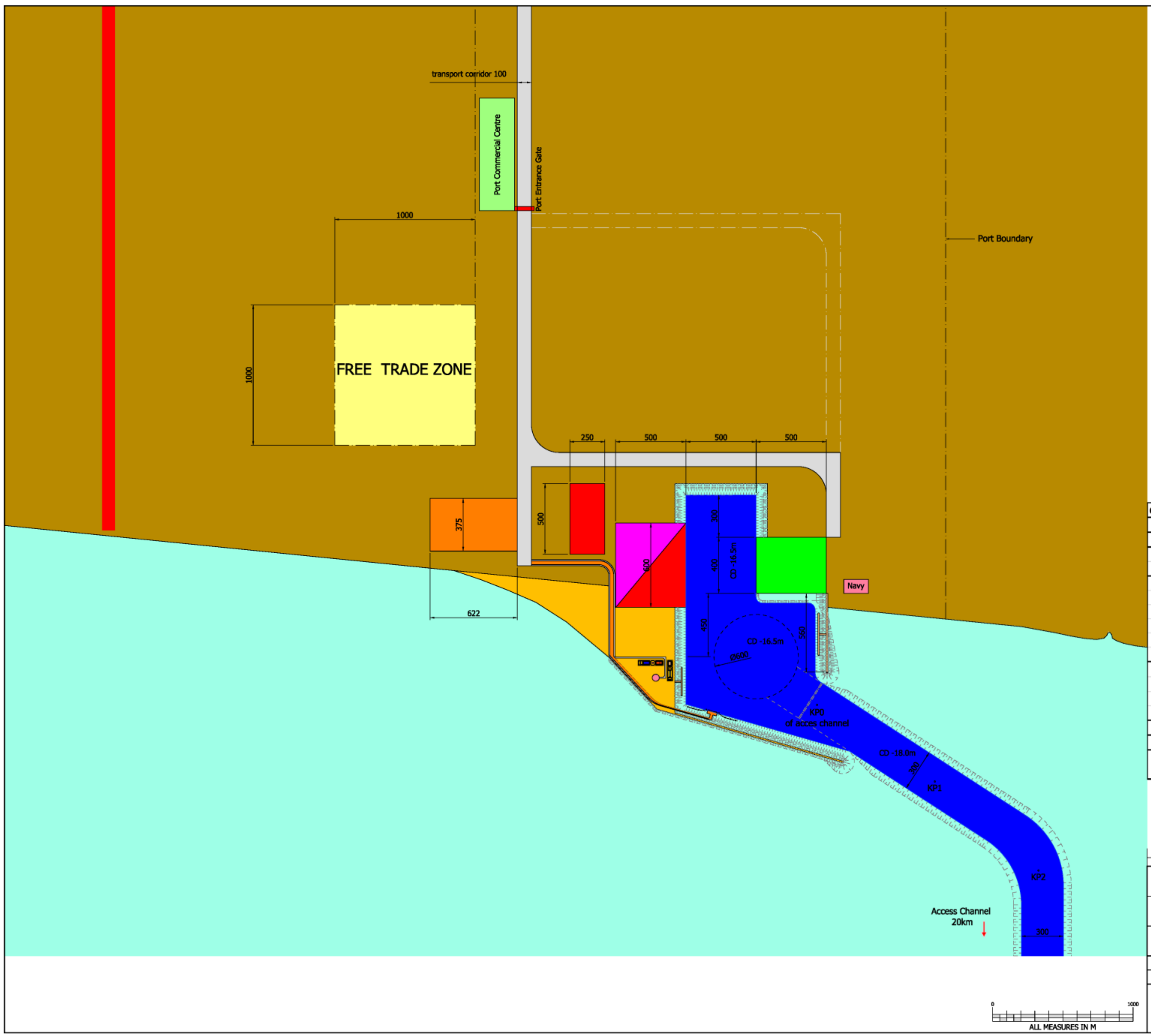
Overview – Project Master Plan 2035 (reference design)



QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2035	2035
liquid	fuel products	jetty	2
	LNG	jetty	optional
dry bulk	cement	600	2
	grain sugar	600	2
	fertilizer other	600	2
	total	*1800*	*6*
gen. cargo (break-bulk)	iron&steel other bagged dry bulk	1000	4
	total		
Ro-Ro	vehicles	500	2
gen. cargo	containers	1400	4
other	offshore supply base	1200	6

Overview – Phase 1 (minimum scope, reference design)



QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2020	2020
liquid	fuel products	jetty	1
dry bulk	cement		
	grain		
	sugar		
	fertilizer		
	other		
	total	*0*	*0*
gen. cargo (break-bulk)	iron&steel	250	1
	other		
	bagged dry bulk		
	total		
Ro-Ro	vehicles		
gen. cargo	containers	350	1
other	offshore supply base	400	2

Client	Federal Government of Nigeria Akwa Ibom State Government
Project	Feasibility study Ibom deep sea port Nigeria
Subject	Reference Layout 1
Scale	1 : 12500
Date	16-07-2013
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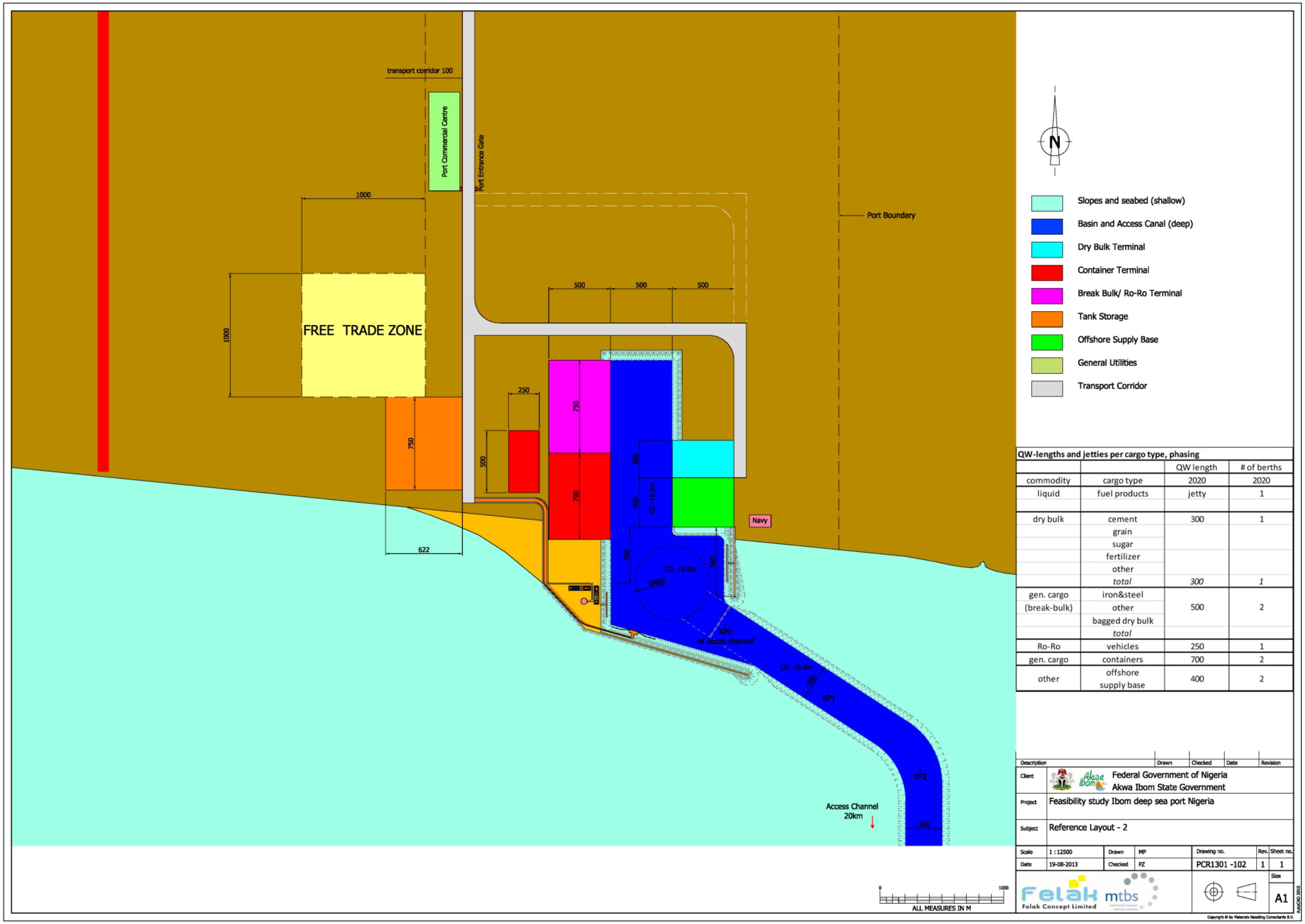
Overview – Phase 1 (maximum scope, reference design)

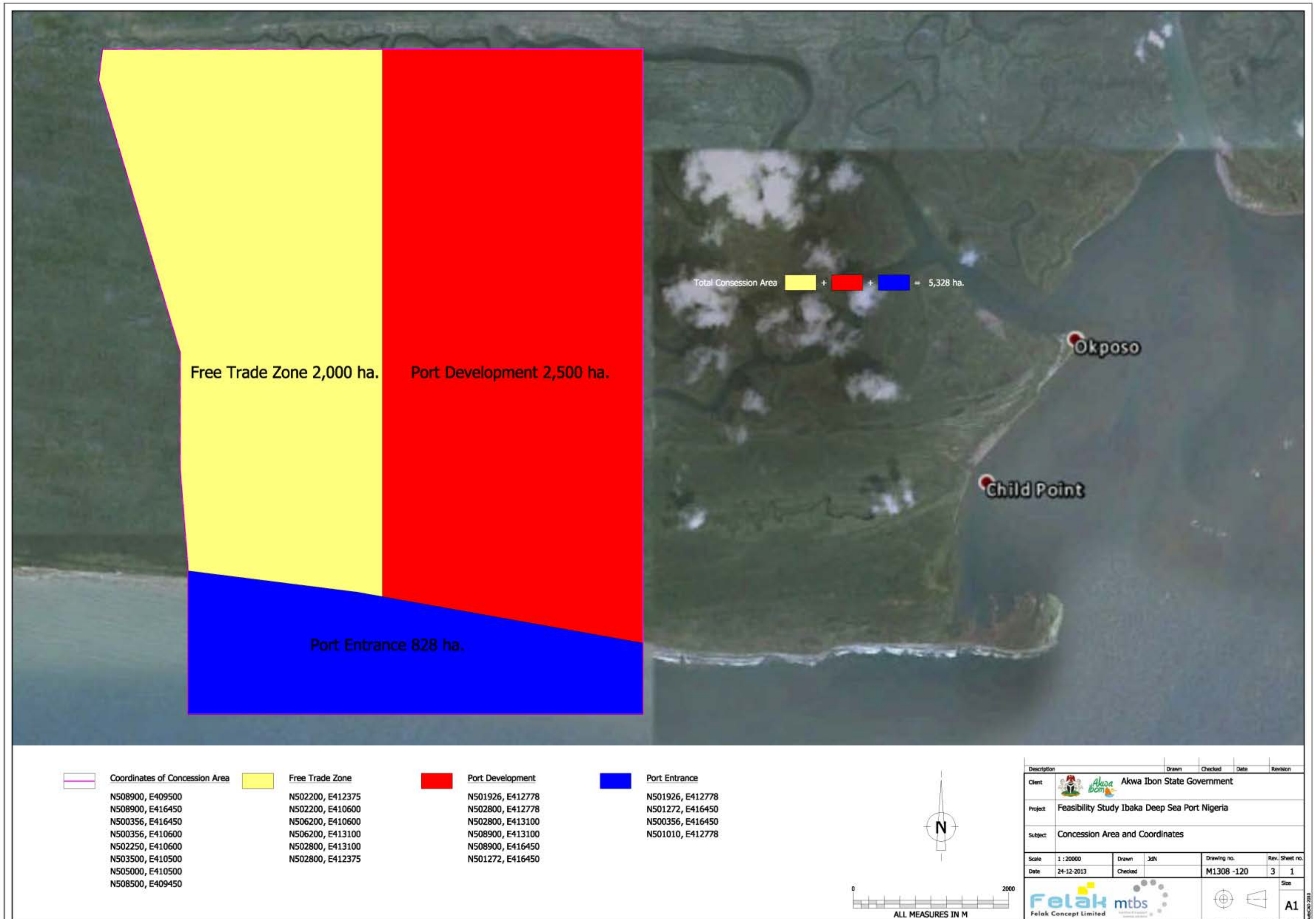


QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2020	2020
liquid	fuel products	jetty	1
dry bulk	cement	300	1
	grain		
	sugar		
	fertilizer		
	other		
	total	*300*	*1*
gen. cargo (break-bulk)	iron&steel	500	2
	other		
	bagged dry bulk		
	total		
Ro-Ro	vehicles	250	1
gen. cargo	containers	700	2
other	offshore supply base	400	2

Overview – Concession Area

The Ibom DSP Project shall be developed on the south-western part of the Ibom Industrial City (IIC) site, with direct access to deep sea trade routes; stable and predictable natural conditions; and ample area for expansion of the Port and the Free Trade Zone. The development of the 30km road connecting the Project to the Federal Highway and the 20km channel connecting the Project to the deep sea are included in the responsibilities of the PDMC.



Overview – Initial Artist Impression

Overview – PPP Implementation

The project is implemented through a PPP structure based on a Concession Agreement amongst the NPA (Grantor) and a public-private consortium (Concessionaire). For successful implementation of the project, both Federal and State Government have committed to an investment contribution of 20% each*, with the balance under responsibility of the private sector.

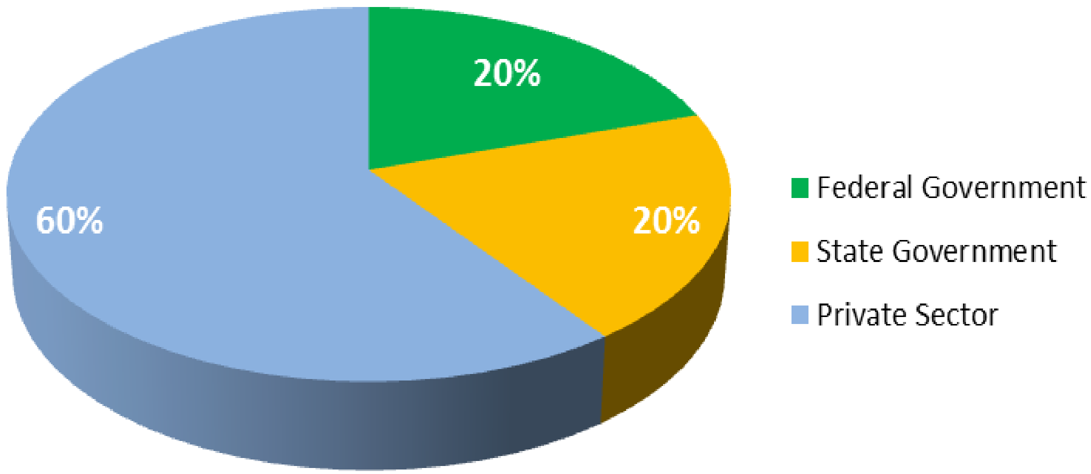


Figure 2.9 – Distribution of capital contribution for Ibom DSP first phase development

In line with Nigerian procurement regulations, PPP guidelines as established by the Federal Infrastructure Concession Regulatory Commission (ICRC) apply: The PPP procurement will be implemented through an open and competitive bidding process with pre-qualified bidders. The contract will be awarded to the most technical and economically comprehensive bid.

The specific PPP structure is described on the following page and will be extensively discussed in Section H of the OBC and in the Procurement File.

* The percentages mentioned in the figure are replaced by concrete figures (investment contributions) after OBC approval by the Federal Executive Council of Nigeria

Overview – PPP Structure

Reference is made to the PPP Structuring Section in the Project Procurement File for more details on this topic.

The proposed implementation of the Public Private Partnership for Ibom DSP's development is based on a Port Development & Management Company Model as visualized in the figure below.

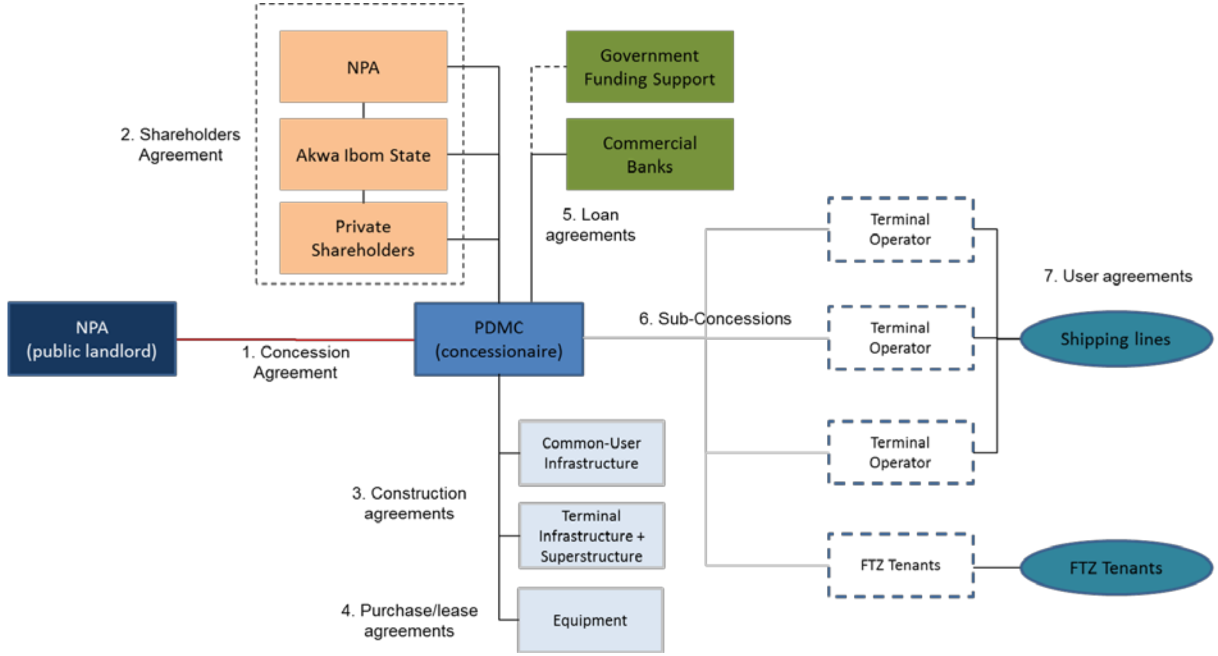
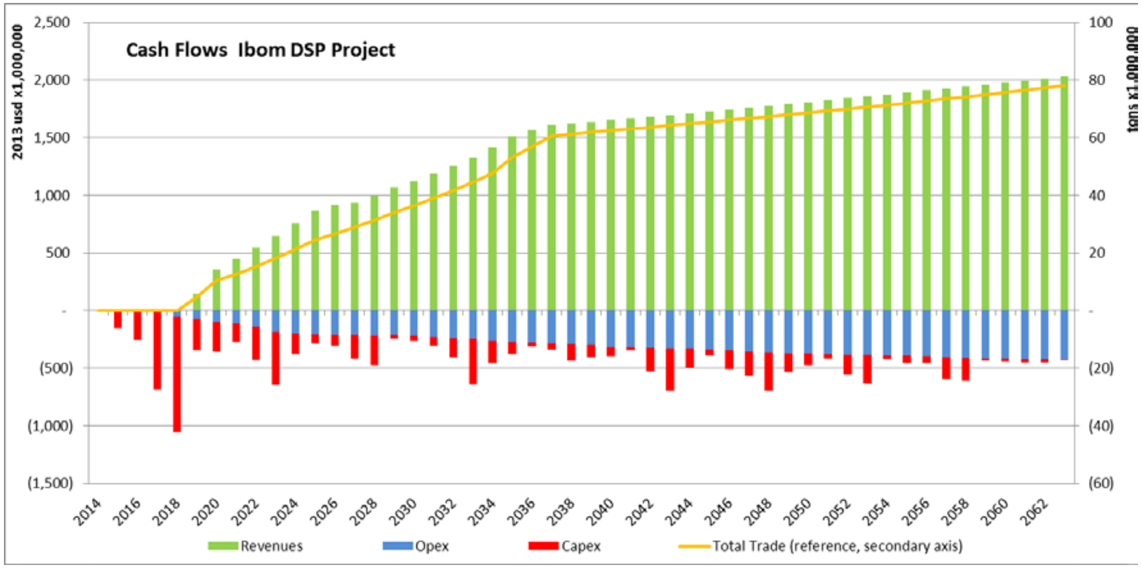


Figure 2.10 – Envisaged PPP structure for Ibom DSP

- The PPP structure for the Port Development & Management Company consists of a Concession Agreement between the NPA (Grantor) to the Port Development & Management Company (PDMC) who is responsible for the development of the Ibom DSP Project.
- The PDMC's shares are divided amongst the Federal Government with NPA as the representative, Akwa Ibom State Government and the private sector (company/consortium), where the majority of the shares are privately owned.
- The PDMC is responsible for **all** investments in common-user infrastructure (including access road, dredging, channel, breakwater, free trade zone, terminal infrastructure, superstructure and equipment). The PDMC has the right to enter into sub-concession contracts with separate terminal operators or service providers. These sub-concessionaires may then invest in the terminal's superstructure and equipment.
- The PDMC is responsible to arrange the debt financing with banks (and/or bond holders) to finance part of the PDMC's investments.
- To ensure the committed capex contribution by the public sector, while preventing a too large public shareholding in the private PDMC, Government Funding Support in the form of soft loans are required.

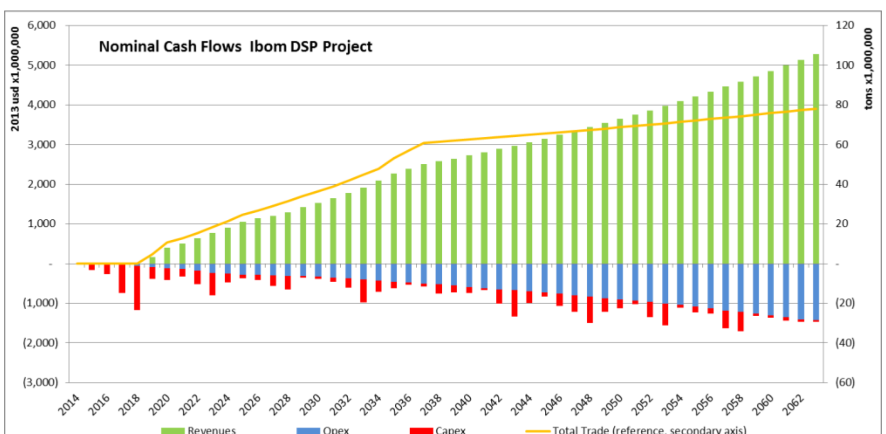
Overview – Project Viability

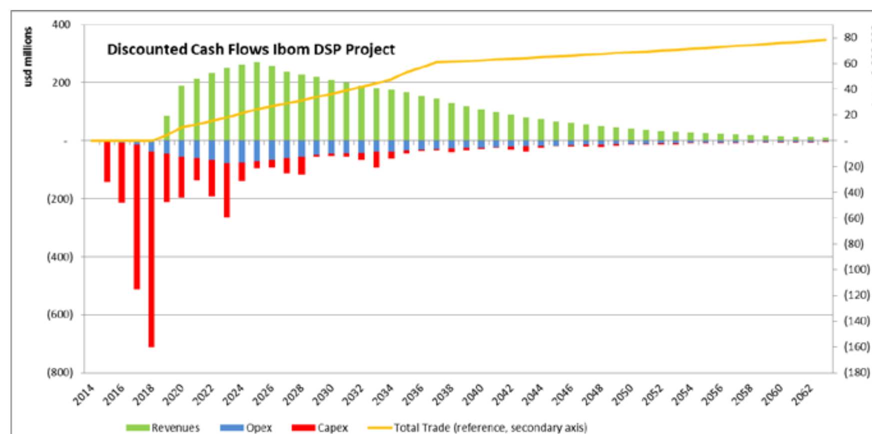
The Ibom DSP Project, covering all public and private activities, is viable, having an Internal Rate of Return of 16.9% and a Net Present Value in excess of 1.2B USD (using blended Weighted Average Cost of Capital of 13.02%.



Investments - Ibom DSP Project - USD 2013		
Phase1 Capex Operators	652,451,040	USD
Phase1 Capex NPA	18,026,250	USD
Phase 1 Capex PDMC Common Infra	1,089,876,749	USD
Total Phase 1 Capex	**1,760,354,039**	**USD**
Additional first 10y Capex Operators	1,379,178,705	USD
Additional first 10y Capex NPA	18,026,250	USD
Additional first 10y Capex PDMC Common Infra	887,273,612	USD
Additional first 10y Capex	**2,284,478,567**	**USD**

Business Case - Ibom DSP Project - Feasibility PDMC		
Project IRR	**16.89%**	**%**
Project NPV	**1,255,274,639**	**USD**
WACC	**13.02%**	**%**
Payback Period	**13.9**	**years**





Overview – Economic Cost Benefit Analysis

Outcome of the Economic Cost Benefit Analysis: Positive Economic Effect of 2.3 billion NPV and 189 billion accumulated

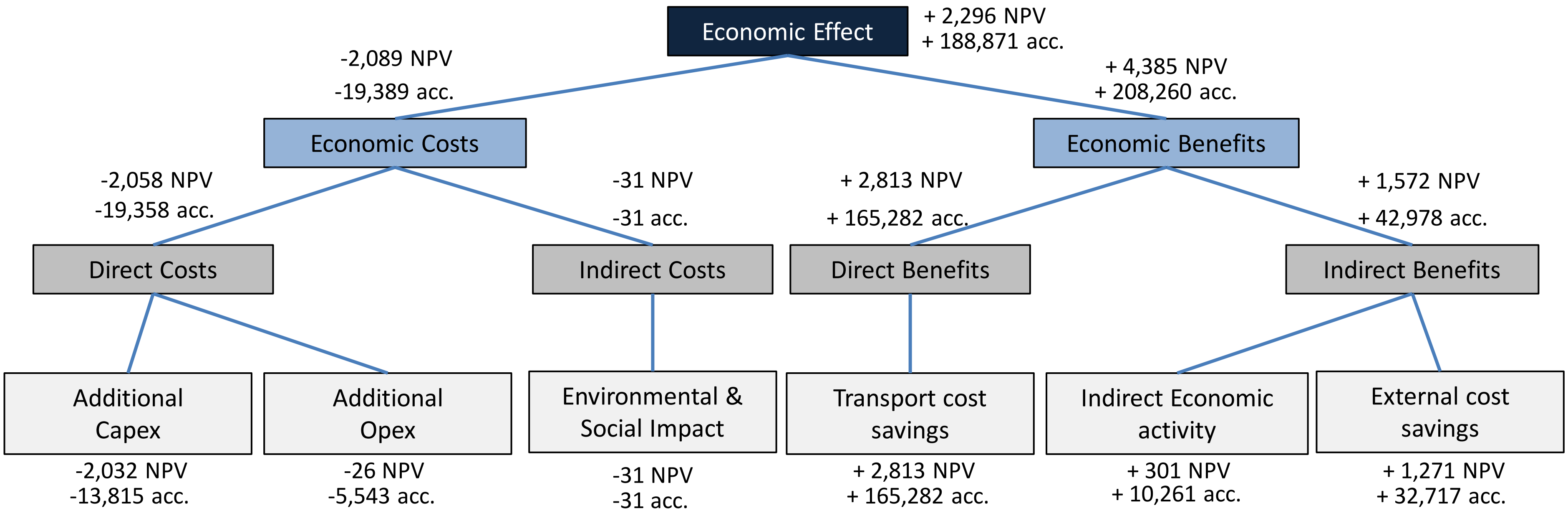


Figure 2.11 – Output of Economic Cost Benefit Analysis

The figure above presents the outcome of the Economic Cost Benefit Analysis for the Ibom Deep Sea port & Free Trade Zone Project for two cases: in present value terms (NPV) over a period of 30 years and in accumulated value terms (acc.) over the concession period of 50 years.

The economic effect of the Ibom Deep Sea port & Free Trade Zone Project is estimated at 2.296 billion USD (NPV). The incremental economic costs created by Ibom DSP (2.089 billion NPV) are compensated for by the economic benefits (4.385 billion NPV). The economic effects over the full concession period (50 years) based on an accumulation of all benefits and costs are estimated at a positive effect of 189 billion USD (acc.)

The direct costs of Ibom DSP are estimated by using input from the financial business case. The indirect costs, the local environmental and social impact, are a preliminary cost estimation based on the environmental and social impact assessment scoping. A preliminary cost of 31 million USD NPV is estimated; this estimation contains an error margin of (+/- 30%). The full environmental impact assessment will assess a more accurate estimation; this preliminary estimation is included in this analysis in order to present the relative impact of the environmental and social impact on the overall macro-economic effect of the Ibom Deep Sea Port.

The economic benefits are estimated at 4.385 billion USD NPV. The largest share of these benefits are created by direct benefits; transport cost savings are estimated at 2.813 billion USD NPV. The indirect benefits are estimated at 1.572 billion USD NPV; this effect is created by indirect economic activity (301 million USD NPV) and external cost savings (1.271 billion USD NPV).

Overview – Private Sector Position: Market Consultation

The Market Consultation amongst private stakeholders has provided vital insight in project characteristics and has allowed scoping of the project to enhance market appetite for this Greenfield infrastructure development project.

The market consultation has been held amongst various private stakeholders; both foreign and Nigerian; including terminal operators, shipping lines, cargo owners, potential FTZ tenants, banks, investments funds, dredgers, general contractors, et cetera. Their overall position towards the project is indicated here:

- There is significant interest in the development of a Deep Sea Port in Akwa Ibom State. Both domestic and international target groups acknowledge continuous growth of the Nigerian economy and the need for additional deep sea port capacity. The Ibom DSP Project is seen as the only deep sea port development initiative in Eastern Nigeria.

- Target groups agree on:
  - The cargoes to be handled in the port: Containers, Breakbulk, Vehicles, Petroleum Products, Dry Bulks and an Offshore Supplies.
  - The location of the port: Deep sea location; predictable natural conditions; sufficient area for development; stable soil.
  - The nautical Infrastructure: A design draft of at least 15 meters. Proximity to deep sea trade routes.
  - The PPP structure: the PDMC model offers best value for money and shortest time to market in the Nigerian market. NPA as Grantor.
  - The transaction procedure: Public tendering of the Concession Agreement is considered critical. Especially by banks.
  - Funding of the project: Government Funding Support needed for initial development of the project (soft loan). Government at arm's length.
  - Shareholding in the PDMC: Strict public mandate; public shareholding in the PDMC should therefore be 40%.

- Target groups agree that prudence should be taken into account regarding:
  - General risks: The "Double Greenfield" nature of the Ibom DSP project: No port AND no port business environment currently exists there.
  - Road connections: these should be included in the PDMCs scope in order to ensure the Project's land-sided accessibility.
  - Financing of the project and country risks: investors require a significant return on investment and a proper covering of their risks.
  - Competition & focus: Operators and banks stress that four Greenfield ports are too much for the economy at this stage. NPA Master Plan.
  - Time-consuming processes: project funding (1-2 years) and construction (2-4 years).

Contents

Project Outlook – Project Phasing

The structure of Ibom DSP's project phasing is based on four main development phases:

Initial Due Diligence

The IDD is conducted to carefully assess the project; to verify its initial feasibility from a financial, technical and legal perspective and to design a structured approach for the subsequent phases.

The IDD has been submitted to the Steering Committee on Ibom Deep Sea Port in January 2013.

Outline Business Case & Procurement Preparation

The OBC is developed to combine all project development information, including technical, legal, social, economic, financial, and environmental aspects, into one document prior to seeking the government's approval to proceed to the procurement phase.

The Procurement Preparation is conducted in parallel to the development of the OBC, in order to accelerate start of the Procurement Implementation once government approval for the OBC is granted. It covers initial market consultations, PPP structuring, procurement planning and procurement documentation.

The OBC & Procurement Preparation documents are submitted to the Steering Committee on Ibom Deep Sea Port in late 2013 / early 2014.

Full Business Case & Procurement Implementation

The FBC and Procurement Implementation is the final step in the preparation of Ibom DSP's implementation. This implies that the bidding process is executed and the PPP contracts are finalised and signed by the PPP partners, including the Preferred Bidder.

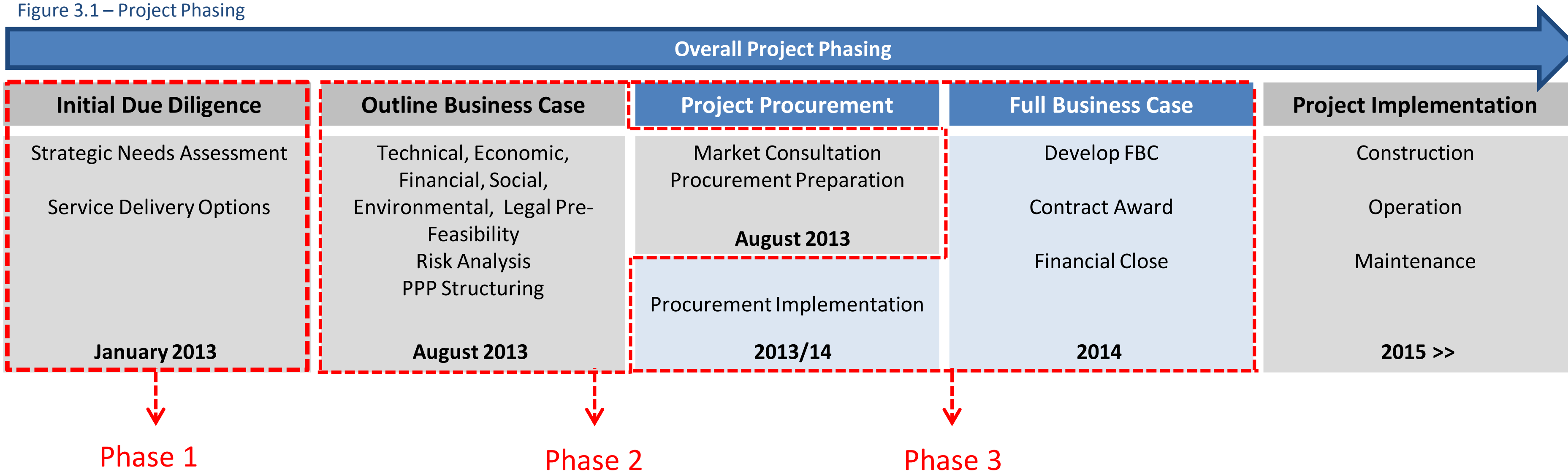
PPP and Project Implementation

The project's implementation phase consists of the construction of the port, the start of operations and the continued development and maintenance of the project until expiry (or termination) of the PPP contract.

A schematic overview of the project's phasing is presented on the next page.

Project Outlook – Phase 3

Figure 3.1 – Project Phasing



The 3rd and final phase of Project Development comprises of Project Implementation (including FBC phase) and fundamental research which enables private bidders to develop their Bids:

A. Start Procurement Implementation Phase (PPP tender):

Phase 3 of Transaction Advisory after Initial Due Diligence Phase (phase 1) and combined Outline Business Case & Procurement Preparation Phase (phase 2). Aimed at identifying and selecting the Preferred Candidate to establish the PDMC and sign the Concession Agreement.

B. Execute Detailed Survey Campaign:

For selected location. Output to be made available for Bidders through tender data room to establish detailed designs by Bidders. OBC Survey was only aimed at Location Selection and verification of Dredging/Reclamation Volumes.

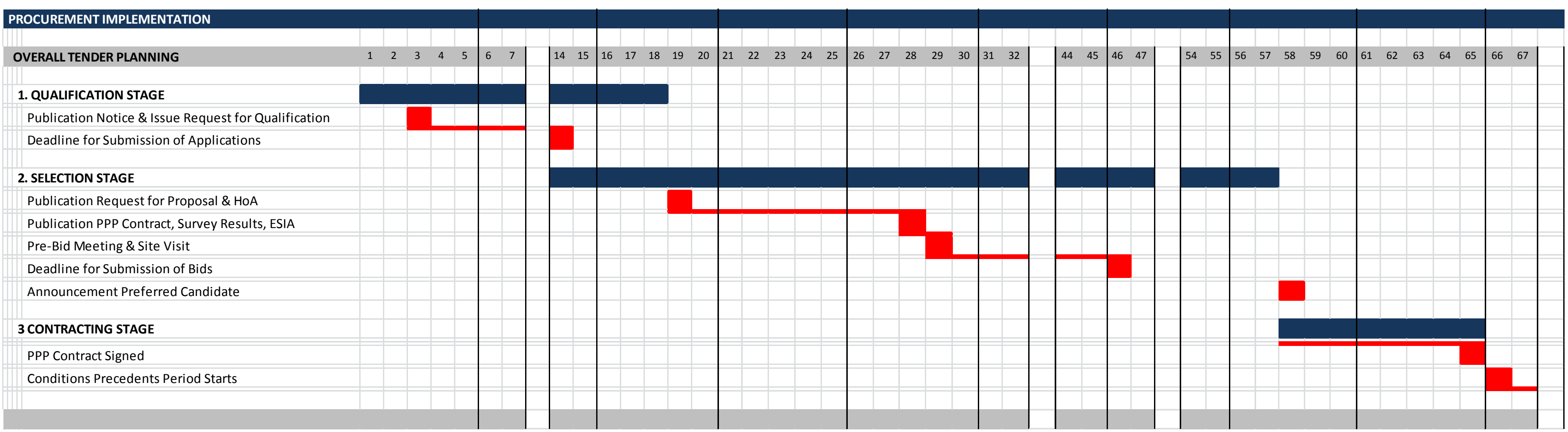
C. Execute Full Environmental and Social Impact Assessment (full ESIA):

For selected location and scope. Output and environmental clearance to be made available to Bidders through tender data room to establish environmental and corporate social responsibility (CSR) plans by Bidders.

Project Outlook – PPP Tender Process

- Objective Transaction Phase: Select & Contract Preferred Private Bidder
- Private Bidder to establish PDMC (80% equity) and sign Concession Contract with NPA
- Process compliant to ICRC guidelines
- 3-stage process: Qualification + Pre-Selection + Bid Optimisation
- Qualification Criteria: Suitability, Experience, Funding Capacity
- Selection Criteria:
    - Technical Proposal: Incentives on Scope, Timing, Public Funding Requirements, Consortium
    - Financial Bids: Incentives on Revenue Share (royalty) to Government
- Planning:
    - Tender Start: Q3 2013
    - Contract Signing: Q2 2014
    - Effective Date: Q1 2015 (after Conditions Precedent period, financial close)
- Detailed Procurement Plan & Tender Documents: “Project Procurement File” (submission to SteerCo parallel to Final OBC)

Figure 3.2 – Time planning for implementation of Ibom DSP



Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs
maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

INTRODUCTION TO THE OUTLINE BUSINESS CASE

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs maritime & transport business solutions

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Introduction to the OBC
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Contents

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Introduction by Transaction Advisors – Background & Stakeholders

This Outline Business Case for the Ibom Deep Sea Port and Free Trade Zone Project[1] is prepared by the Transaction Advisors of the Ibom Project: Felak Concept Limited from Abuja, Nigeria and Maritime and Transport Business Solutions B.V. (MTBS) from Rotterdam, The Netherlands.

The Transaction Advisors are mandated by the Project's Initiators, being the Federal Government of Nigeria through The Honourable Minister of Transport, Senator Idris Umar and the Akwa Ibom State Government through The Executive Governor of Akwa Ibom State, His Excellency Chief Godswill Akpabio.

This Outline Business Case is developed on behalf of the Ministerial Steering Committee on Ibom Deep Sea Port, which consists of delegates of:

- The Ministry of Transport
- The Akwa Ibom State
- The Nigerian Ports Authority
- The Infrastructure Concession Regulatory Commission
- The Nigerian Export Promotion Council

[1] The Ibom Deep Sea Port and Free Trade Zone project ("Ibom DSP Project") is formerly known as "Ibaka Deep Sea Port and Free Trade Zone project".

Introduction by Transaction Advisors – Parallel Execution

In order to fast-track the project, the Outline Business Case has been developed in parallel with the Procurement Preparation. This implies that Transaction Advisors have worked intensively in the past 6 months in order to guarantee a correct and timely delivery of the Outline Business Case. An overview of the entire project planning and a detailed overview of the Transaction Advisor's presence in Nigeria is presented on the following pages.

The Steering Committee has supported Transaction Advisors in developing the Outline Business Case. This Outline Business Case is presented to the Federal Executive Council of Nigeria for its official approval.

Figure 1.1 – Project Phasing

Overall Project Phasing

Initial Due Diligence	Outline Business Case	Project Procurement	Full Business Case	Project Implementation
Strategic Needs Assessment Service Delivery Options	Technical, Economic, Financial, Social, Environmental, Legal Pre-Feasibility Risk Analysis PPP Structuring	Market Consultation Procurement Preparation **August 2013**	Develop FBC Contract Award Financial Close	Construction Operation Maintenance
		Procurement Implementation		
January 2013	**August 2013**	**2013/14**	**2014**	**2015 >>**

Phase 1

Phase 2

Phase 3

Introduction by Transaction Advisors – Project Planning

During the course of developing the Outline Business Case and the Project Procurement File, strong interaction has taken place in the form of scheduled meetings with the Steering Committee (SteerCo) and the Project Development Team (PDT). Besides, interaction with Third Parties has been established through selected international conferences and during the Initial Market Consulation Campaign.

	month	Feb		Mar				Apr				May					June				July					Aug			
wk	**VISITS** week	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
6	SteerCo 1 - Lagos - Proposal Phase 2 (OBC & Procurement Preparation)																												
7	SteerCo 2 - Lagos - Finalization Phase 1 (IDD)																												
9	SteerCo 3 - Uyo - Kick-Off Phase 2		9																										
12	SteerCo 4 - Lagos - Kick-Off Market Consultation & Surveying Campaign					12																							
21	*Surveying Campaign*														*21*														
12	*Market Consultation Campaign*					*12*																							
13	Conference: Intermodal Africa - Dakar - 27-28 March						13																						
18	Conference: Canada-Nigeria Investment Conference - Toronto - 1 May											18																	
20	SteerCo 5 - Uyo - Traffic, Location, Concept Design, Structuring													20															
21	Conference: Maximizing African Port Capacity - Durban - 22-23 May														21														
25	Additional SteerCo - Abuja - Project Structuring																		25										
26	Conference: African Ports & Harbours Show - Johannesburg - 24-26 June																			26									
28	SteerCo 6 - Lagos - Feasibility Design, Draft OBC & Procurement File																					28							
30	SteerCo 7 - Lagos - OBC Delivery & Procurement File Delivery																							30					
33	SteerCo 8 - Lagos - NPA Update on PPP Structure & Funding																										33		
	SteerCo 9 - Abuja - Kick-OffProcurement Implementation Phase																												
	Conference: Tender Launch Conference - Uyo - August/September																												

Figure 1.2 – Project Planning

Contents

Scope of the Outline Business Case

This Outline Business Case (OBC) document provides the project preparation for the Ibom Deep Sea Port project. In this section, the OBC's content and structure are discussed, the project organisation is assessed and the Ibom DSP Project is introduced based on previous reports and studies. The OBC structure and methodology is based upon the PPP Manual for Nigeria as provided by Nigeria's Infrastructure Concession Regulatory Commission (ICRC, September 2012). This manual provides guidance for the development of PPP projects in Nigeria.

The PPP Manual gives the following directions for the Outline Business Case in terms of its goals and its content:

The Rationale for an Outline Business Case

The purpose of developing an Outline Business Case is to combine all project development information, including technical, legal, social, economic, financial, and environmental aspects, into one document prior to seeking the government's approval to proceed to the procurement phase. The Outline Business Case also sets out the proposed project structure, such as a PPP, the procurement process for awarding the contract, the required resources and proposed management arrangements. The Outline Business Case is the critical document of the project preparation phase.

The completion and approval of an Outline Business Case, however, often does not mean that all project preparation has been completed. The government may not require that an Outline Business Case contains all of the studies/analysis that are necessary before contract award. For example, although screening of the project's environmental and social impact will have been done for the OBC, the full Environmental and Social Impact Assessments (ESIA) may be on-going during the early stages of the procurement and the costs of any mitigation against adverse impacts only estimated for the OBC. Similarly more detailed ground investigations may be carried out in consultation with the bidders who will be preparing their outline designs during the bidding phase. Pre-feasibility studies (i.e. basic studies) are often done prior to the Outline Business Case to ensure that there are no fundamental issues that make the project unviable before the MDA's Project Development Team commit to the costs of the preparation of an Outline Business Case.

Developing an Outline Business Case

The Outline Business Case process involves bringing together the following information gathered during project preparation:

- *Strategic Needs Assessment*
- *Analysis of the Service Delivery Options*
- *Technical analysis of options and outline design*
- *Preparation of a Risk Matrix which identifies all of the project risks and allocates them to the party best able to manage them*
- *Financial modelling of the risk-adjusted project costs and revenues, including sensitivity and value for money analysis for government, in the form of a Public Sector Comparator*
- *Project viability assessment for private investors using a shadow bid model incorporating financing costs and debt service cover ratios*
- *Economic cost benefit analysis*
- *Project Implementation Plan*
- *Compilation of the Outline Business Case Report*

Scope of the Outline Business Case

The Outline Business Case document is developed in order to be used in three different manners:

As a project planning tool

The OBC report is used as a principle input for the planning of the Ibom DSP Project. The outcomes of all analyses conducted in the OBC will provide guidance for many of the planning related matters in the development and construction of the project: e.g. the outcomes from the Technical Options Analysis will depict the time needed for the project's dredging and the project planning should be adapted to those outcomes.

As a decision-making document

The OBC report is used as decision-making document for the Ibom DSP Project. Based on the outcomes of the analyses, specific choices regarding the development of the project can be made. Many of the elements assessed in the Outline Business Case document provide guidance for decision-making: e.g. conclusions from the financial modelling will determine the required minimum scope and size of the project.

As a formal deliverable for the Steering Committee on Ibom DSP Project and the Federal Executive Council of Nigeria

The OBC report is used as a formal deliverable to two entities that are involved in the development of Ibom DSP. The first entity involved is the Ministerial Steering Committee on Ibom DSP Project, being the main supervisor of the project. Once the Steering Committee has approved the OBC, it is being reviewed by Nigeria's Federal Executive Council. This entity is the official reviewer of the OBC and has to give its approval before the project is allowed to move to the next phase, the project procurement.

Contents

Structure of the Outline Business Case 1/3

The structure of this OBC is based on the guidelines that are provided in the ICRC's PPP Manual. The OBC consists of the following sections:

Section PD – Project Definition

The Project Definition provides insight in the Ibom Deep Sea Port project's characteristics and market, the project organisation and project planning.

Section A - Strategic Needs Assessment

The Strategic Needs Assessment focuses on the initial need for the project. In this section, the project is assessed on its contributions to government policy, its demand, output and scope and on the capacity of the public and private sector to develop the project.

Section B - Service Delivery Options

In the Service Delivery Options section, the possible options for providing the service as assessed in the Strategic Needs Assessment are listed. A preferred Service Delivery Option is selected in this section based on a structured comparison of the delivery options. Furthermore, recommendations on the project's structure as a traditional procurement or as a PPP are provided.

Section C - Technical Options Analysis:

The Technical Options Analysis section consists of three sub-sections in which the non-financial and non-economical parts of the Outline Business Case are assessed:

- **I - Technical (Pre-) Feasibility Study**

  The Technical (Pre-) Feasibility Study assesses the engineering-related subjects of the Technical Options Analysis. This includes field surveys, natural condition studies and preliminary designs on the technical solutions required for meeting the service delivery needs.
- **II - Social and Environmental (Pre-) Feasibility Study**

  The Social and Environmental (Pre-) Feasibility Study assesses the social and environmental impact of the project. The main analyses conducted in this section are the Environmental and Social Impact Assessments. These documents are compulsory for the development of the project in future phases.
- **III - Legal Review**

  The Legal Review must be conducted in order to ensure that all legal requirements for the project are met. This includes a study on the required permits, tax laws, regulatory matters and other legislation applicable.

Structure of the Outline Business Case 2/3

Section D - Financial Due Diligence:

The Financial Due Diligence of the project assesses the financial aspects of the project in four sections:

- **I - Financial Feasibility & II - Financial Modelling:**

  The project's Financial Feasibility is one of the main components of the OBC, as it depicts the overall feasibility of the project in terms of the costs involved and the revenue potential. Through three main components (capex, opex, revenues) the financial feasibility is depicted. The inputs from the project's financial feasibility are inserted in a financial model in order to calculate the Internal Rate of Return (IRR) and Net Present Value (NPV) of the project as the main indicators of the financial feasibility.

- **III - Risk Analysis & Financial Sensitivity**

  The Risk Analysis & Financial Sensitivity provides insight on the financial robustness of the project by analysing the impact of different variables (e.g. changes in construction period, inflation rates, operating costs, etc.).

- **IV - Value for Money and Affordability Analysis**

  The Value for Money and Affordability Analysis serves as a comparison between PPP and conventional procurement for the project. The Public Sector Comparator (PSC) depicts the financial performance of the two procurement methods and thereby a preferred procurement method is selected.

Section E - Economic Cost Benefit Analysis

Besides the financial feasibility of the project, the economic feasibility is one of the important components of the OBC. The Economic Cost Benefit Analysis demonstrates the economic benefits of the project and determines whether there is an economic case for the investment decision. This implies that the project's benefits for the Nigerian economy and are valuated in this section.

Section F - Project Implementation Plan

The Project Implementation Plan is developed once all OBC sections have been developed and their interrelations have been assessed. The purpose of the plan is to provide a detailed list of remaining studies, procurement milestones and other tasks required for the project to be completed.

Section TF – Traffic Forecast

The Traffic Forecast serves as a fundament for many of the financial and economic analyses. It comprises of a detailed investigation to the expected trade flows to and from Nigeria. Both top-down (based on GDP and trade statistics) and bottom-up (based on market consultations) analyses are developed in order to prepare traffic forecasts for the Ibom DSP Project Project.

Structure of the Outline Business Case 3/3

Besides the sections that are prescribed by the ICRC 's PPP manual, the Supporting Documents to the OBC contain documents that provide more background regarding the project :

Market Consultation Report

The Market Consultation for the Ibom DSP Project provides an overview of the initial interest in the project from a private sector's perspective. It is based on a large number of meetings with the private sector that were conducted by the Transaction Advisors.

Technical File

The Technical File comprises of all technical output which has been developed for the Technical Options Analyses, but was not specifically included in the main OBC document. This output includes the following documents:

- TF1 – Technical Program of Requirements
- TF2 – Basis of Design
- TF3 – Location alternatives and site selection
- TF4 – Bathymetric survey report
- TF5 – Verifications of design
    - TF5a – Maneuvering simulations
    - TF5b – Wave conditions and coastal morphology
- TF6 – Preliminary design calculations
- TF7 – Background of CAPEX and OPEX estimates
- TF8 – Book of Drawings
- TF9 – Recommended Additional Surveys and Studies
- TF10 – Project Coordinates

Social & Environmental Scoping Study

The SESS covers the entire output of the social & environmental research which has been executed in the OBC phase. It expands on topics dealt with in the Social and Environmental (Pre-) Feasibility Study, part of the Technical Options Analysis

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs

maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

STRATEGIC NEEDS ASSESSMENT

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Strategic Needs Assessment
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Executive Summary

Source: ICRC PPP Manual for Nigeria

A case for the strategic need for the project, in terms of output, scope, and objectives, must be made. This involves reviewing any previous Strategic Needs Assessment study done (if applicable) and determining the project's ability to meet the MDA's objectives. The project should already be a component of the government's sectoral planning, and therefore should be justified in the major sector development plans. However, there is also a need to justify "why now."

As part of this Strategic Needs Assessment, the key elements to be included are:

- The project's contribution to the implementation of government policy;
- The MDA's ability and capacity to develop the project;
- The relative demand for and corresponding size of the project in terms of its anticipated budget or capital expenditure;
- Detailing the desired outputs, including any minimum service/technical standards and performance requirements;
- The capacity of the private sector to provide the services;
- Any desired outcomes and impacts of the project (i.e. how it will provide additional benefits to the service area);
- And any other major driving factors for the rationale of developing the project.

Executive Summary

With this Strategic Needs Assessment for the Ibom Deep Sea Port, Transaction Advisors have clarified the urgent need for the development of port gateway capacity in Eastern Nigeria under a PPP structure. The main conclusions of the Strategic Needs Assessment for the Ibom DSP Project per PPP Manual for Nigeria (Infrastructure Concession Regulatory Commission, 21 September 2012) are as follows:

The project contributes to the implementation of government policy

The project aligns with the Government policy on the port sector, as has been demonstrated in a comparison of the NPA's policy, the Federal Government's policy and the Akwa Ibom State's policy. It is regarded as essential to include the Ibom Deep Sea Port development in the 25 Year National Ports Master Plan as currently developed by the NPA. By doing so, the project is officially incorporated in the strategic planning of the NPA.

The NPA's ability and capacity to develop the project

Through its privatization policy, the NPA has proven that it is capable to concession important parts of the port operations to the private sector and to operate as a land manager. However, the NPA does not have recent experience in developing a (greenfield) port at this scale.

The relative demand for and corresponding size of the project in terms of its anticipated budget or capital expenditure

Demand for the project is proven by the expected rise in port traffic in Nigeria. The anticipated capex for the entire project is $1,750 million.

The detailed desired outputs including any minimum service/technical standards and performance requirements

The desired outcome of the project is a financially and economically viable project that provides benefits to the project region and Nigeria as a whole

The private sector has proven to be capable to provide its services in similar projects in the past

The private sector has proven its capacity in executing its tasks and responsibilities. In a large number of West-African ports the private sector involvement has gradually increased in the last decade. Thereby, efficiency has significantly improved and costs for the public sector have decreased.

Any desired outcomes and impacts of the project (i.e. how it will provide additional benefits to the service area);

The project will provide additional benefits to the nearby project region through job creation and provision of amenities (roads, electricity, water and sewerage). The larger project region (East-Nigeria) will benefit from lower transport costs compared to transporting from Lagos.

Any other major driving factors for the rationale of developing the project.

Other driving factors are the development of port capacity, job creation, economic balancing within the country and hub development in Nigeria.

Content

Content

Introduction

This section comprises the Strategic Needs Assessment for the Ibom Deep Sea Port and Free Trade Zone project. In this section, Nigeria's strategic need for the port sector is assessed based on the following direction as provided in the PPP Manual for Nigeria.

Source: ICRC PPP Manual for Nigeria

A case for the strategic need for the project, in terms of output, scope, and objectives, must be made. This involves reviewing any previous Strategic Needs Assessment study done (if applicable) and determining the project's ability to meet the MDA's objectives. The project should already be a component of the government's sectoral planning, and therefore should be justified in the major sector development plans. However, there is also a need to justify "why now."

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- The capacity of the private sector to provide the services;
- Any desired outcomes and impacts of the project (i.e. how it will provide additional benefits to the service area);
- And any other major driving factors for the rationale of developing the project.

Content

Project's Contributions to the Implementation of Government Policy

This section describes the contributions of the Ibom DSP Project in line with the Nigerian Government Policy on port development projects: the project's contributions to the implementation of Government Policy as per ICRC PPP Manual. These contributions are classified in contributions to federal government policy and contributions to state government policy. Multiple sources have been used in order to obtain these specific policies; these sources are listed in the introductory sections of this chapter.

It is regarded as vitally important to include Ibom DSP's development in policy documents. Once policy documents mention a project as a strategic need, the project's development and execution is more founded and consequently has a much higher likelihood of being executed successfully.

The following policy documents are discussed in this chapter:

Federal Government Policy

- Nigerian Ports Authority Act
- National Transport Commission Bill
- Nigerian Transportation Master Plan
- Nigerian Transport Policy
- National Integrated Infrastructure Master Plan
- Inception Report for the 25-year National Port Master Plan

State Government Policy

- Road & Transportation Master Plan
- Uncommon Transformation Agenda and Ibom Industrial City Master Plan

Nigerian Ports Authority Act - Functions

The Nigerian Ports Authority's functions and powers are described in Part II 7 – *Functions and Powers,* Part II 8 – *Powers of the Authority* and Part II 9 – *Power to act through officer or agent, etc.* of the Nigerian Ports Authority Act in Chapter N126 of the Laws of the Federation. In this section, the most relevant functions of the Authority mentioned in the Act are listed in order to compare the NPA's policy goals with the envisaged goals of Ibom DSP.

The functions and powers of the Nigerian Ports Authority as stated in the Ports Authority Act are:

The functions of the Authority shall be to:

- provide and operate, in the ports, such facilities as appear to it best calculated to serve the interest of Nigeria;
- maintain, improve and regulate the use of ports;
- ensure the efficient management of port operations, optimal allocation and use of resources, diversification of sources of revenue and guaranteeing adequate returns on its investments, in order to contribute effectively to the well-being of the Nigerian society;
- provide, for the approaches to all ports and the territorial waters of Nigeria, such pilotage services and lights, marks and other navigational services and aids, including cleaning, deepening and improving of all waterways;
- provide facilities for:
  - berthing, towing, mooring, moving or dry-docking of ships, in entering or leaving a port or its approaches;
  - the loading and unloading of goods or embarking or disembarking of passengers in or from a ship;
  - the lighterage or the sorting, weighing, warehousing and handling of good; and,
  - for the carriage of passengers or goods.
- manage, supervise and control or take part in the management, supervision or control of any company or undertaking in which the Authority is interested, by reason of shareholding or otherwise and for that purpose appoint and remunerate directors, accountants, other experts and agents;
- provide and use appliances for the towage or protection, 'or salvage of life and property or for the prevention of fire within Nigeria and on vessels on the high seas;
- supply water to shipping vessels;
- control pollution arising from oil or any other substance from ships using the port limits or their approaches;
- provide and operate such other services as the Minister may, from time to time, require; and
- carry out such other activities which are connected with or incidental to its other functions under this Act.

Nigerian Ports Authority Act – Powers (1)

The Authority shall have power to:

- Construct, execute, carry out, equip, improve, work and develop ports, docks, harbours, piers, wharves, canals water courses, embankments and jetties
- Invest and deal with the monies of the Authority not immediately required on such securities or in such investments and manner as may, from time to time be expedient
- erect, construct, lay down, enlarge, maintain and alter any building, erection and work which may seem directly or indirectly necessary or convenient for any of its purposes;
- act as consultants and advisers in relation to ports and port operations in Nigeria or in any part of the world;
- carry on rile business of carrier by land or sea, stevedore, wharfinger, warehouseman or lighterman or any other business desirable for the functions of the Authority;
- acquire any undertaking of any registered business that affords facilities for the loading, unloading or warehousing of any goods in any port in Nigeria;
- appoint, license and manage pilots of vessels;
- insure all goods and consignments that are in the custody of the Authority;
- control the erection and use of wharves in any port or its approaches;
- buy any property, and sell, let, lease or otherwise dispose of any property, which appear to the Authority to be unnecessary for its purposes;
- enter into agreement with any person for the supply, construction, manufacture, maintenance or repair by that person of any property, movable or immovable, necessary for the purposes of the Authority;
- Enter into agreement with any person for the operation or for the provision of any of the port facilities which may be operated or provided by the Authority
- provide, appoint license and regulate weighers and meters for measuring goods in any port in Nigeria;
- reclaim, excavate, enclose, raise or develop any of the lands acquired by or vested in the Authority;
- win sand from the ports and their approaches for such purposes as it may deem fit;
- do anything for the purpose of advancing:
  - the skills of persons employed by the Authority; or
  - the efficiency of the equipment of the Authority or of the manner in which that equipment is operated,

Nigerian Ports Authority Act – Powers (2)

The Authority shall have power to:

- including the provision by others of the facilities for training, education and research;
- provide residential accommodation, houses, hostels and oilier like accommodation for its deserving employees on terms and conditions to be determined, from time to time, by the Authority, in order to promote the welfare of its employees;
- purchase, take on lease or in exchange or otherwise acquire, hold, manage, work, develop the resources of and turn to account any estate, land, building, tenement, and other real property of any description, including leasehold or other tenure and wheresoever situate and any interest therein and any right connected therewith, and in particular, to acquire or take over estates situated, in Nigeria;
- grant loans to its deserving and needy employees for the purposes specifically approved by the Authority on such terms and conditions to be determined by the Authority at its discretion and in such a manner as is likely to increase the effectiveness of such employees in their service to the Authority, or otherwise for the purpose of the functions of the Authority;
- provide loans to any of its employees for the purpose of-
  - building a house;
  - purchasing a plot of land on which to build a h use; and
  - purchasing a house for the employee's use or for the residential use of the employee's family,
- on such terms and conditions to be determined by the Authority, at its discretion;
- fabricate and repair vessels, engines, boilers and all items being used in vessels;
- carry on the business of ship builders, engineers and manufacturers of machinery;
- purchase or otherwise acquire, take on lease, construct, maintain, work and use wet and dry docks, ships, quays,' wharves, piers, warehouses, buildings, yards and every kind of property, structure, appliance and anything necessary for equipping, salvaging and assisting ships;
- Form, establish or incorporate subsidiaries or affiliate companies, whether wholly or jointly, with other persons or organisations for the purpose of carrying out any of the functions of the Authority; and,
- do such other things as are necessary for the successful performance of its functions under this Act.

Nigerian Ports Authority Act – Powers to Act through Officer

Power to act through officer or agent, etc.:

- The Authority may perform or exercise any of its functions or powers under this Act, other than the power to make regulations, through an officer or agent of the Authority or through any other person authorised by the Authority in that behalf.

From these functions and powers it can be derived that the basic functions of the NPA are to provide port capacity in Nigeria as to support its economy in an efficient manner. Thereby, the NPA has the ability to cooperate with the private sector in order to improve its performance on these basic functions.

National Transport Commission Bill – Purpose

The National Transport Commission Bill comprises the purpose and task of Nigeria's National Transport Commission. This commission is established "to provide an independent regulator for the transport sector and for matters related thereto" (National Transport Commission Bill, 2008).

In this section, the most relevant functions of the Commission that are mentioned in the Bill are listed in order to analyze the impact of the Bill on the Ibaka project.

Purpose, Application and Scope of the Act:

Purpose of the Act

1. The purpose of this Act is to:
   - establish the National Transport Commission, set out the objectives, functions and powers of the Commission; and
   - provide for an economic regulatory framework for the provision of services and supply of goods in the transport sector or regulated industry;
   - provide a mechanism for monitoring and providing advice to Government on matters relating to the transport sector;
   - provide for efficient operation and regulation of the transport sector through consolidation, streamlining and removing the multiplicity, duplicity of regulatory functions by Government and its Agencies

2. The purpose of this Act shall be achieved through:
   - the establishment of a National Transport Commission which shall be responsible for executing the provisions of this Act, the Nigerian Shippers' Council Act and its subsidiary regulations and all other relevant Federal legislation
   - the transformation of Nigerian Shippers' Council into a National Transport Commission
   - the transfer of the ownership of land and assets currently vested in Nigerian Shippers' Council to the National Transport Commission.

National Transport Commission Bill – Application & Scope

Application and Scope

1. This Act shall apply to the provision of or use of all regulated services and related transport services and facilities including ports, inland waterways, all forms of land transport including rail and road transports in Nigeria and within Nigerian waters.

2. Regulation Declaring a Regulated Industry

3. Except as otherwise provided in this section, the Minister may by Regulation declare an industry within the purview of this Act to be a regulated industry after having regard to:

- the existence of a significant and non-transitory market power;
- the existence of regulatory benefits to the Nigerian public'
- the non-existence of economic regulation specific to that industry by another body under any other existing legislation; and,
- any other relevant considerations.

4. The Regulation may declare:

- which goods and services are to be prescribed goods and services in respect of a regulated industry; and
- which prices are to be prescribed prices in respect of a regulated industry.

National Transport Commission Bill – Establishment

Establishment and Functions of the National Transport Commission:

Establishment of the commission

1. There is hereby established an independent transport sector regulator to be known as the National Transport Commission.

2. The Commission shall be a body corporate with perpetual succession and a common seal, capable of suing and being sued in its corporate name, and shall have the power to do all and any of the following:

- enter into contracts and incur obligations;
- acquire, hold, mortgage, purchase, sell, lease and deal howsoever with property, whether movable or immovable, real or personal for the purpose of this Act;
- do and suffer all acts and things which a body corporate may by law do and suffer and which are necessary or convenient for the purposes of this Act;
- exercise all of the powers given to it under this Act, do and suffer all acts and things which are necessary or convenient for carrying out of its functions and duties under this Act.

3. The common seal of the Commission must be kept in such custody as the Commission directs and must not be used except as authorized by the Commission.

4. The Commission shall be structured into various industry specific units as the Board may from time to time deem appropriate for the effective discharge of its functions and operations.

5. On the date of the commencement of this Act, the Nigerian Shippers' Council established by the Nigerian Shippers' Council Act, Cap. N133 LFN 2004 shall be abrogated and the National Transport Commission established under this Act become successor to the Nigerian Shippers' Council.

6. Upon the date mentioned in subsection (5) of this section, all assets, liabilities, rights and obligations of the Nigerian Shippers' Council shall vest in the National Transport Commission.

7. Any enactment, instrument or other document passed or made before the commencement of subsection (5) of this section which refers to the Nigerian Shippers' Council shall have effect, so far as necessary for the purpose of or in consequence of anything being transferred as if any reference to the Nigerian Shippers' Council were a reference to the National Transport Commission established under this Act.

National Transport Commission Bill – Functions

Establishment and Functions of the National Transport Commission:

The Commission shall

1. Create an economic regulatory framework in respect of the provision of transport services and facilities which promotes and safeguards competition, fair and efficient market conduct or, in the absence of a competitive market, which prevents the misuse of monopoly or market power;

- facilitate effective competition and promote competitive market conduct;
- facilitate the financial viability of regulated industries and related services;
- ensure that the misuse of monopoly or non-transitory market power is prevented;
- facilitate the incentive for efficient long-term investment in Nigeria for the provision of transport services and facilities;
- protect the interest of users of transport services y ensuring that prices are fair and reasonable while having regard to the level of competition in, and efficiency of, the transport industry;
- establish, regulate and monitor operational standards of infrastructure, equipment, facilities, and services at the Inland Container Depots (ICDs) and freight stations;
- approve and fix maximum fees for grant of licenses and permits for the provision of transport services.
- approve and review tariffs set by public and private transport service providers and operators;
- monitor the relationship between public transport service providers and their affiliates, and the relationship between concessionaires and their affiliates to ensure that no party derives unfair advantages over other transport service providers;
- develop and monitor performance standards and indices relating to the quality of transport services and facilities provided to users and consumers in Nigeria having regard to the best international performance indicators;
- examine and resolve complaints, objections and disputes between concessionaires, licensed operators, users and consumers or ally other person involved in the transport industry, using such dispute resolution methods as the Commission may determine from time to time including mediation and arbitration;
- implement Government's general regulatory policies on transport and execute all such other functions and responsibilities as are given on the Commission under this Act;
- make such regulations as may be necessary under this Act to give full force and effect to the provisions of the Act and the enforcement of such regulations and the provisions of this Act generally.

2. Subject to this Act, the Commission has the power to do all things necessary or convenient to be done for or in connection with the performance of its functions and to enable it to achieve its objectives under this Act and under relevant legislation.

3. Without derogating from subsection (2) of this Section, the Commission shall have such powers as may be, conferred on the Commission by the relevant legislation and regulations under which a regulated industry operates.

4. The Commission shall at all times perform its functions and exercise its powers in such a manner as the Commission considers best achieves the objectives of this Act and any objectives specified in any relevant legislation under which a regulated industry operates.

National Transport Commission Bill – Tariff Regulation (1)

Tariff Regulation

Regulation of Tariff

1. The Commission shall regulate tariffs for or in respect of prescribed goods and services supplied by or within a regulated industry.

2. In this section –

- "prescribed goods and services" means any goods or services, or access to transport services and facilities, made, produced, supplied or provided by or within a regulated industry which goods or services are specified in the empowering instrument as being goods or services in respect of which the Commission has power to regulate tariff;
- "prescribed tariff" means the tariff or tariff – range or particular factors used in tariff-fixing however designated for the provision, supply, or sale of any prescribed goods and services within a regulated industry;
- "tariff" includes fees, price, dues, charges and rates;

3. In making a tariff determination, the Commission shall adopt an approach and methodology which the commission considers will best meet the objectives specified in this Act and any relevant legislation and the Commission may regulate the tariff for prescribed goods and services in any manner the Commission considers appropriate.

4. Without limiting the generality of subsection (3) of this section, the procedure for tariff determination may include –

- fixing a maximum tariff or maximum rate of increase or minimum rate of decrease in the maximum tariff;
- specifying pricing policies or principles;
- specifying an amount determined by reference to a general tariff index, the cost of production, a rate of return on assets employed or any other specified factor;
- specifying an amount determined by reference to quantity, location, period, or other specified factor relevant to the rate or supply of the goods or services;
- monitoring the tariff levels of specified goods and services.

National Transport Commission Bill – Tariff Regulation (2)

Tariff Regulation

Approval of Tariffs or Charges by Commission.

1. Transport service providers including the operator mentioned in Section 34 of this Act shall not impose any tariff or charges for the provision of any service unless such tariff rates and charges are within the range approved by the Commission under Section 27(4)(a) or as otherwise provided in this Part.

2. All transport service providers shall provide services only at the tariff rates and charges so approved by the Commission and shall not depart there from without prior written approval by the Commission of such proposed changes in tariff rates and charges.

3. All transport service providers shall publish the tariff rates charged to users and consumers for their respective services and the modifications thereto as may be approved from time to time by the Commission.

4. The tariff rates fixed by transport service providers shall be on the basis of such principles as the Commission may from time to time stipulate in its guidelines or regulations and shall have regard to:

- the particular and peculiar circumstances of the regulated industry and the prescribed goods and services for which the determination is being made;
- the costs of making, producing or supplying the goods or services;
- the cost of complying with relevant health, safety, environmental and social legislation applying to the regulated industry;
- the return on assets in the regulated industry;
- any relevant interstate and international benchmarks for tariffs, costs and return on assets in comparable industries;
- the financial implications of the determinants for the regulated industry and regulated entities; and
- any other factors that the Commission considers relevant and which will best meet the objectives specified in this Act and any relevant legislation.

5. In exercising its powers under this Part the Commission must ensure that –

- wherever possible the costs of regulation do not exceed the benefits;
- the decision takes into account and clearly articulates any trade-off between costs and service standards;
- tariffs are fair, reasonable and non-discriminatory; and
- tariffs are cost-oriented and, in general, cross-subsidies not permitted.

National Transport Commission Bill – Tariff Regulation (3)

Tariff Regulation

Commission may Prescribe Tariff.

1. Notwithstanding the provisions of section 28 of this Act, the Commission may intervene in such manner as it deems appropriate in determining and setting the tariff rates for any non-competitive services provided by a provider mentioned in section 33 (1) of this Act in order to meet the objectives of this Act or for reasons of national or public interest.

Power to Issue Regulation on Tariff.

1. The Commission may from time to time make rules or regulations on determination and publication of tariff rates for the prescribed services specified in Section 27 of this Act.
2. The regulations and rules made by the Commission under subsection (1) of this Section may include -
   - rules about the tariff and variation of tariff for specified or classes of services
   - rules about the publication or disclosure of tariff for specified or classes of services; or
   - range of tariff applicable to specified or classes of services.

Penalty for Unauthorized Tariff

2. Notwithstanding any other provision of this Act, the Commission shall prescribe and enforce appropriate penalties on any transport service provider who exceeds the tariff duly approved by the Commission for the provision of any of its services.

National Transport Commission Bill – Ibom DSP Implications

From the sections quoted from the National Transport Commission Bill, the most relevant sections for the Ibom DSP Project relate to the power of the Commission on the regulation of tariffs in the port. Regulations on the tariff setting of transport service providers are strict and should thus be taken into account when developing the Ibom DSP Project.

No specifications on the actual tariffs for the port services are provided in the National Transport Commission Bill. However, the Nigerian Port's Authority's Tariff Book provides extensive information on the tariffs that are currently applicable in the ports. These tariffs are to be used in calculating the financial viability of the project in section D of the Outline Business Case.

Nigerian Transport Master Plan - Introduction

The Ibom Deep Sea Port project aligns to Government Policy on transportation in Nigeria. The Nigerian Transportation Master Plan of 2006 describes the following considerations for port sector development regarding congestion in Lagos' Ports: "These ports are almost operating at their upper limits (...) as a result stacking areas are blocked. This has a negative influence on the throughput of the container terminal in particular, but also indirectly on the remaining port areas which are then occupied by containers. It is urgent that this situation will be alleviated." Alleviation is possible through increasing efficiency, expanding current ports or the development of new ports, with the latter being the focus of the Ibom DSP Project.

The requirements that are mentioned in the Transportation Master Plan for new port projects are stated point by point below, including arguments on how and why Ibom DSP satisfies these requirements:

- Ports should have short access from the seaside;
- Ports should have space for seaside berth extensions;
- Ports should have space for landside extension and re-organisation of storage facilities;
- Railway access to ports should be provided;
- Ports should be located in or near an industrial and agglomeration centre – to profit from interactions and make the port more attractive (customer and work force vicinity).

The next pages will elaborate on the relation of Ibom Deep Sea Port with the above mentioned points.

Ports should have short access from the seaside

The envisaged location for the Ibom Deep Sea Port is located closely to the seaside. The five locations that have been selected as potential project locations are situated at a distance between 10 and 35 kilometres from deep water. This implies that an entrance channel to the Ibom port will have a limited length, reducing navigational issues and costs of maintenance dredging.

When compared to other ports in the region, Ibom Deep Sea Port has the preferred location. The Calabar channel has a length of 84 kilometres, making it difficult and time consuming to reach the port from open seas. The two other multi-purpose ports in the region, Port-Harcourt and Onne face similar drawbacks as Calabar has, with respective channel lengths of around 80 and 50 kilometres. The port at Bonny is the only exemption, having direct access from the seaside. However, the port at Bonny is a dedicated port for Bonny's LNG plant, implying that its scope differs from the scope of the planned Ibom Deep Sea Port and the other ports in the region that can all be classified as multi-purpose ports.

Besides these navigational issues, the costs of maintenance dredging for a port located far from the seaside are high. The table below shows a comparison of the main marine access characteristics of the ports in the region:

Figure 2.1 – Nautical access of Ibom DSP compared to regional peers

Table 2.1 – Nautical access of Ibom DSP compared to regional peers

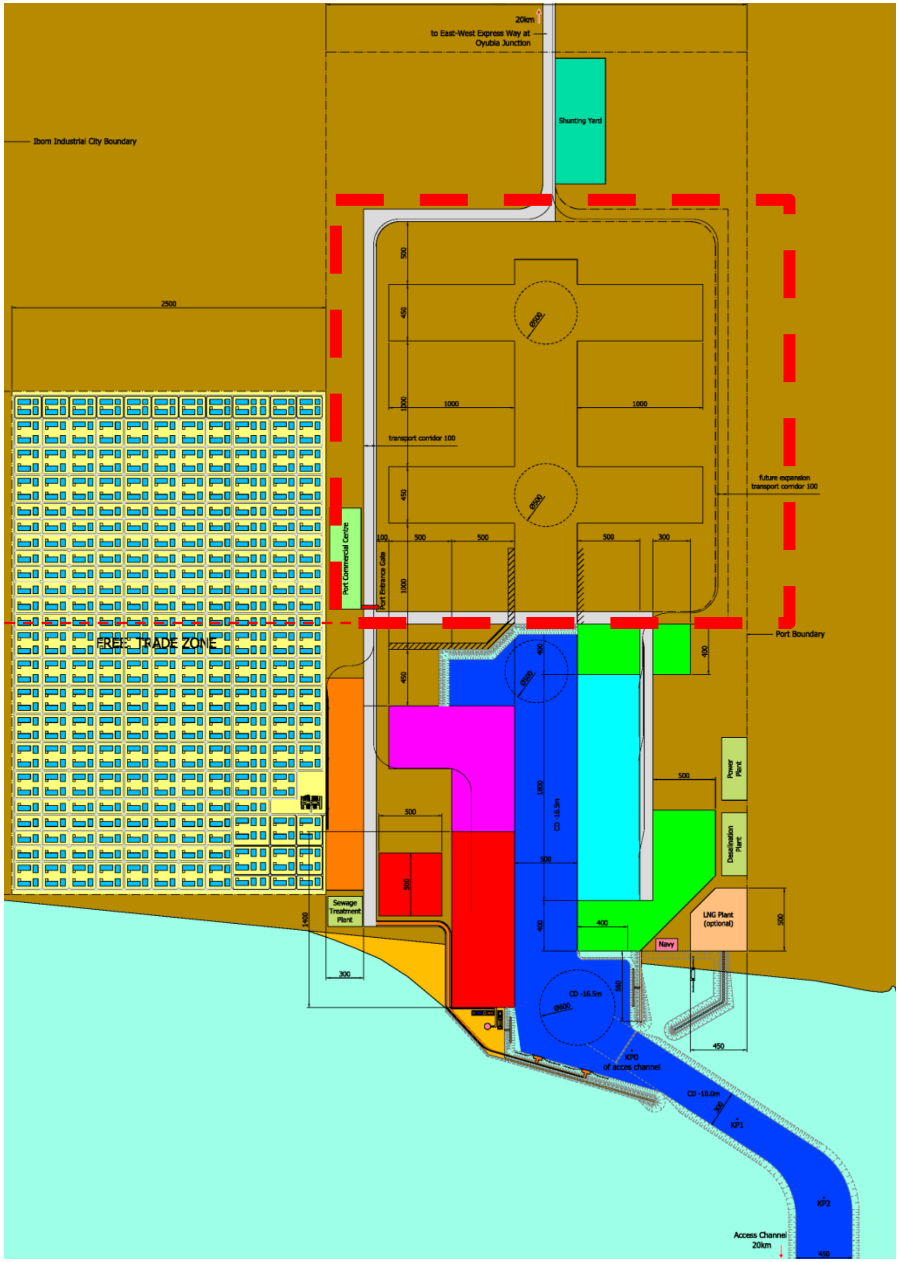
	Channel Length (km)	Allowable Vessel Length (m)	Access Channel Draught Chart Datum (m)	Design Depth at Quay Chart Datum (m)	Present Possible Draught (m)
Existing Ports					
Port Harcourt	79	185	7.6	7.8 to 10.0	7.6
Onne Federal Ocean	47	>185	10.0	13.5	10.0
Onne Federal Lighter	49	150	10.0	5.9	5.9
Calabar	84	150	7.0	8.0	7.0
					Port Project
Ibom Deep Sea Port	20	350	18.5	16.5	-

Nigerian Transport Master Plan – Berth Extension Space

Ports should have space for seaside berth extensions

As was mentioned in the Project Definition section of this OBC, Ibom Deep Sea Port is located within the proposed Ibom Industrial City (IIC), there is abundant space for seaside berth extensions. In the IIC plans, the project area has a surface of 14,400 hectares with a shoreline of around 30 kilometres, enabling for seaside berth extensions in the future. This topic has been discussed in the Project Definition of the Outline Business Case and can be further explained by the figure on the right. In this figure, the location for the Ibom Deep Sea Port is shown in what might be the long-term outlook for the port. It thereby illustrates the strategic value of future berth extensions. The Ibom Deep Sea Port does not limit itself on its size in an early phase. Besides, entrance dimension are designed to allow the future fleet to enter the port as well.

Port Expansion Area post 2035

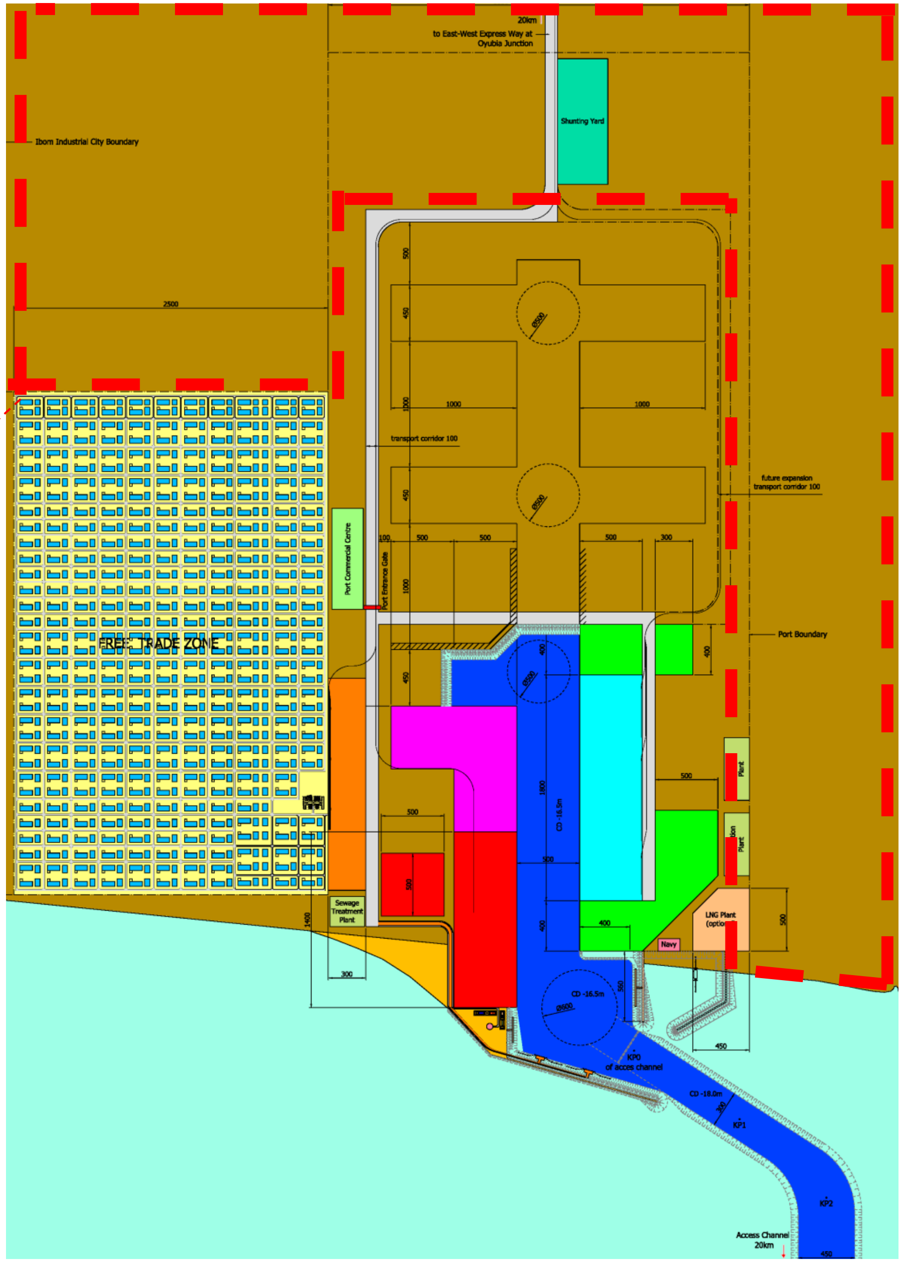


Nigerian Transport Master Plan – Landside Expansion Space

Ports should have space for landside extension and re-organisation of storage facilities

For the same reasons as mentioned for the seaside berth extensions, Ibom DSP also envisages a future growth for its storage facilities and Free Trade Zone. These future extensions can be placed alongside the IIC's borders as visualized in the grey areas on the figure above. The extensions have already been incorporated in the long term plans for Ibom DSP through the provision of land to the NPA by the Akwa Ibom State government. The planned project area consists for a large part of undeveloped land, which is owned by the state government. Thereby the availability of land for future landside extensions is ensured.

Expansion Area post 2035



Nigerian Transport Master Plan – Railway Access

Railway access to ports should be provided

Railway access to the port is currently not regarded as a feasible option in the first phase of the project's development. The Nigerian railway network requires large investments before it can be considered as a valuable addition for the Ibom Deep Sea Port . In the Transportation Master Plan, a railway network strategy is presented that aims to connect large parts of the country. The South-Eastern states should also benefit from this by a railway line that starts at Calabar and via Uyo and Aba connects to the national network as is displayed on the figure on the right

This strategy is promising for Akwa Ibom and could reduce barriers to serving large parts of the country from Ibom Deep Sea Port . However, it should be noted that the development of a railway network will take a long time and requires large investments. As such, it is assumed that the railway connection for Ibom Deep Sea Port will not be available before the first extension of the port. All cargoes from the first phase of the port's development will have to be handled by truck. In later phases of the port development, the railway line is considered as a valuable strategic need for the port. As can be obtained from the figure above, a connection to the planned railway Uyo – Enugu would provide Ibom DSP with the possibility to reach important (regional) centres by rail, e.g. Enugu, Makurdi, Abuja, Jos, Bauchi, Maiduguri, Kaduna, and Kano.

In the design of the port, future railway connection is taken into account by allocating sufficient space for the railway corridor; both in the port area and on the terminals.

The needs for a railway connection strongly correlates to the project's ability to efficiently deal with dry bulk cargoes. Once rail service is available it is expected that this trade shall show strong growth.

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Figure 2.2 – Railway system of Nigeria (existing & planned)

Ports should be located in or near an industrial and agglomeration centre – to profit from interactions and make the port more attractive (customer and work force vicinity)

Ibom DSP's proposed location is situated in the future Ibom Industrial City, implying that it will be located in an industrial centre. And with the towns of Uyo and Oron in its proximity, the agglomeration centres are close by as well. However, at the moment, the IIC is non-existent and still needs to be developed. The actual existence of the IIC will be of major importance for the successful operations at the Ibom Deep Sea Port as it will provide Ibom DSP with the availability of necessary utilities, a potential labour-force and it will attract additional cargo to the port and/or supply additional export cargo to the port.

The same reasoning as is used for the IIC can be used for the development of the Free Trade Zone in the Ibom Deep Sea Port : this has a large potential to improve the port's performance and vice versa, but the FTZ currently exists in plans. Therefore it is important to mention that Ibom Deep Sea Port should also be able to operate in a financially robust manner without an operational IIC or FTZ.

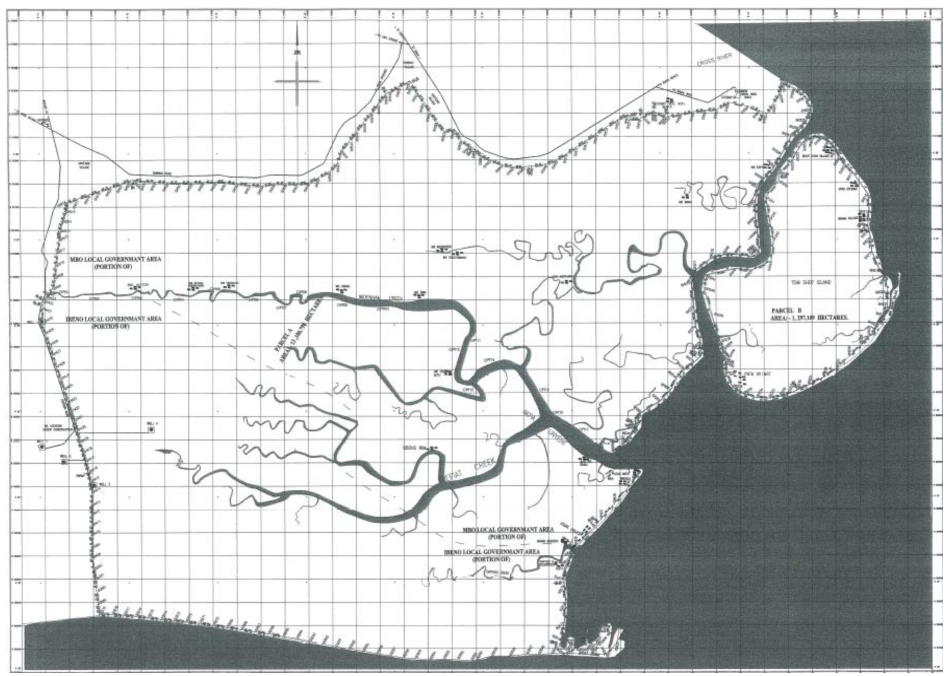


Figure 2.3 – Area of the envisaged Ibom Industrial City development in Akwa Ibom State

Nigerian Transport Master Plan – Ibom Deep Sea Port Implications

When comparing the requirements from the Transportation Master Plan for new ports with Ibom Deep Sea Port's specifications, some of the requirements are fulfilled by the project. Ibom Deep Sea Port is located directly at the seaside, offers a large landside area with abundant space for berth extensions and landside storage facilities.

However, a railway connection and the Ibom Industrial City are currently not (yet) present in the area. Although plans exist to develop these assets, Ibom Deep Sea Port should have the ability to function on its own as a port with an accompanied Free Trade Zone and should not necessarily rely on the development of these other projects. The road connecting the port to the Federal highway system is included in the scope of the project. It is anticipated that the forecasted traffic of Ibom Deep Sea Port in the first years of port operations can be transported to and from the hinterland by road. This will be further elaborated in this part of the OBC.

Nigerian Transport Policy

Next to the Transportation Master Plan of 2006, the Nigerian Transport Policy 2010 is used here as a policy document regarding the country's ports. The additional contribution of the Transport Policy Document is associated with its focus on policy, rather than on the operational and locational aspects that were covered in the Transportation Master Plan.

The main policy objectives mentioned in the Transport Policy document are:

"The policy implications of the aforementioned goals and outlook are that there is an urgent need:

- To achieve the highest possible level of efficiency at the major seaports of Nigeria, in the shortest time possible.
- To monitor carefully, international maritime developments in order to make the necessary adjustments to maintain and improve the competitiveness of Nigerian Ports, in the quest to a hub in the West and Central Africa Sub-region

To achieve these, government will pursue the following specific objectives:

- Enhance competition and raise performance standard of the Ports;
- Ensure greater investment in up to date cargo handling equipment and information technology;
- Simplify tariffs and operational processes to enhance transparency;
- Free Port system from political, bureaucratic interference and make them responsive to customers' needs;
- Reduce financial burden on government through increased private sector participation; and
- Reform the institutional and structural set up in the Ports to support desired efficiency level."

Beside the policy's focus on the regulatory and legislative framework, the most valuable addition of the Transport Policy Document regarding the port sector is the required private sector participation that is stated as follows: "The goal of Government is to continue the Port Reform process and provide the enabling environment for effectiveness Public Private Partnership in Port development and activities".

The Policy Document does not provide practical or measurable requirements for the seaports and thereby is more abstract than specific. The government's policy on the continued process of PPPs can be regarded as an important point for Ibom DSP, since PPP is considered as the optimal structure for the project.

National Integrated Infrastructure Master Plan

The National Integrated Infrastructure Master Plan (2013-2042) assesses the current challenges in Nigeria's port sector. In order to overcome these challenges, the report states that the following policy developments are required:

- A planning of port infrastructure and its regulation based on a context of integration and intermodalism: Ibom's development is part of an integrated approach. The development of IDSP enables the handling of transhipment cargoes for regional ports (Calabar, Onne, Port Harcourt).
- A holistic and comprehensive approach that takes into consideration the interrelation of seaports with other sectors of the economy (i.e. inland waterways, road and rail transport): Ibom's development is part of a holistic approach towards the regional and nation-wide economy, developed in parallel with the Ibom Industrial City and the project's Free Trade Zone.

The most relevant and most specific policy objective from the National Integrated Infrastructure Master Plan (NIIMP) for the development of Ibom Deep Sea Port is presented on page 69 of the NIIMP report:

- Developing three deep sea ports in Lekki, Olokola and Ibaka (the former designation of the "Ibom Deep Sea Port & Free Trade Zone")

Besides the government's policy perspective the NIIMP represents the private sector's view on infrastructure developments through its representation as a Business Support Group . In the development of the NIIMP, the Business Support Group has highlighted the key enablers required for the maritime sector as follows:

- Policy stability
- Elimination of the multiplicity of government agencies at ports
- Improvement In power supply and security for effective port operations
- Improved regulation
- Improvement in infrastructure to accommodate current and emerging traffic in seaports
- Encouraging the development of infrastructure to cater for increased port activities
- Government support in terms of guarantees to enhance the viability of projects in the sector

These enablers are deemed to be essential in the development of a stable and well-performing port sector.

Inception Report National Port Master Plan

The NPA currently prepares the 25-Year National Port Master Plan for Nigeria. This plan's Inception Report has been reviewed for this Outline Business Case report, as it contains the scope of the master plan. The main objective of the National Port Master Plan is to provide 'a 25 year blueprint for the development of the ports infrastructure and services to accommodate existing and further increases in traffic'.

The points assessed in the Inception Report for the Master Plan relate to developments in the currently existing ports in Nigeria. The report however does not (yet) comprises the significant capacity increases that are expected through the development of greenfield ports in the country. It is stated in the Inception Report, that the National Ports Master Plan comprises of an assessment of developments that will be needed to meet future traffic demands. However, the currently scheduled greenfield port development projects, among others Ibom Deep Sea Port, are not mentioned in the inception report yet. This is regarded as a shortcoming of the master plan, as the greenfield projects - if developed - will have a significant influence on the Nigerian port sector. Furthermore, the viability of Ibom Deep Sea Port's development is largely dependent on its inclusion in policy documents, with the National Port Master Plan being the most relevant one. It is expected that future port developments rely to a large extent on the strategies as developed in the National Port Master Plan. The inclusion of the Ibom Deep Sea Port project in the 25-Year National Port Master Plan should therefore be carried out following the mindset that projects drive policy.

Road & Transportation Master Plan

Besides Ibom DSP's contributions to Federal Government Policy, the project aligns with Akwa Ibom State Government Policy. In the 2009 Road and Transportation Master Plan for Akwa Ibom State, prepared by German architect AS&P, the Ibom DSP Project and accompanying infrastructure are envisaged as necessary gateways to the state. This plan includes proper access roads to the port that connect it to Nigeria's road network.

Construction of these access roads is scheduled to begin by the end of 2013. Besides connectivity to the East-West Road, the port is connected to northern states via a corridor that leads through Oron and Uyo. The figure below provides a detailed map of the proposed infrastructure developments in the state. Ibom DSP is being represented by the port in the south-eastern part of the state, and the new connecting infrastructure is clearly depicted by the dark coloured access road that links Ibom DSP to the Ibom International Airport, Uyo, and further north.

Figure 2.4 – Transportation options in the vicinity of the Ibom DSP project

Uncommon Transformation Agenda

The state's policy is based on the Uncommon Transformation agenda, which aims at the rapid development of Akwa Ibom State in a large number of sectors, e.g. agriculture, healthcare, education and infrastructure. The Ibom DSP Project belongs to the latter sector and is one of the key projects of the state's policy as a part of the Ibom Industrial City.

The Ibom Industrial City (IIC) Master Plan comprises of the development of a 14,400 hectare area in the south-eastern part of Akwa Ibom. The development includes urban development, heavy and medium-light industry and a large commercial port area. The latter has been detached from the original IIC plans as to increase the speed of implementation and to have the port function as an enabler for the IIC's development. The original Master Plan for the Ibom Industrial City has been developed in 2010 by Australian consultant and project engineer WorleyParsons. In this Master Plan, the Ibom DSP Project is incorporated as the commercial port area that supports the IIC.

The area of the IIC is provided in the figure on the right. The south and eastern boundaries of the IIC are determined by the sea, whilst on the northern side, the IIC's boundary is depicted by the Mbo Local Government area's state border. The western side's boundary is depicted by Mbo's state border as well, following a straight line to the sea.

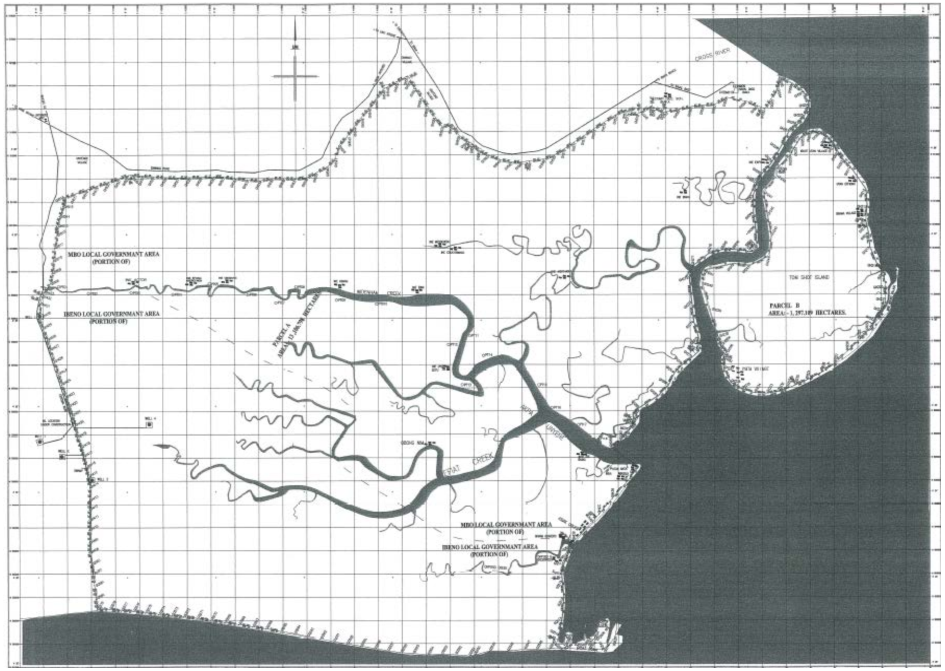


Figure 2.5 – Area of the envisaged Ibom Industrial City development in Akwa Ibom State

Content

MDA's Ability and Capacity to Develop the Project

For the Ibom Deep Sea Project, the Ministry, Department or Agency (MDA) specifically responsible for project development projects is the Nigerian Ports Authority (NPA). The NPA is the landlord port authority in all Nigerian seaports and its duties are carried out in cooperation with the Federal Ministry of Transport. These ports are mostly operated under landlord structure, with a clear distinction in responsibilities between the NPA and the private sector concessionaires. From the NPA's Statutory Functions under the port sector's reform programme, the following division of responsibilities between the three actors in the port sector can be derived:

NPA's responsibilities

- Ownership and administration of land and water within port limits.
- Planning and development of port operational infrastructure.
- Leasing and concession of port infrastructure and setting bench mark for tariff structure
- Responsible for nautical/Harbour operations and hydrographical survey.
- Marine incidents and pollution management
- Maintenance of safety and security at the common user areas.
- Enacting port regulations and bye-laws as well as monitor and enforce them
- Day to day monitoring of operations and enforcement of relevant sections of respective agreements.

Federal Ministry of Transport responsibilities

- Policy formulation and planning at national level of basic marine infrastructure.
- Legislation
- International relations

Private sector's responsibilities

- Cargo handling, stevedoring, warehousing and delivery.
- Acquisition of cargo handling and operations related equipment
- Development and maintenance of ports' superstructure
- Maintenance of safety and security within the terminal
- Towage, mooring, bunkering, ship chandelling and ship repairs

MDA's Ability and Capacity to Develop the Project

Currently, the NPA's policy is based on the Federal Government policy on PPP that fosters an economy that is responsive, robust, private sector oriented and in line with the international best practices. Starting in late 2004, the NPA initiated an ambitious program on the concessioning of its ports. Since then, Nigeria's port sector has been transformed from a 'tool port' model to a 'landlord port' model. This implies that the sector moved from a structure in which limited private sector involvement takes place towards a structure in which the private sector is responsible for marine and terminal operations, construction, purchase, and ownership of superstructure and equipment and the public sector (the NPA) is responsible for port planning, regulatory tasks and the ownership and development of port related land and infrastructure.

The NPA's ability and capability to develop the Ibom Deep Sea Project is based on the following points:

- **Mandated:** the NPA is mandated as the national pots authority by the Federal Government
- **Financial:** a 20-20-60 investment distribution is proposed, based on a 20% investment contribution by the NPA, 20% investment contribution by the Akwa Ibom State and 60% investment contribution by the private sector. The NPA's contribution is provided by the Federal Government and
- **Operational:** operations in the Ibom Deep Sea Port will be carried out by the private sector
- **Conceding Authority:** the NPA is the conceding authority in the Ibom Deep Sea Port project (Concession Grantor).
- **Experience:** the NPA is experienced in public-private partnerships, however, not at the scale of Ibom Deep Sea Port.

Figure 3.1 – Primary seaports and Greenfield port initiatives in Nigeria

In all Nigerian ports strong private sector presence is established through the concession contracts between the NPA as landlord and private operators as concessionaires. Depending on trade an location, private concessionaires are international or regional players. The figure above provides an overview of the NPA's port complexes and the envisaged location of Ibom DSP. Through the recent reforms, the NPA has proven that it is able to concession important parts of the port operations to the private sector. With a 20/20/60 funding target for the Ibom DSP Project, a substantial role for both the NPA and the private sector is foreseen.

With the notion that significant private sector involvement is crucial for the successful development and operation of Ibom Deep Sea Port, the NPA is regarded to be able and capable of developing the project in conjunction with private concessionaires.

Content

Project Demand – Summary (1/2)

As per ICRC Manual, this section describes the market demand for the project and the corresponding size in terms of port capacity, key dimensions and capex required in terms of investments in infrastructure, superstructure and equipment. The demand for the project has been assessed in the Traffic Forecast Report. Based on the traffic forecast analysis, the following market demand opportunities for the Ibom DSP Project have been identified:

General Cargo: Containers & Break Bulk:

- Opportunity for container handling, the absence of an efficient container import port in Delta and River ports creates an opportunity for Ibom Deep Sea Port to serve local and Eastern Nigeria container import market. A significant ramp-up period is required;
- Opportunity for other general cargo handling (e.g. iron an steel);
- Opportunity for off-shore supply: proximity to oil fields and absence of competition in the market currently ensures appetite for creation of off-shore supply terminal at Ibom Deep Sea Port;
- Opportunity for project cargo: the construction of and business on the Ibom Industrial City and the Free Trade Zone require heavy lift quays and equipment which offers potential for project cargo handling;

Vehicles:

- Opportunity for vehicle imports; the absence of vehicle import in Delta and River ports create an opportunity for Ibom Deep Sea Port to serve local and Eastern Nigeria car import market;
- Due to the ramp-up period of especially containers and vehicles, the three general cargo segments are suggested to be facilitated on one combined terminal in the first phase of operations.

Liquid bulk:

- Nigerian need for a port with a deep draft in order to increase economies of scale; Ibom Deep Sea Port can offer a good proposition in comparison to other ports and as such liquid bulk cargo has potential for the Ibom Deep Sea Port;
- Within the liquid bulk segment, import of petroleum products is identified as the commodity with the highest potential.
- LNG export is not regarded as a potential market for first phase, as the port of Bonny currently facilitates all LNG export. In later phases of development, a LNG-plant within the Akwa Ibom state could support the potential of liquid bulk export through the Ibom Deep Sea Port.

Project Demand – Summary (2/2)

Dry bulk:

- Dry bulk is regarded as a potential market for Ibom DSP: demand for cement, fertilizer, grains and sugar can be significant. However, local production of these goods might reduce the import requirements. Therefore, estimated dry bulk volumes are currently considered too low for a dedicated terminal. One large tenant that guarantees a certain amount of throughput can be sufficient to achieve a viable dry bulk terminal.

Shipyard and Dry Dock facilities:

- A shipyard and dry dock is regarded to be a potential market for Ibom DSP as the number of shipyards and dry docks in West-Africa is still very limited. The closest dry dock of significant size (length of 280 meter) is located in Tema, Ghana, whilst Lagos has a dry dock facility of 200 meter length.
- Shipyard and dry dock facilities are regarded as upside potential in this phase of the project. Based on interest by bidders a shipyard and dry dock might be implemented in a later stage of the port's development. In order to allow for this future business to be operational, the port basin is designed at a width of 500 meters. Furthermore, ample of space is available in the North-Western part of the port to locate a dry dock of significant length (>250 meter)

Project Demand – Cumulative: Nigeria and IDSP

The figures below provide an overview of the historical and forecasted total throughput figures for Nigeria and the Ibom Deep Sea Port. The graph on the left shows the historical throughput tonnage in Nigerian ports for the period 2002 – 2012 and forecasted throughput tonnage for Nigerian ports and IDSP. The graph on the right shows the forecasted throughput tonnage for IDSP (2013 – 2063). The graphs demonstrate that a conservative approach was used in developing the traffic forecast for Ibom Deep Sea Port: IDSP's modest share in the left graph proves this.

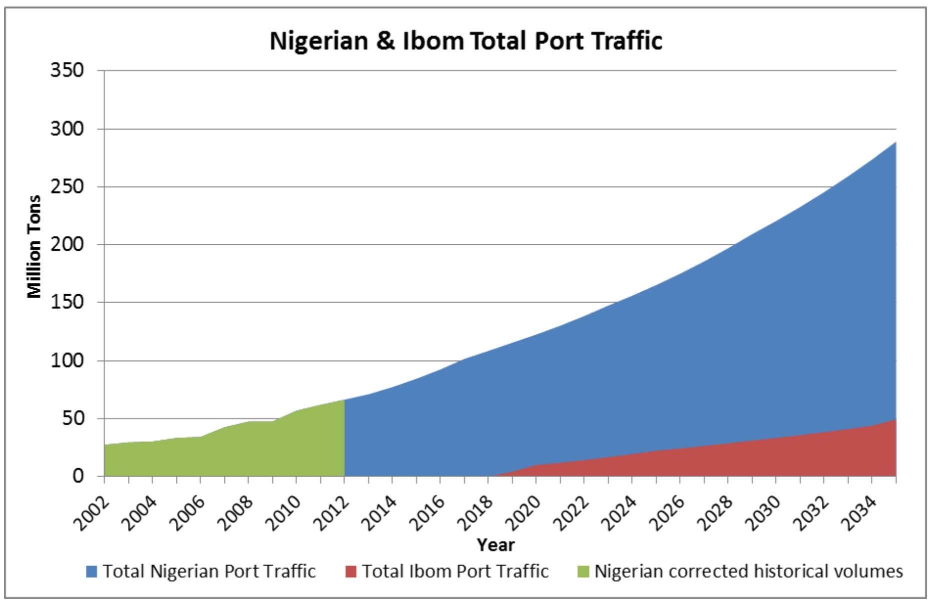
Assumptions

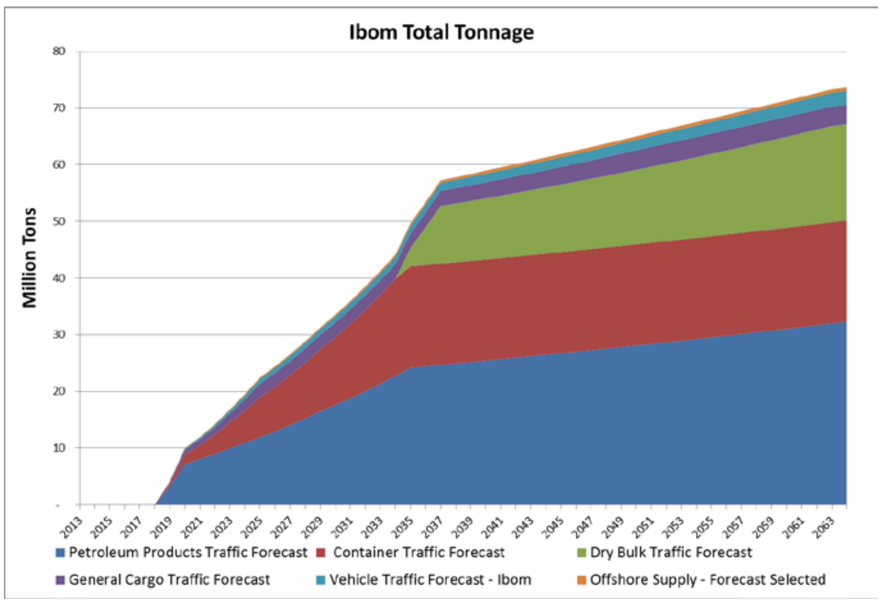
All cargo forecasts are transformed to total tonnage under the following assumptions:

- Average weight of vehicle: 2 tons
- Average weight of a container (1 TEU): between 7.5 and 8.5 tons

For an extensive description of the assumptions and results, reference is made to the Traffic Forecast Report.

Demand & Capacity Development: National & Regional Demand (left) & Ibom DSP Demand (right)





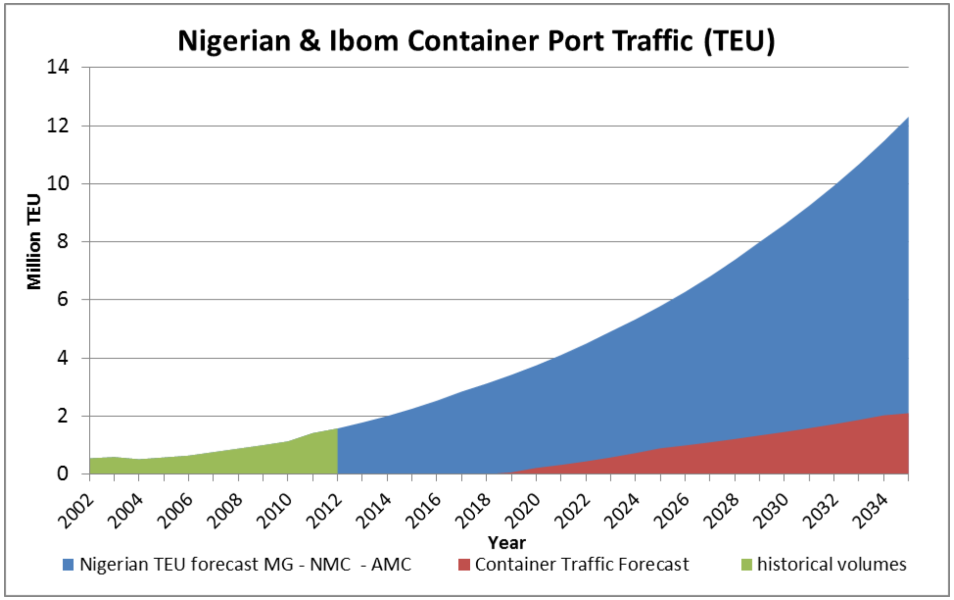
Project Demand – General Cargo: Containers

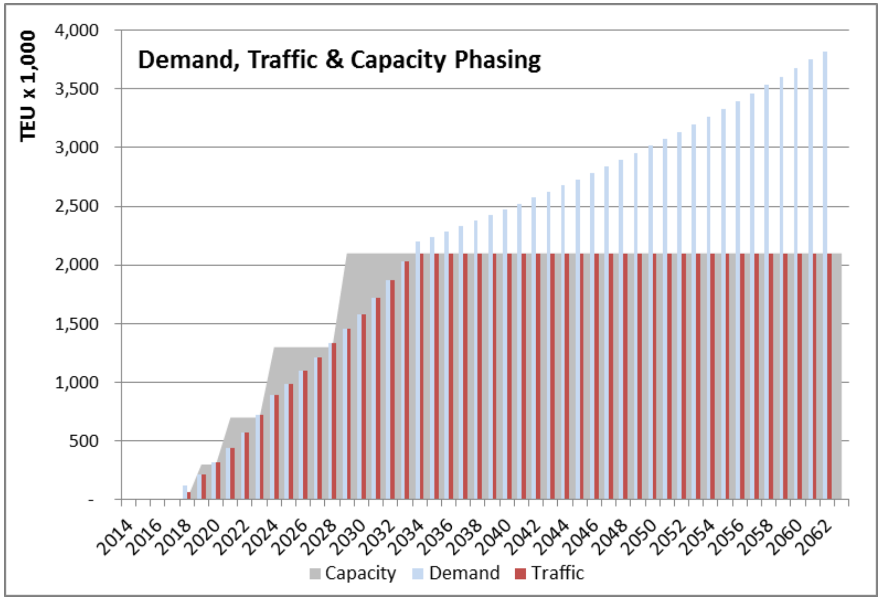
Assumptions

- The general cargo demand projection comprises two cargo segments: the container segment and the breakbulk segment .
- The GDP multiplier that was found is equal to 1.54. This implies that for every 1% of GDP growth, the demand for general cargo grows with approximately 1.54.
- Containerization rate grows from 44% in 2011 to 78% in 2035.
- Maximum domestic production capacity for containerizeable cargo in Nigeria is estimated at 700,000 TEUs in 2035 (approximately 6 million tons of containerized goods), building up from 0 in 2013.
- Container market share for East-Delta ports is set at a maximum of 10% of the Nigerian market
- Ibom Deep Sea Port's market share within East-Delta is set at a maximum of 75% within the East-Delta

For an extensive description of the General Cargo assumptions and results, reference is made to the Traffic Forecast Report.

Demand & Capacity Development: National & Ibom Demand (left) & Ibom DSP Demand/Capacity (right)





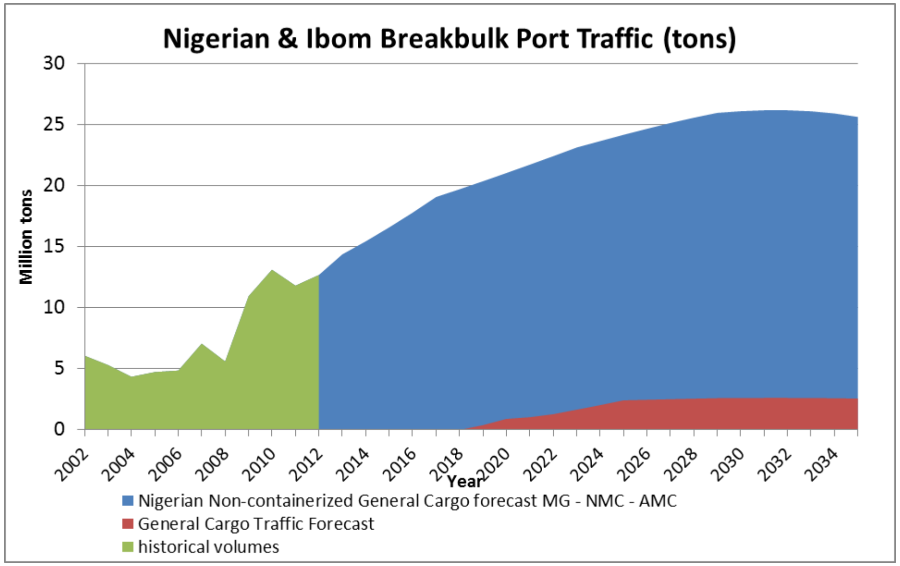
Project Demand – General Cargo: Breakbulk

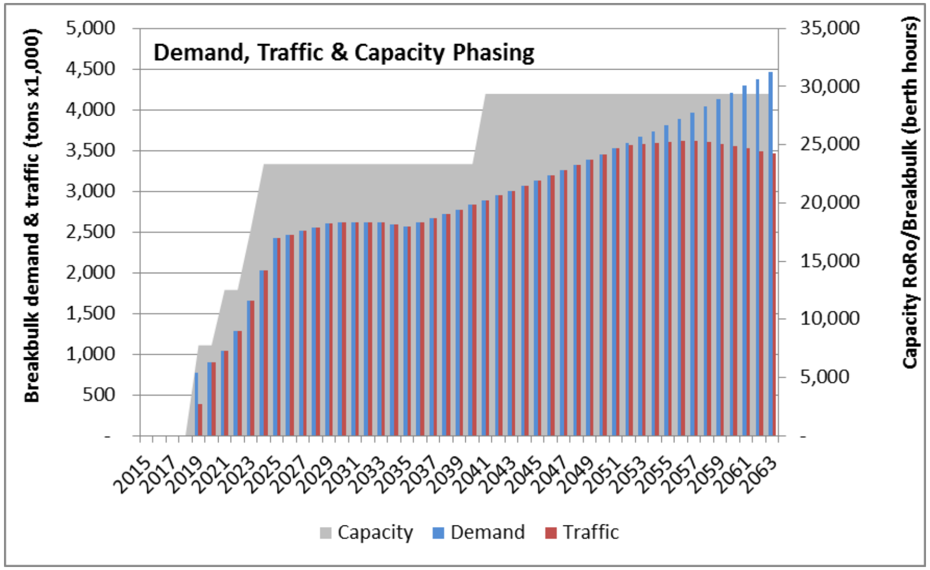
Assumptions

- The general cargo demand projection comprises two cargo segments: the container segment and the breakbulk segment .
- The GDP multiplier that was found is equal to 1.54. This implies that for every 1% of GDP growth, the demand for general cargo grows with approximately 1.54.
- Maximum production capacity for breakbulk in Nigeria is estimated at 4 million tons per annum in 2035, building up from 0 in 2016.
- Breakbulk market share for East-Delta ports is set at a maximum of 20% of the Nigerian market
- Ibom Deep Sea Port's market share within East-Delta is set at a maximum of 50% within the East-Delta

For an extensive description of the General Cargo assumptions and results, reference is made to the Traffic Forecast Report.

Demand & Capacity Development: National & Ibom Demand (left) & Ibom DSP Demand/Capacity (right)





Due to the combination of both vehicle (units) and regular breakbulk (tons) on the same terminal, capacity utilization is established through the occupancy of the berths of the RoRo/Breakbulk terminal (vessel-based)

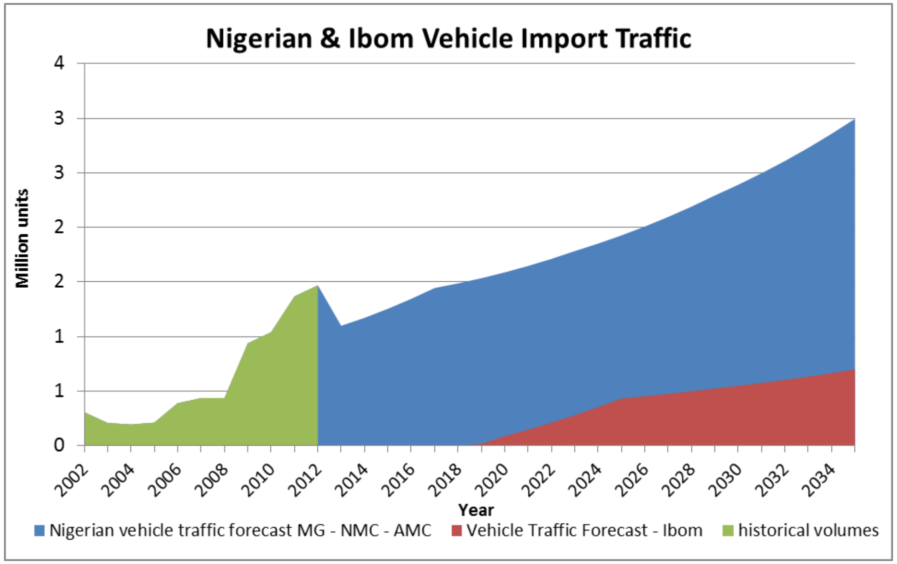
Project Demand – Vehicles

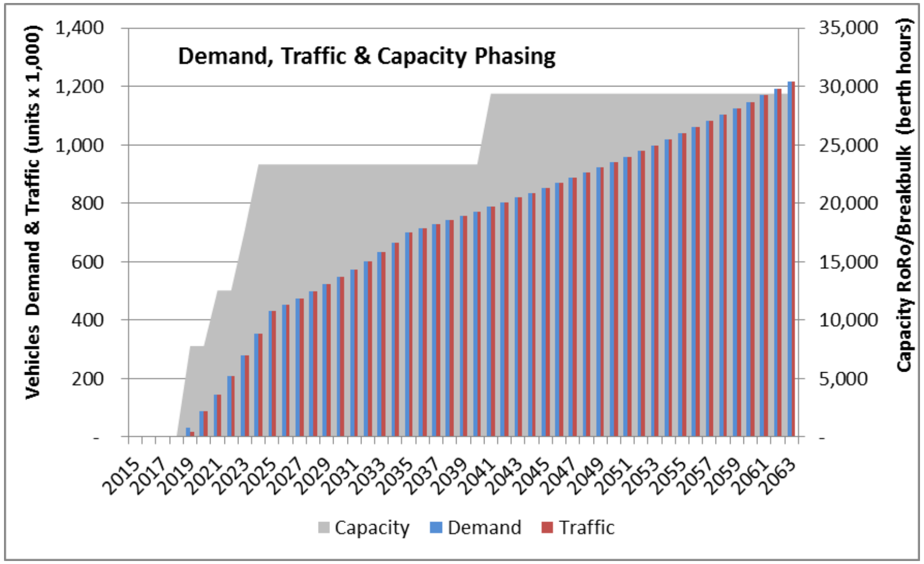
Assumptions

- A strong relation between GDP per capita levels and the car stock in a country can be observed in a cross-section analysis: GDP growth serves as the basis for vehicle demand projections resulting in a replacement rate of vehicles in Nigeria of 12 years.
- Maximum production capacity for vehicles in Nigeria is estimated at 750,000 vehicles per annum by 2025.
- Vehicle market share for East-Delta ports is set at a maximum of 25% of the Nigerian market
- Ibom Deep Sea Port's market share within East-Delta is set at a maximum of 80% within the East-Delta

For an extensive description of the General Cargo assumptions and results, reference is made to the Traffic Forecast Report.

Demand & Capacity Development: National & Ibom Demand (left) & Ibom DSP Demand/Capacity (right)





Due to the combination of both vehicle (units) and regular breakbulk (tons) on the same terminal, capacity utilization is established through the occupancy of the berths of the RoRo/Breakbulk terminal (vessel-based)

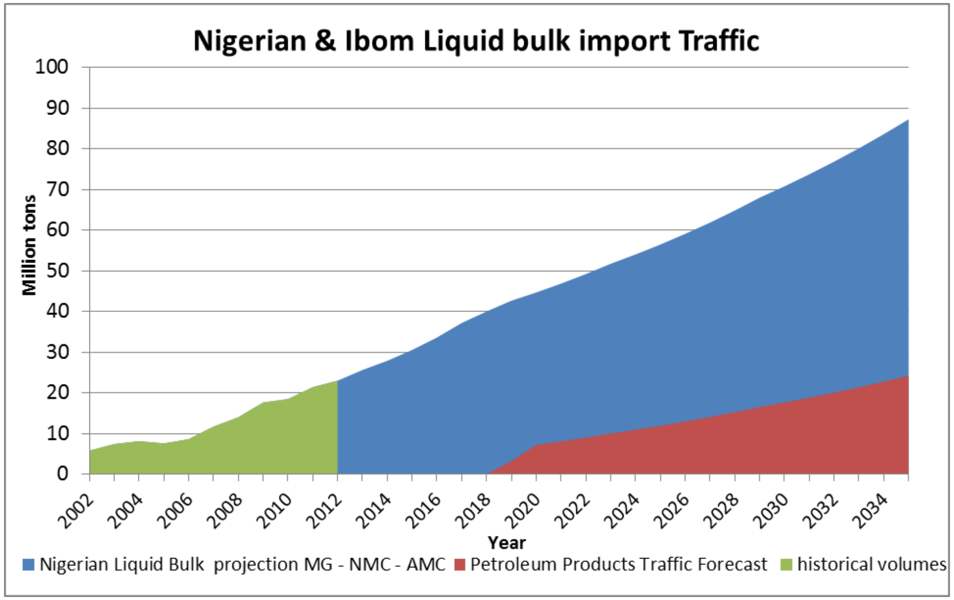
Project Demand – Liquid Bulk

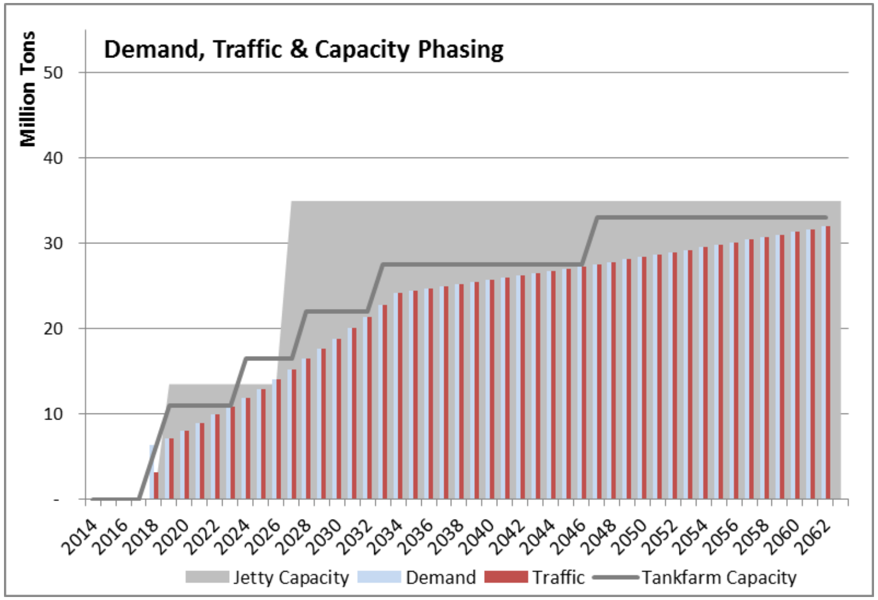
Assumptions

- For liquid bulk, a statistical significant multiplier of 1.8 was found in the analysis of historical NPA-data
- The final production capacity in Nigeria is estimated at 20 million tons of petroleum products per annum by 2035.
- Liquid bulk market share for East-Delta ports is set at a maximum of 40% of the Nigerian market
- Ibom Deep Sea Port's market share within East-Delta is set at a maximum of 33% within the East-Delta

For an extensive description of the General Cargo assumptions and results, reference is made to the Traffic Forecast Report.

Demand & Capacity Development: National & Ibom Demand (left) & Ibom DSP Demand/Capacity (right)





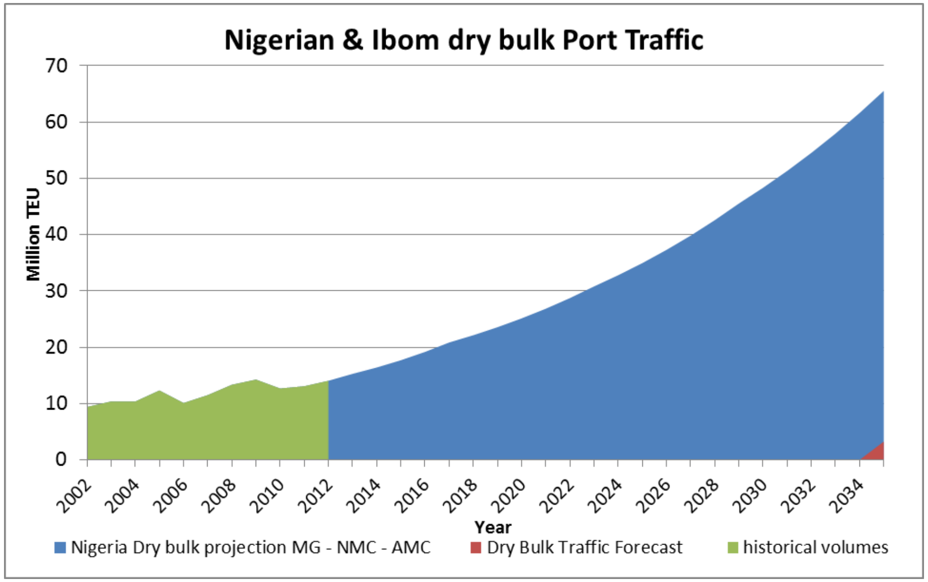
Project Demand – Dry Bulk

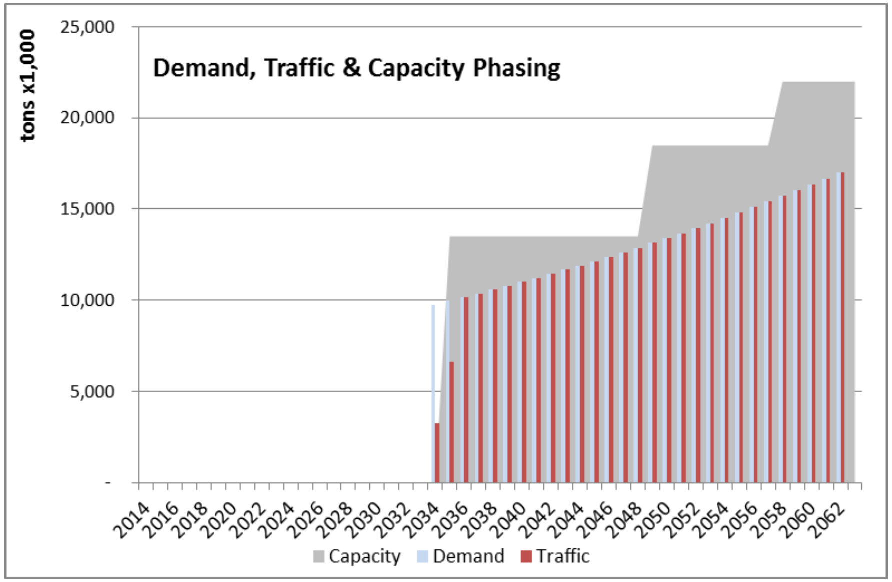
Assumptions

- For dry bulk, a statistical significant multiplier of 1.54 was found in the analysis of historical NPA-data
- The breakdown of dry bulk is assumed to be a 50%-share for cement, 30% for grains/wheat, 8% for sugar and 5% for fertilizer.
- The final production capacity in Nigeria is estimated at 10 million tons of cement per annum by 2035.
- Dry bulk market share for East-Delta ports is set at a maximum of 30% of the Nigerian market
- Ibom Deep Sea Port's market share within East-Delta is set at a maximum of 33% within the East-Delta

For an extensive description of the General Cargo assumptions and results, reference is made to the Traffic Forecast Report.

Demand & Capacity Development: National & Ibom Demand (left) & Ibom DSP Demand/Capacity (right)





The start of dry bulk operations strongly relates to the availability of committed dry bulk volumes by specific entities controlling such volumes. To ensure market appetite for the project, dry bulk operations are therefore not considered mandatory in the initial phase of the project (although the tender has incentives on the early establishment of dry bulk terminals). For simulation purposes, dry bulk operations have therefore been postponed to 2035. Earlier start is however envisaged.

Content

Desired Outputs – Technical Requirements (1)

The desired outputs of the port project are based on port parameters that represent technical standards and performance requirements. Furthermore, the outputs of the project are based on a phased approach that enables for a flexible development of the project. In a phased approach, the port is able to respond on market demand. The Ibom DSP Project has the ability to expand in multiple phases along the shoreline of Akwa Ibom.

The parameters that represent the technical standards for the project are based on the requirements as mentioned in the Project Definition:

Nautical:
- Site close to major international shipping routes
- Deep water in channel, turning circle and port basin (allowing design vessels with a draft of up to -15m)
- Operations protected from waves, currents and winds

Terminals:
- Quay walls for Deep Sea berths (phased to >2,000m)
- Port area for modern terminal operations (phased to >300 hectares)
- Modern jetties for safe and efficient liquid bulk operations

Hinterland:
- Free Trade Zone and Ibom Industrial City for local trade
- Committed inter-state road investment program connecting the port to distant hinterland for regional and national trade

Furthermore, the technical standards are represented by the operational requirements of the port that are based on the cargo throughput in the port:
- annual capacity of the port in terms of containers and other throughputs (general cargo, liquid bulks, dry bulks, vehicles, industrials)
- phased approach of port development
- required utilities and equipment in the port
- required amounts of dredging and breakwaters

Desired Outputs – Technical Requirements (2)

The expected size or volume of these parameters is developed based on the traffic forecasts that are developed for the project. Based on these traffic forecasts, a specific throughput capacity is depicted. Furthermore, the traffic forecast provides a basis for future port expansions. Based on the throughput capacity and traffic forecasts, one can indicate a point when the forecasted throughput exceeds the capacity. This is the moment when the port's expansion should be realized in order to enable continuous growth of the port's throughput. As a direct effect from these throughput capacities, the port will require certain amounts of utilities and equipment.

In order to handle a certain amount of cargoes, a port requires:

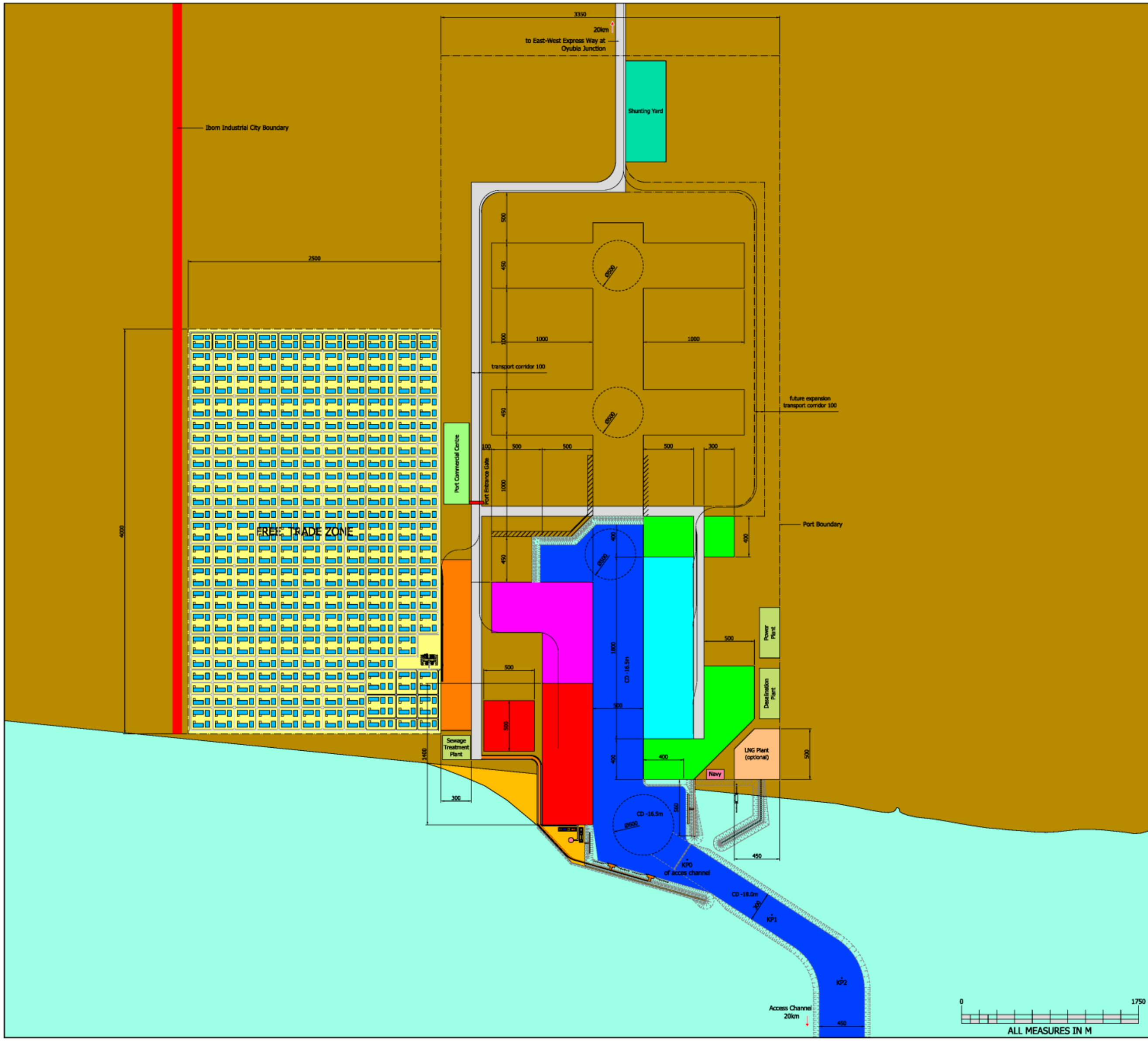
- a channel, turning circle, port basin and quay wall with dimensions that can handle specific ship types
- equipment on the port's terminal: ship-to-shore cranes, gantry cranes, reach stackers, straddle carriers and terminal tractors
- road capacity to and from the port to enable hinterland transport

Next to the technical standards, a performance requirement for the port is the project's development timing. Transaction Advisors see the need for the port to be developed urgently due to the need for port capacity in Nigeria. This implies that a fast-tracked project execution is regarded as a requirement for the port development.

In the Technical Program of Requirements in Section C of the Outline Business Case, the Technical Programme of Requirements for the port will be analysed in detail. Engineers will be using traffic forecasts and design vessel dimensions to develop a detailed programme of requirements.

final version – confidential

Project Master Plan 2035 (reference design)



Slopes and seabed (shallow)
Basin and Access Canal (deep)
Dry Bulk Terminal
Container Terminal
Break Bulk/ Ro-Ro Terminal
Tank Storage
LNG (optional)
Offshore Supply Base
General Utilities
Transport Corridor

QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2035	2035
liquid	fuel products	jetty	2
	LNG	jetty	optional
dry bulk	cement	600	2
	grain sugar	600	2
	fertilizer other	600	2
	total	*1800*	*6*
gen. cargo (break-bulk)	iron&steel other bagged dry bulk	1000	4
	total		
Ro-Ro	vehicles	500	2
gen. cargo	containers	1400	4
other	offshore supply base	1200	6

Description	Drawn	Checked	Date	Revision

Client	Federal Government of Nigeria Akwa Ibom State Government
Project	Feasibility study Ibom deep sea port Nigeria
Subject	Master Plan 2035 - Coast Location

Scale	1 : 17500	Drawn	MP	Drawing no.	Rev.	Sheet no.
Date	16-07-2013	Checked	PZ	PCR1301 -101	2	1

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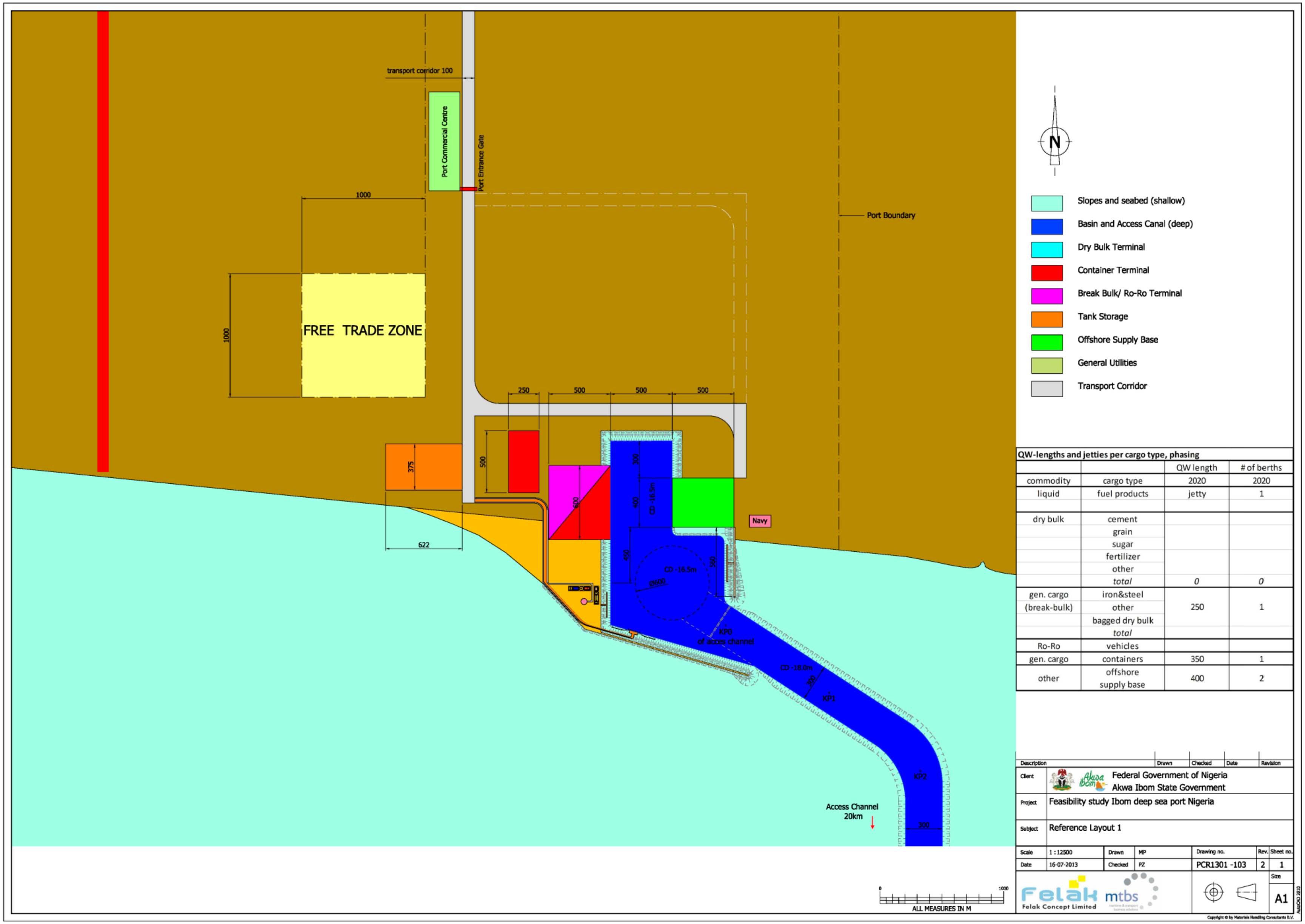
Size A1

AutoCAD 2010

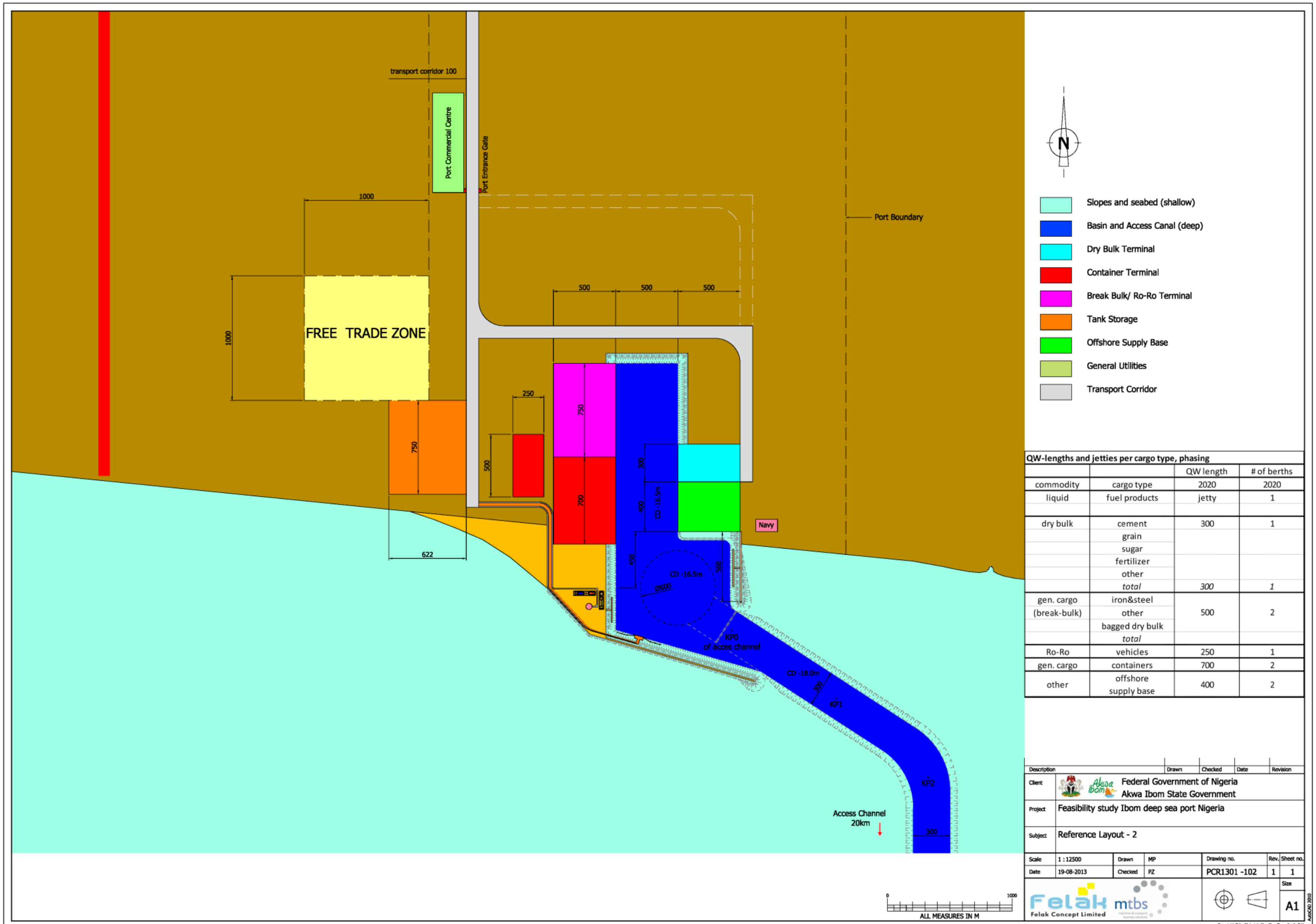
Phase 1 Development (minimum scope, reference design)



QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2020	2020
liquid	fuel products	jetty	1
dry bulk	cement		
	grain		
	sugar		
	fertilizer		
	other		
	total	*0*	*0*
gen. cargo (break-bulk)	iron&steel	250	1
	other		
	bagged dry bulk		
	total		
Ro-Ro	vehicles		
gen. cargo	containers	350	1
other	offshore supply base	400	2

Phase 1 Development (maximum scope, reference design)



QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2020	2020
liquid	fuel products	jetty	1
dry bulk	cement	300	1
	grain		
	sugar		
	fertilizer		
	other		
	total	*300*	*1*
gen. cargo (break-bulk)	iron&steel	500	2
	other		
	bagged dry bulk		
	total		
Ro-Ro	vehicles	250	1
gen. cargo	containers	700	2
other	offshore supply base	400	2

Capex Components of the Project

Following the three capex components (infrastructure, superstructure and equipment), this section provides a broad overview of the capex components that are typically used for port projects. These capex components can be considered as the demand for the project on a component basis. The different components are listed in the below:

Table 5.1 – Primary Capex components for the Ibom DSP project

Capex Components		
Infrastructure Components	**Superstructure Components**	**Equipment Components**
Breakwater	Yard Paving	Tug Boats
Channel & Turning Circle(s)	Roads & Parking	Pilot Boats
Port Basin	Power supply	Ship-to-Shore Cranes
Quay Walls	Gates	Mobile Harbour Cranes
Land Reclamation	Fencing	Yard Equipment
Shore Protection	Offices	Cars
	Sheds and Warehouses	Emergency Response
	IT & Security	
	Jetties	
	Buoys & Aids to Navigation	
	Control Tower	
	Nautical Base for Service Fleet	

Reference is made to the Technical Options Analysis for more details on this topic.

Size of the Project – Capex Size

Table 5.2 – Initial cost estimate for the initial development of the Ibom DSP project

Item	Amount (Phase 1, Minimum Scope)	Amount (Phase 1, Maximum Scope)	Description
Port Infrastructure	996m USD	1,361m USD	Dredging, breakwater, land reclamation, quays, jetties
Access Road	175m USD	175m USD	Project road from Federal Highway to Ibom DSP
Terminal Superstructure	266m USD	421m USD	Paving, roads, fences, offices, warehouses
Terminal Equipment	305m USD	647m USD	Cranes, vehicles, tankfarm, pumps, IT
Service Fleet	18m USD	36m USD	Pilot boats, tugboats and mooring craft
Total Capex - Phase 1	**1,760m USD**	**2,640m USD**	

First phase construction / investment period: 2015 – 2018 / real terms (no indexation, USD 2013)

Reference is made to the Technical Options Analysis for more details on this topic.

Content

Private Sector Capacity (1)

The private sector's capacity to provide specific services in the port has been proven in many of the existing ports in Nigeria and in the entire West African region. The earlier mentioned private sector responsibilities according to the Nigerian Ports Authority are:

- Cargo handling, stevedoring, warehousing and delivery.
- Acquisition of cargo handling and operations related equipment
- Development and maintenance of ports' superstructure
- Maintenance of safety and security within the terminal
- Towage, mooring, bunkering, ship chandelling and ship repairs

Besides these aspects, Transaction Advisors envisage a role for the private sector in carrying out the development and maintenance of the port's infrastructure.

The private sector has proven its capacity in executing abovementioned tasks and responsibilities. In a large number of West-African ports the private sector involvement has gradually increased in the last decade. Through these developments, efficiency has significantly improved and costs for the public sector have decreased.

West-African ports where private sector companies are carrying out one or more of these tasks and responsibilities are provided on the map on the right:

Figure 6.1 – Container terminal operators in West Africa

Port	Operators
Dakar	DP World
Conakry	Bolloré
Monrovia	APM Terminals
Free Town	China Merchant Holdings, Bolloré
San Pedro	Bolloré
Abidjan	Bolloré
Takoradi	Delmas
Tema	Bolloré
Lomé	Terminal Invest Limited, Bolloré
Cotonou	Bolloré
Lagos	Grimaldi, Bolloré
Delta Ports	Ports & Terminal Operators
River Ports	Intels
Calabar	Intels
Douala	Bolloré

Private Sector Capacity (2)

Within these ports, Global Terminal Operators are currently operational (with examples in brackets) such as APM Terminals (Lagos), Bolloré (Abidjan), CMHI (Lomé), Terminal Investment Limited (Lomé), DP World (Dakar) and Grimaldi (Lagos). Marine services and maintenance in several ports is provided by international companies such as Smit Lamnalco and Almatug. This map can be regarded as an evidence for the fact that the private sector is able to provide the services required in ports.

A list of firms that could potentially provide their services in Ibom Deep Sea Port is presented on the right (top). These firms are classified in different categories. Many external stakeholders are expected to be interested in the Ibom DSP Project. The most relevant stakeholders are considered those who may finance significant investments in infrastructure, superstructure and equipment in initial stages of the project and those who may be involved in building and operating the project. Besides, potential anchor tenants for the Free Trade Zone are considered relevant for the project as well.

Based on the targets indicated in previous section, a list of firms is identified that can be used as an example of private sector involvement in ports (table on the right bottom).

Activity	Organisations
Financing	Commercial Banks, Development Banks, Private Equity
Building	Contractors, Dredgers
Operating	Container Terminal Operators, Liquid Bulk Terminal Operators, Other Terminal Operators, Port Management Companies, Nautical Service Providers
Call at the port	Shipping Lines, Oil Companies
Producing at the FTZ	Producers

Organisations	Firms
Commercial Banks	FBN, Zenith, Diamond Bank, Skyebank, Standard Chartered, BNP Paribas, Standard Bank, Rand Merchant Bank, Barclays, HSBC, GTB
Development Banks	World Bank /IFC, AfDB, AFC, Bank of Infrastructure, Proparco, Emerging Africa Infrastructure Fund (CCC)
Private Equity	MacQuairy, Citadel Capital & other infrastructure funds
Contractors	Julius Berger, BAM, CCCC, CCECC, SACYR Int., Bouygues, Vinci, Astaldi,
Dredgers	Boskalis, Van Oord, Dredging International, Jan de Nul, BCC (Bonny), LCM (Lagos)
Terminal Operators	
- Containers	APMT, TIL, HPH, PSA, DPW, ICTSI, Bollore, CMHI, SIPG, Gulftainer, Cosco
- Liquid Bulk	Vopak, Oil Tanking
- Others	Cargill, Glencore (agribulk), Grindrod (cars), Transocean (Oil Supply Base), SeaInvest, UCLH, Steinweg, Jassim
Port Managers	PoRINT, PAI, RentAPort
Port Users	
- Shipping Lines /agents	Maersk Line, MSC, CMA CGM, PIL, ZIM, Cosco, Grimaldi, Hoegh, Hull Blythe
- Oil Companies	Exxon Mobil, Shell, Chevron, TotalFina, Oando
Producers	Dangote, Unilever, GM, PSA, Toyota, Haliburton, AllSeas, Heerema, Damen, Bidvest
Others	MIGA, Attradius

Content

Desired Outcome and Impact of the Project on the Region

Felak Concept Limited mtbs

Desired Outcome and Impact of the Project on the Region

The desired outcome and impact of the project on the region can be derived from the Strategic Needs Assessment and the Service Delivery Options. The Ibom DSP Project's desired outcome and impact can be classified in multiple categories:

Strategically:

- To provide much needed container handling & storage capacity
- To provide much needed import capacity for petroleum products
- To provide much needed import capacity for vehicles
- To provide dedicated import capacity for food and agricultural products
- To provide dedicated export capacity for industrial output and natural resources
- To provide a supply base for the regional oil & gas sector
- To provide a shipyard and dry dock for shipbuilding, vessel maintenance and repairs
- To provide a logistics base and regional trading hub in West Africa

Financially

- To have a positive IRR and NPV for the project's investors
- To have a funding based on the funding division of 20% Federal Government, 20% State Government and 60% Private Sector

Economically

- To serve national and regional economies
- To provide economic value to the Federal Government and the State Government

Socially

- To serve local communities by providing employment
- To serve local communities by providing utilities

Desired Outcome and Impact of the Project on the Region

By fulfilling these outcomes and impacts, Ibom Deep Sea Port Project's Mission is:
"To provide an efficient, safe and customer friendly port and free trade zone as an additional gateway to the Nation's economy"

Ibom DSP Project's Vision is:
"To be the world-class economic engine in Western Africa and a destination hub for countries around the Gulf of Guinea and their hinterland"

By developing the project in a manner that satisfies the abovementioned criteria, Ibom DSP will provide a large positive impact on the region. Local communities can benefit from the port through the large number of jobs that it provides. A distinction is made between the direct effect that is caused by job creation within the port and the indirect effect. This is the result from job creation resulting from the economic improvement in the region: the multiplier effect from higher prosperity among residents.

Besides these economic benefits, the port development comes with investments in infrastructure (roads and possibly railway) and utilities (sewage, electricity, fresh water supplies, etc.) where the local communities might benefit from.

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Other Driving Factors

Next to the strategic needs for the port described above, there are other driving factors for the rationale of developing the Ibom Deep Sea Port project. These factors are:

The nation's need for additional port capacity:

Nigeria faces severe congestion in its current ports, especially in Lagos. Through opening of an additional Deep Sea port in the eastern part of the country, pressure on Lagos' ports will be reduced. Assuming that Ibom Deep Sea Port will attract a significant share of the eastern-bound cargoes, the ports in Lagos retain the ability to process cargoes efficiently and minimize congestion. Thereby, Ibom Deep Sea Port can play a leading role in the NPA's port reform: it creates additional port capacity at a new location, encouraging competition under a new project structure.

Job creation in Akwa Ibom:

The Ibom Deep Sea Port will create a large number of jobs during its construction and once it is operational. This is a boost for Akwa Ibom State, as unemployment levels in the state are relatively high (27.7 %, Nigerian National Bureau of Statistics). Furthermore, indirect employment will create jobs due to increased requirements for supplies in and around the port and due to the spin-off effect caused by a wealthier population in the state.

Developing a world-class infrastructure project that attracts Foreign Direct Investments:

The Ibom Deep Sea Port can serve as a milestone project for Nigeria, offering unprecedented co-operation between the public and private sector and between Nigerian and foreign organizations. It can serve as a show case for fast realization of public procurement and attracting foreign direct investments. Thereby the project can serve as a catalyst for ICRC's public procurement projects beyond the port sector.

Economic distribution over Nigeria

Developing a deep sea port in the Eastern part of Nigeria will improve the distribution of economic activities over the country, thereby balancing the economics in an economy that is currently largely focussed on Lagos and Abuja.

Financial returns for the public sector & an opportunity for Nigerian companies

The Ibom Deep Sea Port project will create valuable financial returns for the public sector through the PMDC structure. Furthermore, it creates an opportunity for Nigerian companies to operate in a world-class port and free trade zone.

Developing a world-class port centre and maritime cluster: creating a hub position in the region.

Through the development of a deep sea port, Nigeria ensures to keep up with global port developments and strengthen its role as a regional hub.

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Conclusions

With this Strategic Needs Assessment for the Ibom Deep Sea Port, Transaction Advisors have clarified the urgent need for the development of port gateway capacity in Eastern Nigeria under a PPP structure. The main conclusions of the Strategic Needs Assessment for the Ibom DSP Project per PPP Manual for Nigeria (Infrastructure Concession Regulatory Commission, 21 September 2012) are as follows:

The project contributes to the implementation of government policy

The project aligns with the Government policy on the port sector, as has been demonstrated in a comparison of the NPA's policy, the Federal Government's policy and the Akwa Ibom State's policy. It is regarded as essential to include the Ibom Deep Sea Port development in the 25 Year National Ports Master Plan as currently developed by the NPA. By doing so, the project is officially incorporated in the strategic planning of the NPA.

The NPA's ability and capacity to develop the project

Through its privatization policy, the NPA has proven that it is capable to concession important parts of the port operations to the private sector and to operate as a land manager. However, the NPA does not have recent experience in developing a (greenfield) port at this scale.

The relative demand for and corresponding size of the project in terms of its anticipated budget or capital expenditure

Demand for the project is proven by the expected rise in port traffic in Nigeria. The anticipated capex for the entire project is $1,750 million.

The detailed desired outputs including any minimum service/technical standards and performance requirements

The desired outcome of the project is a financially and economically viable project that provides benefits to the project region and Nigeria as a whole

The private sector has proven to be capable to provide its services in similar projects in the past

The private sector has proven its capacity in executing its tasks and responsibilities. In a large number of West-African ports the private sector involvement has gradually increased in the last decade. Thereby, efficiency has significantly improved and costs for the public sector have decreased.

Any desired outcomes and impacts of the project (i.e. how it will provide additional benefits to the service area);

The project will provide additional benefits to the nearby project region through job creation and provision of amenities (roads, electricity, water and sewerage). The larger project region (East-Nigeria) will benefit from lower transport costs compared to transporting from Lagos.

Any other major driving factors for the rationale of developing the project.

Other driving factors are the development of port capacity, job creation, economic balancing within the country and hub development in Nigeria.

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs

maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

SERVICE DELIVERY OPTIONS

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Service Delivery Options
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Executive Summary

Source: ICRC PPP Manual for Nigeria

As part of the Outline Business Case, the MDA should identify and evaluate the potential options for meeting their service delivery needs. The objective of this exercise is to list the alternatives and recommend the preferred option, and subsequently why the recommended option should be structured as a PPP project. However, even if a PPP is the preferred method the decision to procure as a PPP will depend on several other factors (e.g. the enabling environment, private sector interest, financial analysis, etc.).

When identifying all potential options for service delivery, options to include are:

- *Non-asset solutions:* Service needs may be met without creating additional government assets, through reconfiguring the means of service delivery, developing initiatives to manage demand more effectively, or allowing the private sector to offer the service in an openly competitive market (i.e. internet, mobile phones, etc.);
- *Upgrading existing asset solutions:* Consider whether existing infrastructure held by the MDA, by another government body, or under an existing or planned PPP might be used. This may involve an expansion or refurbishment to bring the infrastructure to the required standard; or
- *New asset-based solutions:* New infrastructure may be developed to provide the required service.

Each of the service delivery options identified in the previous step should be evaluated to identify their advantages and disadvantages, such as the associated risks and benefits; the technical feasibility elements, social and environmental impacts, potential effects on government budgets and capacity, land acquisition / site issues, legislative and procurement processes, and labour and private sector capacity issues.

Executive Summary

The main conclusion from the analysis of Service Delivery Options is that there is need for an additional seaport of significant size in Nigeria in order to reduce port congestion.

The port's proposed location in the south-eastern part of Nigeria is selected for the reason of a lack of port capacity in that region, as is discussed in chapter 4:

Table 1 – Overview of Service Delivery Options

Possible Solution	Solution?	Main Rationale
Non Asset Solutions		
Reduce dependency on ports	No Solution	Will not reduce port throughput in such a manner that it will solve the congestion problem
Improve efficiency at eastern ports	No Solution	Eastern ports have too little capacity, too little draughts or are already congested
Upgrading Asset Solutions		
Upgrading existing ports in Eastern Nigeria	No Solution	Costly dredging due to location far from sea (Calabar, Onne, Warri & Port Harcourt)
New Asset Based Solutions		
Development of gateway capacity to Eastern Nigeria	Solution	Will provide much needed port capacity, with many future growth options & job-creation in the area

The development of gateway port capacity in Eastern Nigeria is regarded as the best Service Delivery Option for Nigeria's economy. In accordance to existing policy and international best practices, implementation of this solution should be through a public-private partnership.

The preferred PPP structure is in the form of a Port Development and Management Company (PDMC). The PDMC's shares are divided over the Federal government with NPA as the representative, Akwa Ibom State government and private sector (company/consortium), where the majority of the shares are privately owned. The PDMC and the NPA enter into an agreement for 50 years. The PDMC is responsible for all investments in common-user infrastructure, superstructure and equipment. The PDMC has the right to enter into sub-concession contracts with separate terminal operators. These sub-concessionaires may then invest in the terminal's superstructure and equipment.

Content

Content

Introduction - Scope

Source: ICRC PPP Manual for Nigeria

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Introduction – Service Definition – Cargo handling & Storage

The service definition for the Ibom DSP Project that can be derived from the Strategic Needs Assessment is the development of gateway port capacity in Eastern Nigeria. Developing gateway port capacity can be accomplished by offering different services to the market, depending on market demand. Services that are envisaged for the Ibom DSP Project can be classified in three categories: Cargo Handling and Storage, Nautical Services and Free Trade Zone Operations. The components of the different categories are described in detail below.

Cargo Handling and Storage

Containers

Ibom DSP is expected to be handling significant numbers of containers, due to Nigeria's need for container capacity in the east. With Nigeria's population getting wealthier and growing at a rapid pace, it is expected that the import of consumer goods into the country will increase rapidly, leading to a request for additional container capacity in its ports.

General Cargo

The handling of general cargo at Ibom DSP is foreseen to be carried out in three different categories, namely: general trade, offshore supplies and construction materials. With the large oil fields in the proximity of the port, especially the second option is regarded to attract large cargo flows to and from the port. Furthermore, the import of construction materials is expected to be increasing rapidly in the next decades due to the earlier mentioned rise in prosperity of Nigeria's population. This will drive up the demand for building materials. The general trade in this category is expected to consist of cargoes that are currently still not containerized, e.g. roles of paper, sheets of metal or wood.

Introduction – Service Definition – Cargo handling & Storage

Liquid Bulk

The liquid bulk trade at Ibom DSP will be driven by Nigeria's vast demand for oil products and its large exports of crude oil. With Akwa Ibom DSP being one of the largest producers of crude oil, there is a potential for the port to serve as an export location for this trade. However, most of the crude oil is currently exported from the Single Buoy Mooring (SBM) of the Qua Iboe terminal, around 30 kilometres west of Ibom DSP. It is questionable whether that will be changed once Ibom DSP is operational, as the displacement of the crude oil pipelines will be very costly.

The import of oil products into Nigeria is regarded as a highly promising trade for Ibom DSP. Due to the limited production of oil products in Nigerian refineries and the high demand for oil products, the currently existing product terminals in the country's ports are congested. It is expected that the development of Ibom DSP enables to restrict this congestion and attract large flows of oil products to the port.

Another potential liquid bulk trade for Ibom DSP is the export of Liquefied Natural Gas (LNG). With Akwa Ibom's State Government having plans to develop a LNG plant in the Ibom Industrial City, Ibom DSP would be the most obvious location to export the LNG from. However, investments in LNG plants are (very) high and the development of such plants will take a long period. Therefore, LNG is regarded to be an interesting trade for subsequent phases of the port's development.

Dry Bulk

The dry bulk trade at Ibom DSP is expected to comprise agricultural products and other dry bulks. Ibom DSP's role as a dry bulk port is regarded to be in the imports of fertilizers and grains. As mentioned before, Nigeria's population will be growing in the coming decades and consequently demand for wheat and flour is expected to grow. Besides, the local agricultural production is expected to be rising for the same reason, requiring imports of fertilizers. Furthermore imports of construction materials such as cement and supplies for regional industries (cokes or coal) are projected to be handled in Ibom DSP as well.

Vehicles

Both new and second-hand car imports in Nigeria have increased at a rapid pace recently. Demand for cars has been very high and Ibom DSP is expected to reduce pressure on Lagos' car terminals. Besides, Ibom DSP is expected to offer logistical benefits for vehicles that are bound for Eastern Nigeria. The distance from Ibom DSP to Eastern Nigeria is much smaller than the distance from Lagos to the Eastern states.

Introduction – Service Definition – Nautical Services & FTZ

Nautical Services

The following service definitions are required in the port regarding the handling of ships. These are regarded to demand no further comments or explanation as they are basic requirements for any port:

- Towage
- Pilotage
- Mooring
- Vessel Traffic Management
- Channel Management and Maintenance

A potential nautical service provider that needs some comments and explanation is a ship repair yard at Ibom DSP. This is regarded as a valuable addition to the other nautical services and it has a strong relationship with Ibom DSP's function as an offshore supply base. The offshore supply vessels need regular service and maintenance which could be provided from Ibom DSP, minimizing costly downtime for these vessels.

Free Trade Zone

The Free Trade Zone is expected to attract the following industries:

- Logistics
- Manufacturing & Light Industry

With its location in the proposed Ibom Industrial City and next to the Ibom Deep Sea Port, the Free Trade Zone is expected to attract large logistical operators that offer services such as freight (de-)consolidation, distribution and value-added logistics. Manufacturers and light industrial operators could benefit from having a production facility at Ibom DSP for the same reasons as stated above (inside the IIC, close to the port). Furthermore, operating from a Free Trade Zone is attractive for manufacturers due to the favorable tax policy applicable.

Introduction – Service Definition – Decision Tree

A decision tree has been developed based on the service definition analysis for Ibom Deep Sea Port. This tree provides the possible solutions for the provision of gateway port capacity to Eastern Nigeria.

In the following sections, all possible solutions are described and analysed on their suitability for providing the service delivery option.

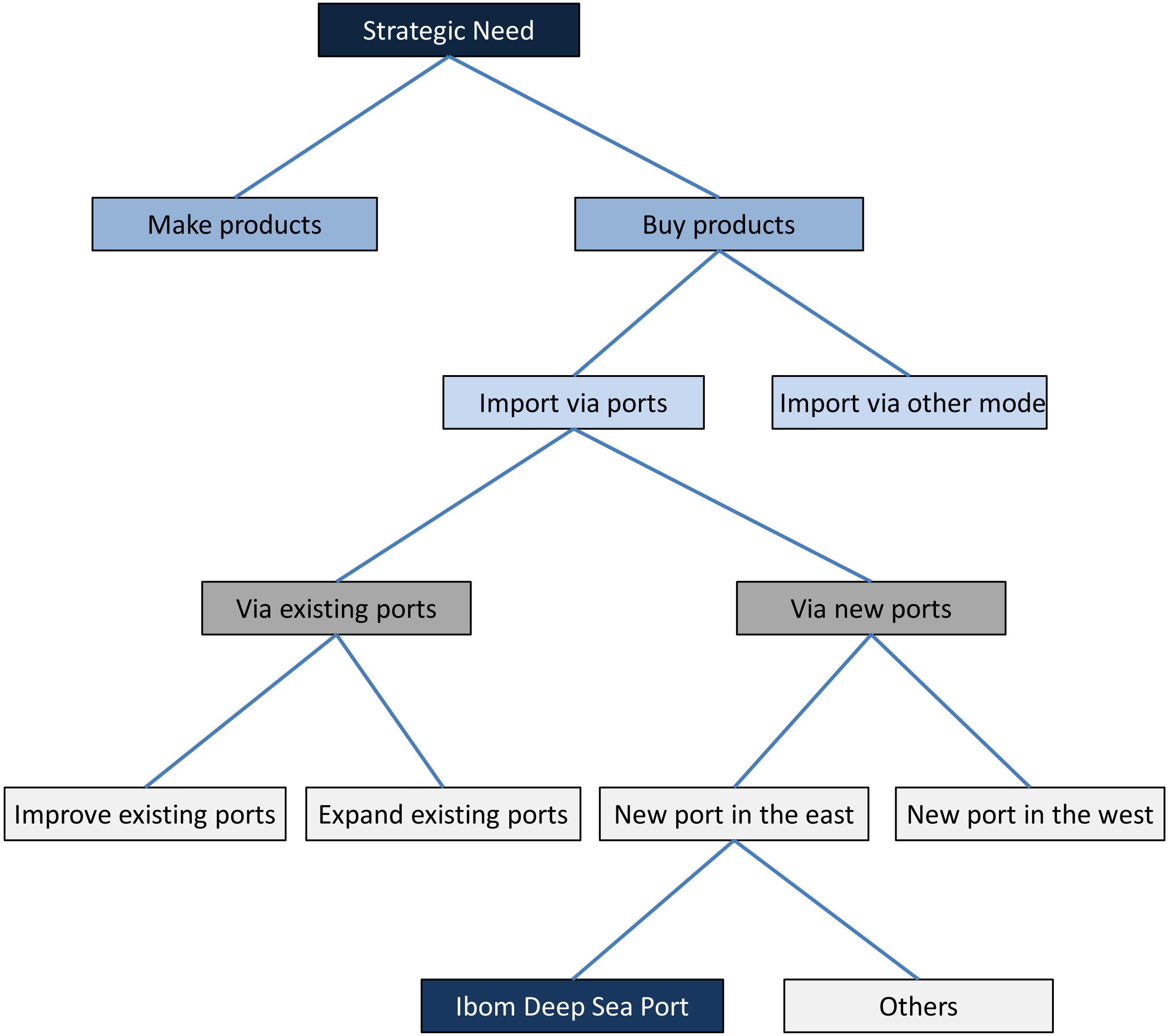


Figure 1.1 – Framework for Service Delivery Options

Content

Non-Asset Solutions - Introduction

This chapter comprises non-asset solutions for the strategic needs as assessed in the strategic needs assessment in Section A. Non-asset solutions are those solutions that can accomplish the strategic needs without creating additional government assets. According to the Nigerian PPP Manual, this can be done through:

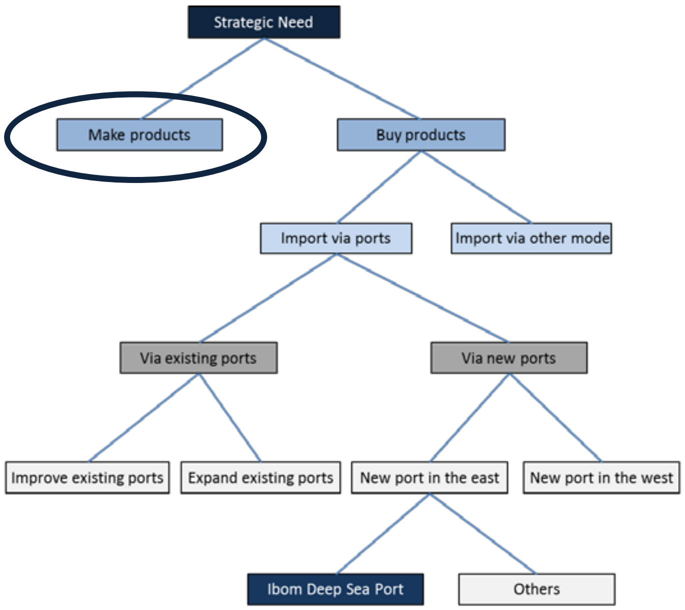
- reconfiguring of service delivery means
- developing demand management initiatives
- allowing the private sector to offer services in a competitive market

Concrete examples of possible non-asset solutions for fulfilling the strategic needs are:

- reduce dependency on ports: increase Nigerian production
- handling cargoes via other transport modes: road, rail & airports
- improve efficiency in Nigerian ports

These examples are evaluated on their applicability and feasibility for serving the strategic needs.

Non-Asset Solutions – Reduce dependency on ports



The most fundamental non-asset solution for Nigerian ports is based on a reduced dependency on the ports. Nigeria is currently largely dependent on the imports of consumer goods for its home market. For oil related cargoes, there are large export flows of crude oil and large import flows of petroleum products. A possible solution that could reduce these trade flows would be the increased production of consumer goods in Nigeria. The same yields for increasing efficiency in the supply of oil related cargoes. These solutions reduce the pressure on its ports.

When considering this solution as a possible service delivery option, it should be noted that only refining of oil in Nigeria actually reduces ship movements. When producing consumer goods in Nigeria, a large fraction of components and raw materials still needs to be imported via the ports. However, it is apparent that port handling will decrease in this situation.

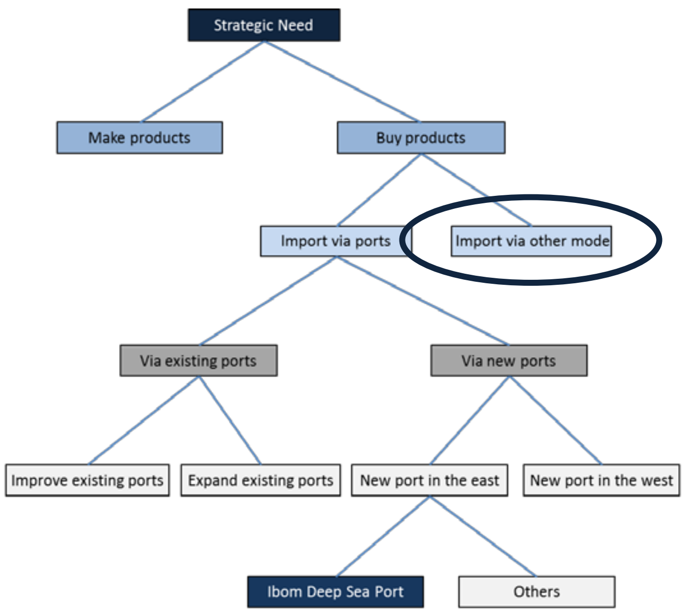
Only in the case of refining of oil products within the country, exports and imports through the ports are reduced. This implies that the share of the crude oil that is currently exported and then re-imported as petroleum products stays within the country and thus does not 'consume' port capacity.

The critical asset that is currently lacking - or at least provides a capacity constraint - is a large scale refining capacity that is capable of producing large quantities of gasoline, diesel, kerosene and other petroleum products. Development of this capacity can thus be considered as a non-asset solution for the NPA. However, the opposite yields for any investor that would consider producing in Nigeria: refineries require significant investments in assets.

Overall, this solution is considered as being interesting for the country. However, it is questionable whether it reduces the need for gateway services in the short term. When referring to the TEU forecast, additional production in Nigeria - whether it is consumer goods or oil products - will not free-up enough port capacity in the short term. Projects such as the Ibom Industrial City are therefore proper means to reduce some of the cargo flows, but these initiatives still require raw materials, semi-finished imports and also require export capacity for the goods produced in the IIC.

Non-Asset Solutions – Handling cargoes via other transport modes

A possible solution to reduce the pressure on Nigerian ports is to handle cargoes via other transport modes such as by road, by rail or via airports. For the road and rail based transport modes, this implies that exports from Nigeria should be transported over land to the neighbouring ports and from there be shipped abroad. The opposite route yields for cargo that is being imported in Nigeria. Air cargo could be transported via Nigeria's own airports.

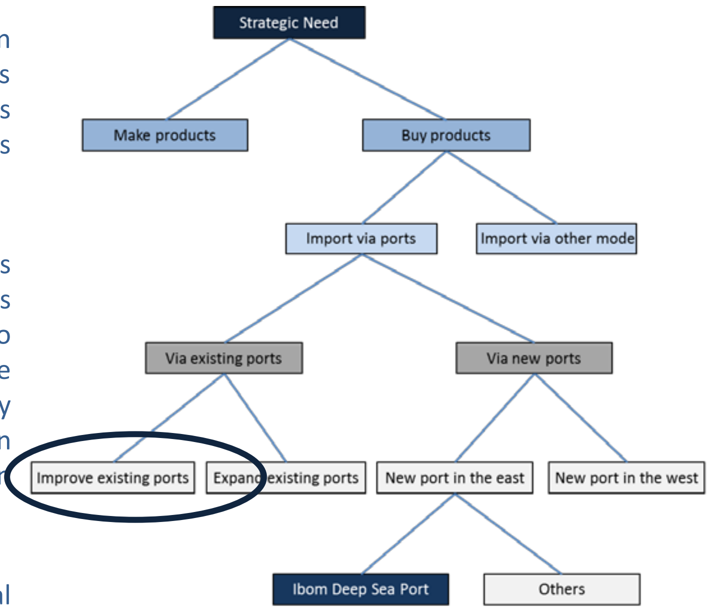


This 'solution' has quite some drawbacks for Nigeria as the major importer and exporter of the region. Currently there is limited cargo traffic between Nigeria and its neighbours, Cameroon and Benin, mostly due to inefficiencies on the countries' national borders and a lack of border-crossing infrastructure. Absorbing the vast increase in expected container throughput via ports in neighbouring countries is not regarded as viable. The ports in Cotonou and Douala are considered unable to handle the large cargo flows. And even if these ports could handle the cargoes, it is debatable whether the landside infrastructure is able to handle all goods. The handling of substantial cargo flows via neighbouring countries' ports is therefore considered as no option for meeting the strategic needs of the port sector.

Handling all cargo via airports is impossible by all means: it is too costly for most cargoes and it is technically impossible for many cargoes (liquids, heavy cargoes, etc.).

Non-Asset Solutions – Improve Efficiency of Eastern Ports

Improving port capacity by increasing the efficiency in ports is regarded as a good solution initially. However, during the Nigerian Port Governance Reforms (2003 – 2007), the NPA has greatly improved efficiency in its ports by concessioning a large number of its terminals. This implies that for a large number of ports (i.e. the concessioned terminals) it is regarded as impossible to achieve large capacity improvements through increased efficiency.



The four smaller ports in Nigeria serve as potential places where additional port capacity is present. The port complexes in Calabar, Onne, Port Harcourt and Warri are considered as smaller ports. However, the large drawback of these ports is their size: they either are too small, have insufficient draught and/or are located at a long distance from open seas. These ports are not considered as structural solutions to increase the current capacity without heavy investments in new assets. The +3 million TEU forecast for 2020 will not be achieved when using these ports in their current state. Except for Onne, none of the ports mentioned can handle vessels of a significantly large size.

When considering improving the role of these ports in Nigeria's maritime sector, substantial investments have to be made in these ports. All four smaller ports have the drawback that they are located relatively far from the Deep Sea. This implies that dredging of their channels to appropriate draughts (-16m) is costly, both for initial dredging and for maintenance dredging.

Overall, dividing the future cargo flows over the existing ports is not considered as a potential option to handle more than 3 million TEUS from 2020 onwards.

Non-Asset Solutions – Conclusion

The table below presents the conclusion of the analyses presented in the three preceding sheets.

Table 2.1 – Non-Asset Solutions

Possible Solution	Solution?	Main Rationale
Non Asset Solutions		
Reduce dependency on ports	No Solution	Will not reduce port throughput in such a manner that it will solve the congestion problem
Handle cargoes via other transport modes	No Solution	Will not be possible via neighboring countries' ports. Impossible to handle all cargoes via airports.
Improve efficiency at eastern ports	No Solution	Eastern ports have too little capacity, too little draughts or are already congested

Content

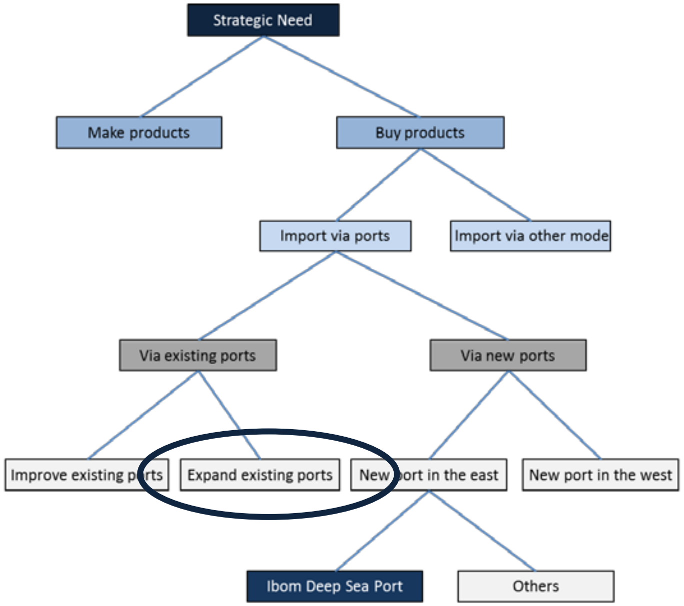
Upgrading Existing Asset Solutions – Introduction

This section comprises a solution that is based on upgrading of existing assets for the strategic needs as assessed in the strategic needs assessment in Section A of this OBC. According to the Nigerian PPP Manual, upgrading asset solutions are those solutions that can accomplish the strategic needs by upgrading government assets. This can be done through expanding or refurbishing current NPA infrastructure or through the use of infrastructure from other government bodies.

Concrete examples of possible upgrading-assets solutions for fulfilling the supply of gateway port capacity in Nigeria are:

- Upgrading existing ports in Nigeria

This example is evaluated on its applicability and feasibility for serving the strategic needs.



Upgrading Existing Asset Solutions – Upgrading Eastern Ports

The upgrading of existing Nigerian ports as a solution for providing additional port capacity has been partly discussed in the previous chapter. The four Eastern ports (Calabar, Onne, Port Harcourt and Warri) all have significant drawbacks when considering their upgrading to appropriate levels (vessel draft of 15 meters, short access from the seaside and sufficient landside expansion possibilities).

Calabar

The port of Calabar is located more than 80 kilometres from Deep Sea, making it difficult to enter for large ships and increasing transit times from open waters. Currently, the port's access channel is maintained at a depth of 6 meters. However, plans exist to deepen the channel to 8 meters. This however will come at a cost: the 84 kilometre long channel will have to be dredged regularly at high costs, especially since it is located in the middle of two large rivers' estuaries that cause siltation in the channel. And as mentioned before: with 8 meters of depth, large container vessels still cannot enter Calabar's port.

Onne

The port of Onne, located in the Delta region is currently Nigeria's second port in container throughput. However, it has similar drawbacks as Calabar has. The depth at Onne's port is an advantage over other Eastern ports (-13.5m), however, the port's channel has a length of 40 kilometres, making it costly to maintain and time-consuming to navigate to and from the port. Furthermore, the security situation in the surroundings of Onne might hamper investments and operations in the area.

Warri and Port Harcourt

The ports of Warri and Port Harcourt, also located in the Delta region, face a combination of the drawbacks of Calabar and Onne: both have relatively limited depths, with Warri at around 6 meters and Port Harcourt at around 7.5 meters. Besides, their location in the Delta makes them less-preferred by international investors. Next to these drawbacks, Port Harcourt faces a problem that is typical for existing ports: there is lack of space for port developments in the area.

Table 3.1 – Upgrading Existing Assets in Eastern Nigeria

Possible Solution	Solution?	Main Rationale
Non Asset Solutions		
Upgrading existing ports in Eastern Nigeria	No Solution	Costly dredging due to location far from sea (Calabar, Onne, Warri & Port Harcourt)

Upgrading Existing Asset Solutions – Upgrading Western Ports

The upgrading of existing Nigerian ports as a solution for providing additional port capacity has been partly discussed in the previous chapter. The four Eastern ports (Calabar, Onne, Port Harcourt and Warri) all have significant drawbacks when considering their upgrading to appropriate levels (vessel draft of 15 meters, short access from the seaside and sufficient landside expansion possibilities).

Lagos

Besides upgrading the smaller ports, it can be considered to upgrade the Lagos port complex. This is an appropriate solution to decrease congestion on the port's seaside, where ships are often waiting to be berthed. However, a main problem for the Lagos port complex is its congestion on the landside. Adding capacity at the seaside means that the burden on the landward side will be even higher. This is regarded as one of the potential drawbacks of the western port projects in Badagry and Lekki and also yields for the upgrading of the Lagos ports: hinterland transport connectivity is one of the key characteristics of ports that should be taken into account here.

Furthermore, the upgrading of the ports in Western Nigeria will not be a solution for the Eastern part of the country. The Strategic Needs Assessment provided sound evidence for the development of gateway capacity to Eastern Nigeria. Improving the port of Lagos does not provide this, since the road-based transport within Nigeria would not change under this 'solution'.

Table 3.2 – Upgrading Existing Assets in Western Nigeria

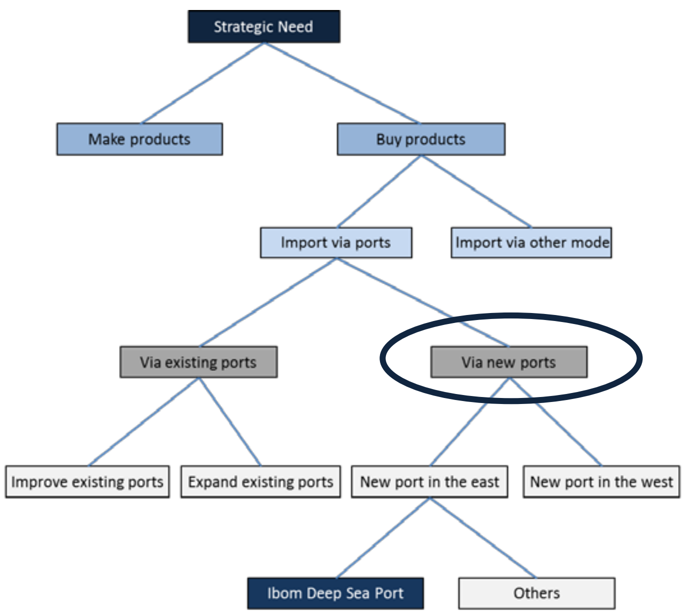
Possible Solution	Solution?	Main Rationale
Non Asset Solutions		
Upgrading existing ports in Western Nigeria	No Solution	Landside congestion; no solution for Eastern Nigeria

Content

New Asset Based Solutions

Next to the non-asset solutions or the use/upgrading of existing assets, a final category of service delivery options are the new asset based solutions. These solutions are based on the development of new infrastructure to provide the required port gateway capacity to Eastern Nigeria. Developing a new gateway port in Eastern Nigeria has the following implications regarding its required developments:

- Land development (clearing, stabilising, reclamation)
- Nautical development (channels, port basins, breakwaters, quays and jetties)
- Terminal development (pavement, superstructure, equipment)
- Hinterland connections (road, rail, utilities)



From the Strategic Needs Assessment, it has been concluded that there is a clear need for developing additional port gateway capacity in Eastern Nigeria. While the western part of the country currently has a large port complex at Lagos, and multiple proposed port development projects in its proximity (Lekki, Badagry and Olokola), the eastern part of the country lacks a port of significant size and depth (i.e. TEU capacity of > 500,000/annum, possible future berth extensions, within an industrial development, with close access to the deep sea).

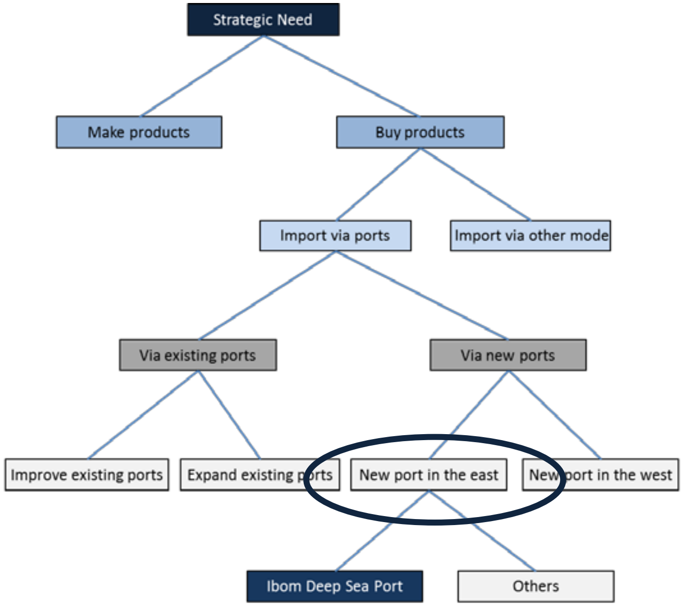
Over 40 million inhabitants of the south-eastern part of Nigeria currently rely on the port of Lagos and to a much smaller extent on ports in the region (Calabar, Onne, Warri and Port Harcourt). Both Lagos and the Eastern ports show that efficiency in the transport chain is low: when using Lagos' port, the landside part of transport is long and time-consuming. When using the smaller ports in the region the sea-side part of transport does not benefit from economies of scale that can be achieved when using a large Deep Sea gateway port in the East.

The single most promising option to overcome these inefficiencies is the construction of a new deep sea port in eastern Nigeria. This will bring significant additional port capacity to a region that currently has a strong need for this capacity. Next to this function, the port will also have a positive influence on a region with a large demand for new jobs. A seaport and surrounding premises will cater for high numbers of new jobs in the region, both directly as a result from the port's business and indirectly through prosperity growth leading to additional jobs.

New Asset Based Solutions – preconditions

The development of a new seaport in Eastern Nigeria as the single most promising option for the creation of Eastern gateway port capacity comes with certain preconditions in order for it to succeed. These preconditions mostly relate to the development of competing ports. The analyses carried out for this Outline Business Case conclude that – from an economic perspective – there is room for one deep sea port in Eastern Nigeria. The development of Ibom Deep Sea Port therefore can only be carried out in a viable manner if no other deep sea port capacity is developed in the region. Ibom Deep Sea Port should be the single deep sea port development east of the imaginary line drawn in the figure below.

Figure 4.1 – New Asset Solution in East of Nigiera



Content

PPP Structuring – Introduction

Next to the selection of the preferred service delivery option, this section deals with the need to structure the project as a Public Private Partnership (PPP) in the most optimal way. Despite large scale privatization of Nigerian ports since 2004, port development remains a public task, with the Nigerian Ports Authority (NPA) being Nigeria's one and only port landlord. This implies that no gateway port capacity can be developed without the direct involvement of the NPA.

In accordance to the NPA act and in accordance to international best practices, private sector should be involved to provide capital and operational excellence:

- **Private capital**: to alleviate government budgets
- **Operational excellence**: for efficient operations, market driven demand, access to markets and negotiation power

PPP structuring

Selecting the preferred Public-Private Partnership (PPP) structure for the implementation of the Ibom Deep Sea Port and Free Trade Zone project (Ibom DSP Project) is one of the key aspects driving the successful implementation of the project:

- The PPP structure drives project feasibility and project bankability
- The PPP structure determines the PPP Procurement Plan and the required profile of private sector bidders
- The PPP structure is an important means for the public sector to ensure its strategic objectives are met

Strategic objectives for PPP structuring

Multiple PPP structures are available when developing an infrastructure project. For the Ibom DSP Project, the main selection criteria are:

- **Value maximisation:** ensure maximized value for the public sector, while ensuring attractive returns for (private) investors to ensure project bankability. This is, amongst others, realized by defining an optimal risk allocation scheme between the parties involved.
- **Level of public control:** ensure sufficient level of public control over strategic (port) infrastructure assets.
- **Do-ability:** ensure political and social acceptance, facilitating public decision-making.
- **Speed of implementation:** ensure that the project is executed by 2015.
- **Market appetite:** yield sufficient market appetite for the project, ensuring PPP tender competitiveness and optimized bids.

PPP Structuring – PPP Options

Reference is made to the PPP Structuring Section in the Project Procurement File for more details on this topic.

PPP structuring options

For the Ibom Deep Sea Port and Free Trade Zone project, three principal PPP structuring options are distinguished, as presented below:

1. **Landlord Model**, where the national port authority (NPA) acts as the landlord and concession agreements are tendered out for the specific terminals to private sector investors/operators (current situation in Lagos).
2. **Port Development & Management Company Model (PDMC),** where the NPA has a Concession Agreement with a Port Development & Management Company (PDMC) comprising a public/private shareholding structure. The PDMC is responsible for the development of the project and is allowed to establish sub-concession contracts with private terminal operators or develop and operate its own terminals (proposed situation in other greenfield deep-sea port projects in Nigeria: Lekki, Badagry, Olokola).
3. **Build-Operate-Transfer Model (BOT),** with NPA handing over the full project to the private sector, making them responsible for the development of the entire project (individual or as consortium).

Preferred PPP option(s)

Based on the strategic objectives for the project and the identified advantages and disadvantages of the various PPP structures as further described in the Project Procurement File, the three PPP options are evaluated in a multi-criteria analysis. In line with the strategic objectives, the following criteria and weights are applied in the evaluation:

- Value maximisation (10%)
- Level of public control (20%)
- Do-ability (10%)
- Speed of implementation (30%)
- Expected market appetite (30%)

The results of the multi-criteria analysis of the three PPP options are shown in the table on the next sheet

PPP Structuring – Evaluation and Preferred PPP Model

Reference is made to the PPP Structuring Section in the Project Procurement File for more details on this topic.

Table 5.1 – Multi-Criteria Analysis for selection of Preferred PPP model of Ibom DSP project

PPP options	Value maximisation	Level public control	Do-ability	Speed of implementation	Market appetite	Scoring
Weight	*10%*	*20%*	*10%*	*30%*	*30%*	*100%*
1. Landlord Model	3	5	3	2	5	**3.7**
2. PDMC Model	5	3.5	5	5	4	**4.4**
3. BOT Model	2	1.5	2	3	1	**1.9**
Total	*10*	*10*	*10*	*10*	*10*	***10***

A more detailed overview of the MCA scoring results is presented in the table on the next page.

PDMC Model as the recommended PPP option for Ibom DSP

As further explained in the next sections, the Port Development & Management Company Model (PDMC) is recommended as most suitable for the Ibom DSP Project. It combines the interests of the public and private sector in the best manner and scores well on the financial objectives of the public and private side. Most importantly, it ensures sufficient level of private capital, expertise and commitment to manage and drive the Ibom DSP Project implementation in a fast and efficient manner. The PDMC Model is also in line with other greenfield port projects currently undertaken or proposed in Nigeria (ensure level playing field). The choice for the PDMC Model is also confirmed during the ongoing market consultation carried out with key market players, such as operators, financiers and contractors.

In the procurement preparation of the project, the possible structures will be discussed extensively. For the Service Delivery Options, the conclusion is that the recommended structure for the Ibom DSP Project is a PPP. This conclusion will be analysed and further elaborated on in detail in the Procurement Procurement File.

PPP Structuring – Description PDMC

Reference is made to the PPP Structuring Section in the Project Procurement File for more details on this topic.

The proposed implementation of the Public Private Partnership for Ibom DSP's development is based on a Port Development & Management Company Model as visualized in the figure below.

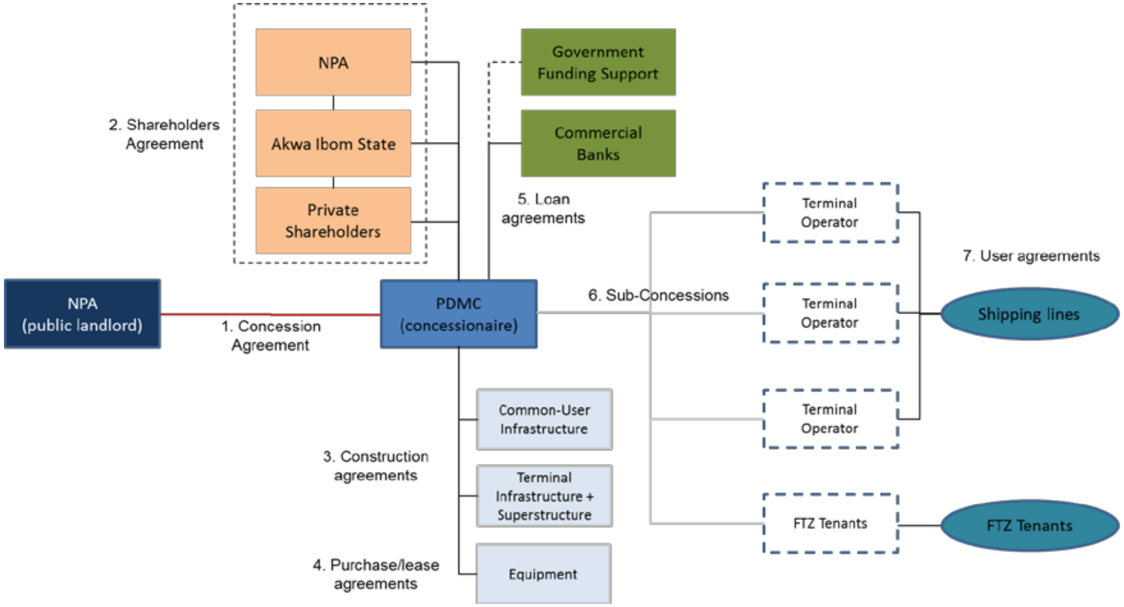


Figure 5.1 – Envisaged PPP structure for Ibom DSP

- The PPP structure for the Port Development & Management Company consists of a Concession Agreement between the NPA (Grantor) to the Port Development & Management Company (PDMC) who is responsible for the development of the Ibom DSP Project.
- The PDMC's shares are divided amongst the Federal Government with NPA as the representative, Akwa Ibom State Government and the private sector (company/consortium), where the majority of the shares are privately owned.
- The PDMC is responsible for **all** investments in common-user infrastructure (including access road, dredging, channel, breakwater, free trade zone, terminal infrastructure, superstructure and equipment). The PDMC has the right to enter into sub-concession contracts with separate terminal operators or service providers. These sub-concessionaires may then invest in the terminal's superstructure and equipment.
- The PDMC is responsible to arrange the debt financing with banks (and/or bond holders) to finance part of the PDMC's investments.
- To ensure the committed capex contribution by the public sector, while preventing a too large public shareholding in the private PDMC, Government Funding Support in the form of soft loans are required.
- Concession Payments between PDMC and NPA are structured as fixed landlease and variable royalty payments . The royalty is structured as a revenue sharing system, which is the primary financial bidding parameter in the upcoming PPP tender.

Government Funding Support for the Ibom DSP Project 1/2

The project's viability from a commercial perspective is proven in the financial analysis. However, from a lender's perspective, the project needs to be "bankable", implying: a focus on Phase 1 and a conservative approach towards tariffs. Project viability can be further strengthened through Government Funding Support (GFS) by the public sector, positively impacting the project's bankability.

Government Funding Support

Government Funding Support (GFS) is a means for the Government to improve critical project characteristics to ensure private involvement in the project and therewith enable the Public-Private Partnership (PPP). In case of the Ibom DSP Project, it is expected that GFS is required to ensure project bankability for the PDMC. Besides, GFS is considered a means to enable the committed 20/20/60 (federal/state/private) project funding structure.

Government Funding Support can be provided in various structures and by various public entities.

Available structures include non-refundable grants, re-fundable grants, (soft) loans and regular loans. For the Ibom DSP Project, it is assumed that GFS shall be in the form of a soft loan. Reasons for this is that a regular loan from the government (on regular commercial terms) would not materially improve bankability from banker's perspective and that (non-refundable or refundable) grant funding is not required due to the positive medium to long term outlook for the project. A soft loan would provide necessary 'seed-funding' for the PDMC and the soft terms are justified by the economic value which is generated by the project.

In the Ibom DSP Project, it is assumed that GFS shall be provided by the Federal Ministry of Finance of Nigeria. As the primary public entities in the project, the NPA (Concession Grantor) and the Akwa Ibom State Government (Concession Co-Signatory) are expected to inject 20% equity in the project.

Other public bodies may be involved in the provision of the GFS. This includes the Petroleum Trust Fund (and its successors) or the National Sovereign Investment Agency (NSIA; possibly in combination with the IFC/WorldBank).

For more information, reference is made to section D1 of this Outline Business Case (Financial Feasibility).

Government Funding Support for the Ibom DSP Project 2/2

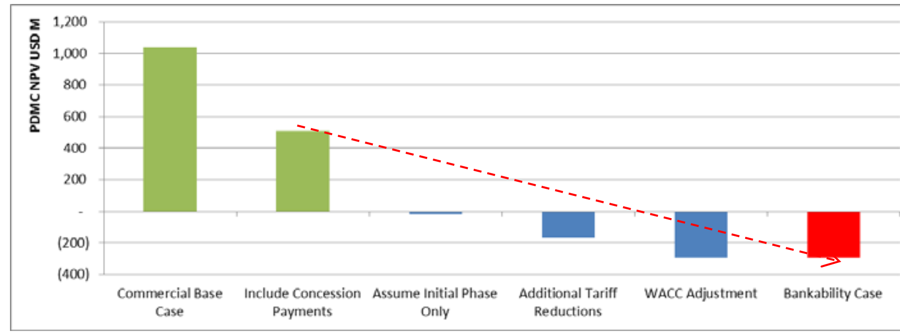
Felak Concept Limited mtbs

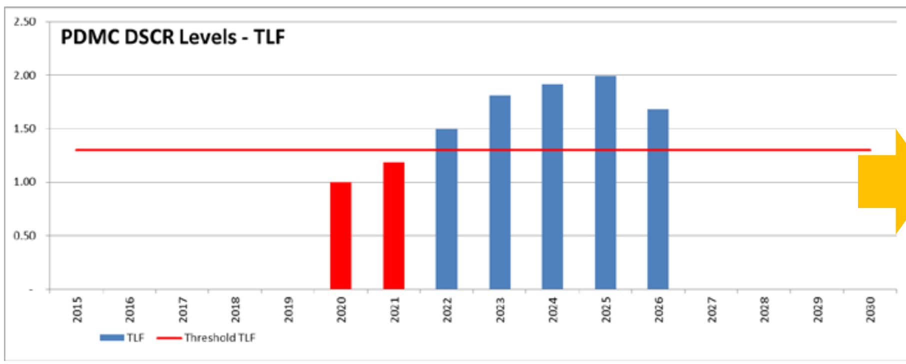
The need for Government Funding Support is justified by assessing the effects on the PDMCs Net Present Value (NPV), Debt Service Cover Ratio (DSCR) and its expected Return on Equity (RoE)

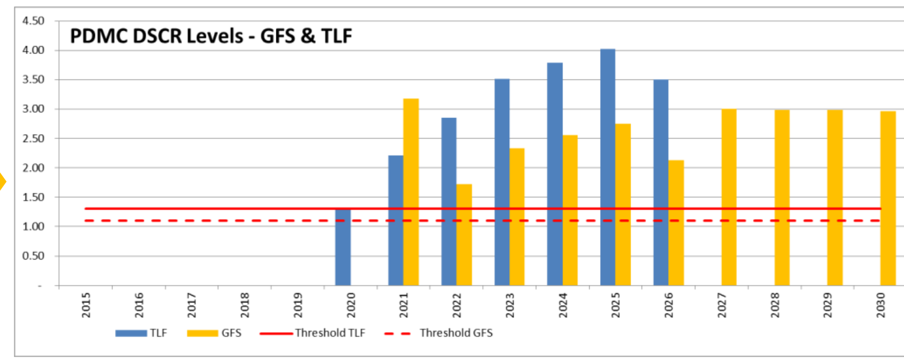
The picture on the right depicts the deterioration of PDMC NPV when considering the project from lenders' perspective. It shows the need for GFS.

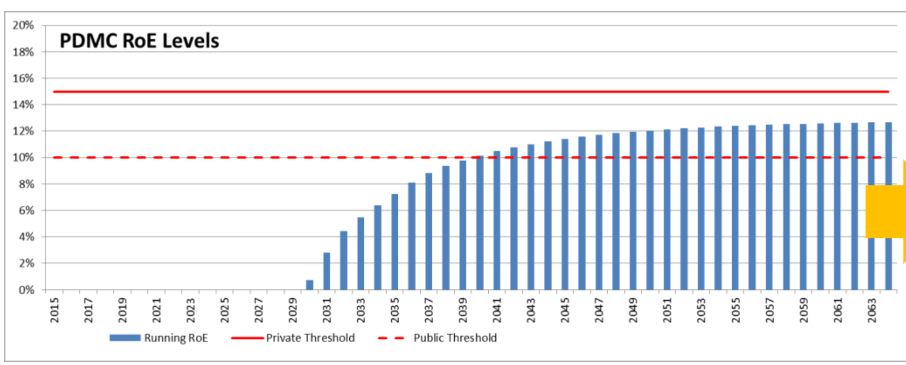
The graphs below show the positive effects of GFS on critical funding drivers: DSCR (lenders) and RoE (investors)

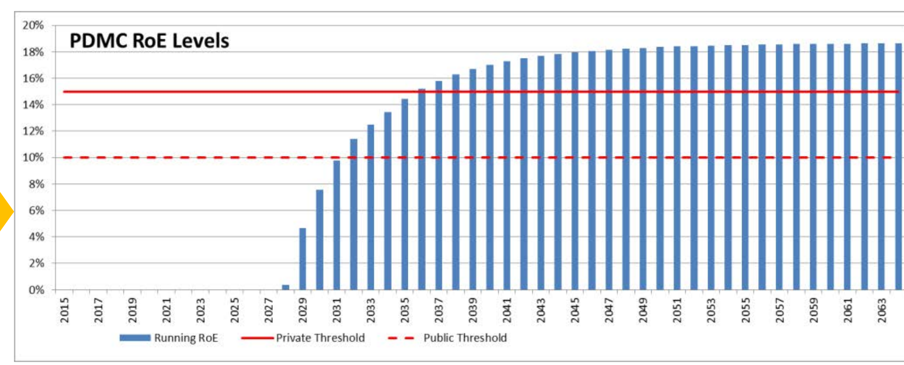
Government Funding Support (GFS) is further assessed in the Outline Business Case, section D1: Financial Feasibility











Content

Conclusions

The main conclusion from the analysis of Service Delivery Options is that there is need for an additional seaport of significant size in Nigeria in order to reduce port congestion. The port's proposed location in the south-eastern part of Nigeria is selected for the reason of a lack of port capacity in that region, as was discussed in chapter 4:

Table 6.1 – Overview of Service Delivery Options

Possible Solution	Solution?	Main Rationale
Non Asset Solutions		
Reduce dependency on ports	No Solution	Will not reduce port throughput in such a manner that it will solve the congestion problem
Handle cargoes via other transport modes	No Solution	Will not be possible via neighboring countries' ports. Impossible to handle all cargoes via airports.
Improve efficiency at eastern ports	No Solution	Eastern ports have too little capacity, too little draughts or are already congested
Upgrading Asset Solutions		
Upgrading existing ports in Eastern Nigeria	No Solution	Costly dredging due to location far from sea (Calabar, Onne, Warri & Port Harcourt)
Upgrading existing ports in Western Nigeria	No Solution	Landside congestion; no solution for Eastern Nigeria
New Asset Based Solutions		
Development of gateway capacity to Eastern Nigeria	Solution	Will provide much needed port capacity, with many future growth options & job-creation in the area

The development of gateway port capacity in Eastern Nigeria is regarded as the best Service Delivery Option for Nigeria's economy. In accordance to existing policy and international best practices, implementation of this solution should be through a public-private partnership.

The preferred PPP structure is in the form of a Port Development and Management Company (PDMC). The PDMC's shares are divided over the Federal government with NPA as the representative, Akwa Ibom State government and private sector (company/consortium), where the majority of the shares are privately owned. The PDMC is responsible for all investments in common-user infrastructure, superstructure and equipment. The PDMC has the right to enter into sub-concession contracts with separate terminal operators. These sub-concessionaires may then invest in the terminal's superstructure and equipment.

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs
maritime & transport
business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

TECHNICAL OPTIONS ANALYSIS

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Technical Options Analysis
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Contents

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs
maritime & transport
business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

TECHNICAL PRE-FEASIBILITY STUDY

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Akwa Ibom

Transaction Advisors:

Felak Concept Limited

mtbs maritime & transport business solutions

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Technical Pre-Feasibility Study
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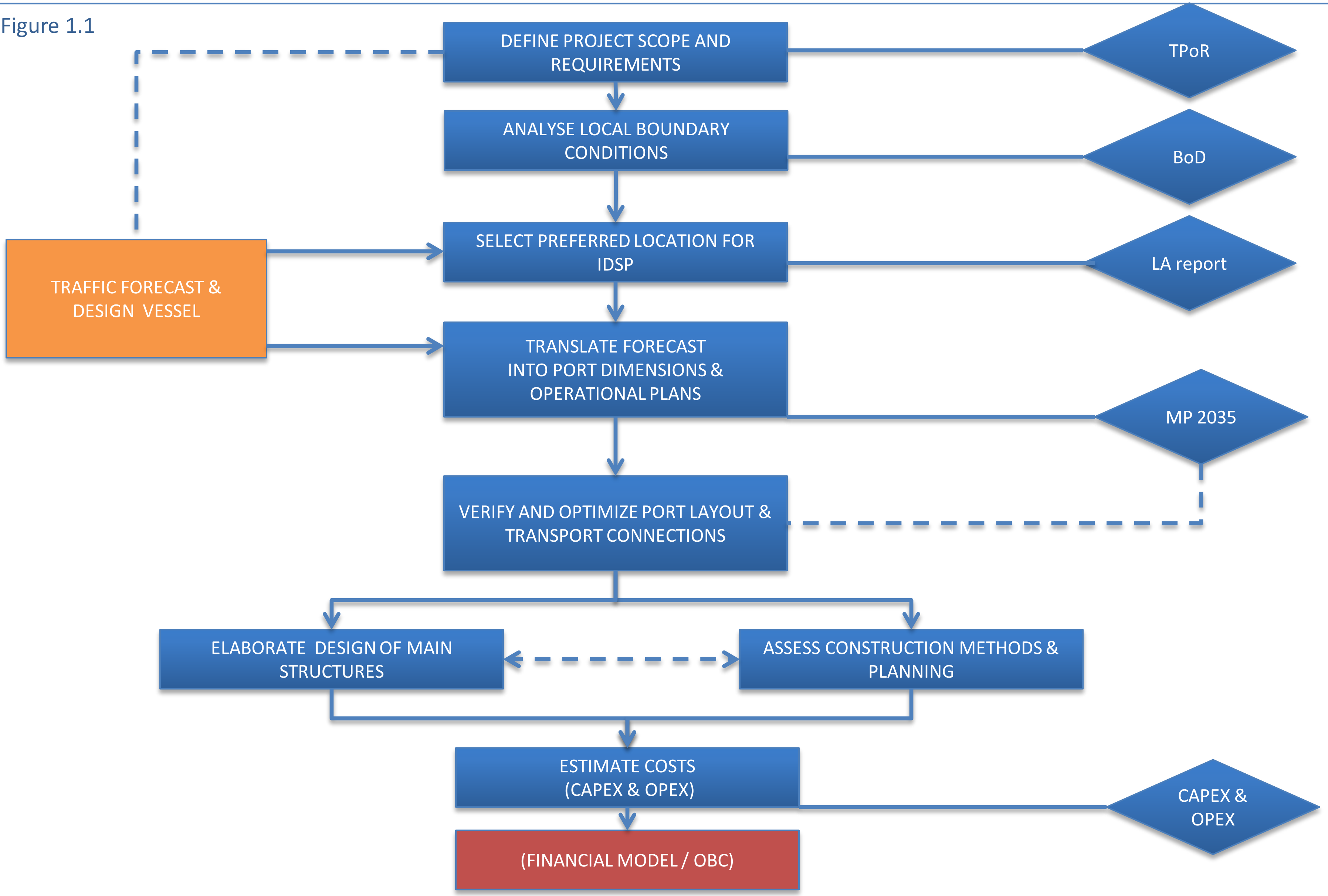
Section 1 - Methodology for port planning and pre-feasibility design

The adopted methodology is based on the following steps of port planning and engineering:
(elaborated further in the corresponding Sections and OBC Supporting Documents, between brackets)

- Define the scope of the project (Section 2; Technical Program of Requirements – Sup.Doc. TF-1).
- Establish the physical boundary conditions (Section 3; Basis of Design – Sup.Doc., TF-2) at the selected location (Section 4, Location Alternatives Report – Sup.Doc. TF-3).
- Assess the development of cargo throughput in time for all commodities (Traffic Forecast – OBC Annex).
- Based on future cargo throughput, developments in the ship sizes and comparable/competitive projects define the Design Vessel characteristics (Traffic Forecast – OBC Annex).
- Based on operational assumptions (TPoR) translate the traffic forecast into number and length of berths, size of terminal areas (Section 5); define corresponding operational systems (Section 7).
- Assess the hinterland transport options; define interfaces and related infrastructure for all modes of transport in the Master Plan (Section 5).
- Assess the nautical infrastructure (approach channel, harbour entrance, turning circle(s), basin) (Sections 5,6)
- Verify and optimize port lay-out with nautical simulations, wave study (Section 6).
- Elaborate feasibility design of main structures (Section 8; Sup.Doc. TF-6).
- Assess construction methods for main structures and port development (Section 9).
- Integrate Master Plan and Phase 1 dimensions and feasibility design of structures into quantities for CAPEX cost estimates (Section 10; Sup.Doc. TF-7); assess OPEX corresponding with chosen operational systems.

The described methodology has been visualized in a flow chart in Figure 1.1.

Figure 1.1


DEFINE PROJECT SCOPE AND REQUIREMENTS
TPoR
ANALYSE LOCAL BOUNDARY CONDITIONS
BoD
TRAFFIC FORECAST & DESIGN VESSEL
SELECT PREFERRED LOCATION FOR IDSP
LA report
TRANSLATE FORECAST INTO PORT DIMENSIONS & OPERATIONAL PLANS
MP 2035
VERIFY AND OPTIMIZE PORT LAYOUT & TRANSPORT CONNECTIONS
ELABORATE DESIGN OF MAIN STRUCTURES
ASSESS CONSTRUCTION METHODS & PLANNING
ESTIMATE COSTS (CAPEX & OPEX)
CAPEX & OPEX
(FINANCIAL MODEL / OBC)

Contents

Section 2 - Technical Program of Requirements

Objectives of the Technical Program of Requirements

The Technical Programme of Requirements (TPoR) defines the minimum requirements for the pre-feasibility plan for the Ibom Deep Sea Port.

The TPoR includes the following requirements:

- Scope requirements for Ibom Deep Sea Port & Free Trade Zone: which elements and infrastructure should be included in the project, which not?
- Provide operational requirements for terminals, nautical accessibility and hinterland connectivity
- Provide technical requirements for conceptual design of infrastructure (and thus for CAPEX and OPEX).

The detailed TPoR is included as Appendix TF-1 in the Supporting Documents to the OBC.

Scope definition of Ibom DSP in the TPoR

The Ibom Deep Sea Port and Free Trade Zone are defined by the following elements:

- **Access channel** for deep sea vessels
- **Anchorage area** for vessels waiting for a free berth or use of access channel
- **Port basin** for ship manoeuvring and (un)mooring
- **Breakwater** or dam, to provide shelter for manoeuvring and cargo handling
- **Berths and terminal area** for containers, general cargo, dry bulk, liquid bulk, Ro-Ro (optional: LNG)
- Terminal **superstructure, equipment and facilities** for all expected cargo types
- **Supply base** for the oil & gas industry (possibly to be extended with a ship repair yard in the future, for oil & gas supply vessels, port craft, minor merchant vessels)
- Berths, area and facilities for **maritime service providers** (tugs, pilots, service vessels, etc.) and for **naval security** (navy vessels, separated from the rest)
- **Utilities** (power, water, sewerage etc.: self-supporting terminals at start, centralized in next stage
- **Connectivity** to existing network: road (from start project), rail (future), pipeline (future) and communication (from start)
- **Free Trade Zone** for logistical and added value activities
- **Port Commercial Centre**, providing area for development of port related commercial business (PDMC, agents, banks, forwarders, shipping companies, leisure): offices, real estate, hotel & restaurants, etc.

Section 2 - Technical Program of Requirements (TPoR)

Contents of the TPoR – Operational Requirements

- The TPoR contains the following types of requirements:

- Vessel parameters and design vessel: LOA, DWT, draught, beam, etc.
- Access channel requirements: 1 / 2-way, service level, etc.
- Harbour basin requirements: depth, width, turning basin, etc.
- Breakwater requirements: overtopping, design period, etc.
- Berth requirements: crane loads, berth dimensions, accessories (fenders, bollards) etc.
- Terminal area requirements: bearing capacity, drainage, etc.
- Connectivity requirements: road, rail, pipeline, etc.
- Requirements regarding utilities: types and capacities

- Most requirements have been derived from international standard practices (e.g. PIANC) or from Consultant's world wide experience in port development projects
- Vessel parameters are presented in Section 5, details of all other requirements can be found in OBC Supporting Documents TF-1 (TPoR – full document)

Contents of the TPoR – operational assumptions

- The TPoR contains the following types of operational assumptions:

- Call sizes
- Berth productivity
- Storage parameters
- Maximum loads in quay zone, other areas
- Hinterland transport assumptions

- The most relevant assumptions are presented in Section 5,
- Details of all other assumptions can be found in OBC Supporting Documents TF-1 (TPoR – full document)

Contents

Wind and wave climate

The region has a moderate wind climate, where winds from the South and South-West prevail

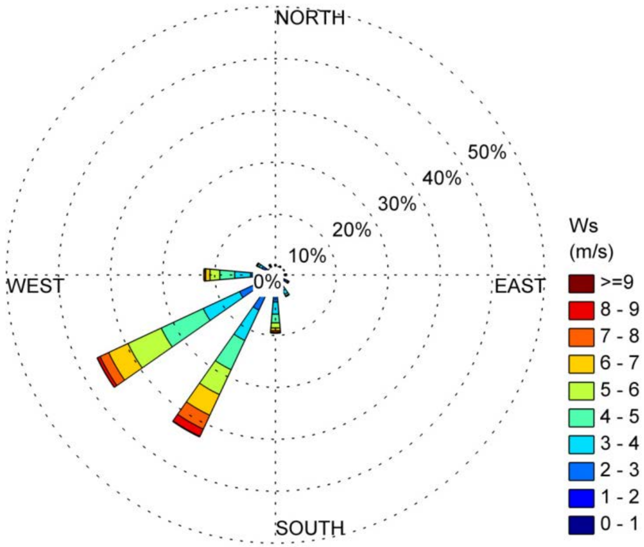


Figure 3.1 - Offshore wind rose and wind speeds for the project area

(source: European Centre for Medium Range Weather Forecasts or CMWF, period 1979-2012)

The region has a moderate wave climate, dominated by swell (long period waves) from the South / South-West:

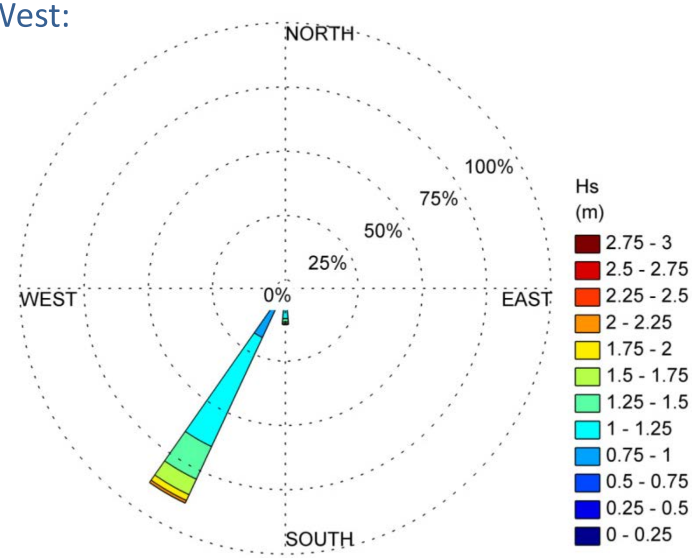


Figure 3.2 - Offshore wave rose and wave heights for the project area

source: ECMWF, period 1979-2012

Water levels and currents

Water levels

- Reference level is Chart Datum (CD), approximately corresponding with lowest astronomical tide.
- The tidal range varies roughly between CD and CD + 2.2 m; Mean Sea Level (MSL) is at CD +1.066m.
- Figure 3.3 shows water level variation around Mean Sea Level (MSL), throughout the year.

Currents:

- Tidal current patterns along the coastline are predictable and vary around 0.2 - 0.4 m/s (< 1 knot).
- Current patterns are more complex and velocities increase further up the estuary (1-3 knots).
- Wave driven currents are moderate and limited to the dynamic surf zone.
- The figure below shows the typical large scale current pattern in the Gulf of Guinea (red arrows related to flood and blue arrows to ebb).

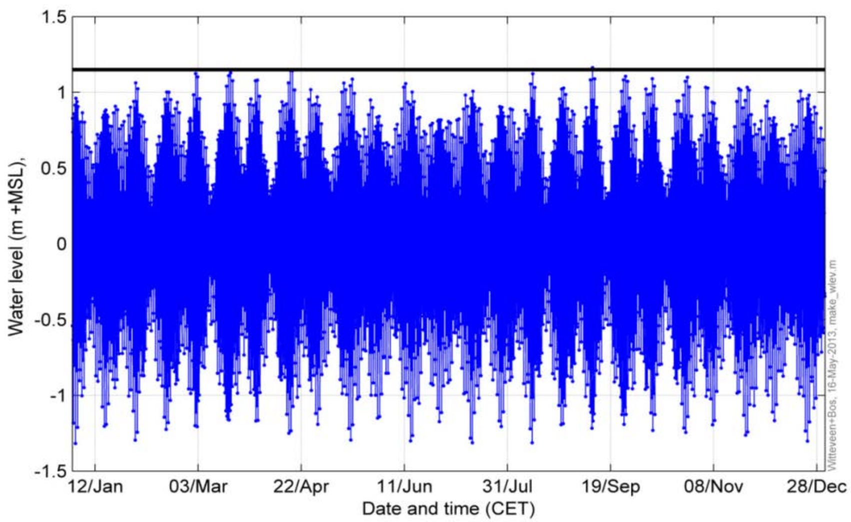


Figure 3.3 – Recorded water levels at Jamestown, over a one year period (2010)

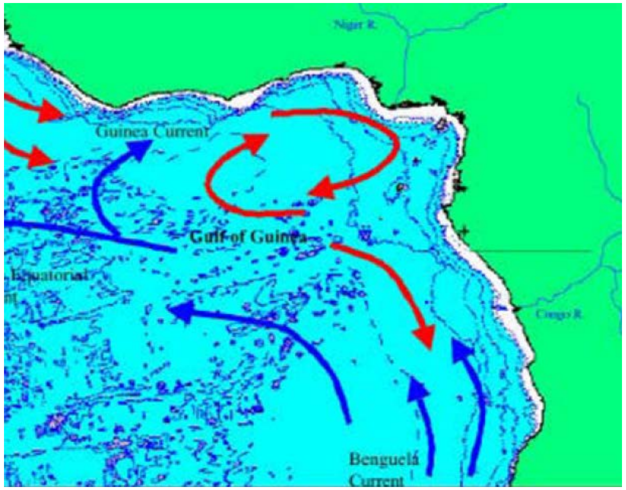


Figure 3.4 – Large scale current patterns in the Gulf of Guinea

Geology and subsoil conditions

- Limited knowledge, based on Consultant's geological desk study and interviews with local experts.
- Subsoils expected to consist of sandy, silty and clayey sediments.
- Large variation is expected in gradation and thickness of layers.
- Geological desk studies indicates that top of bedrock should not be expected above -60 to -100 m; Geophysical survey does not contradict this.
- Geotechnical data shall be obtained through extensive geotechnical survey works, both on- and offshore.

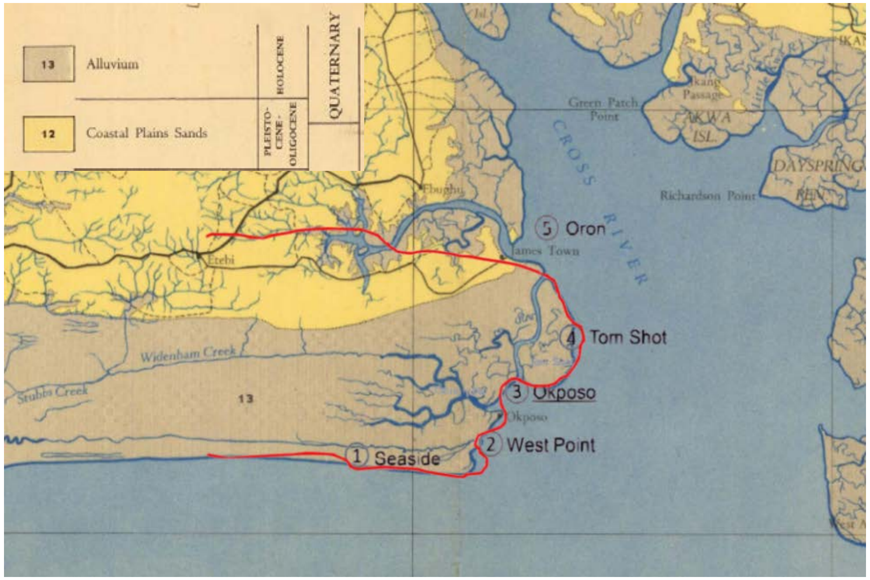


Figure 3.5 - Regional geological profile
(Ref: Geological Survey of Nigeria 1957)

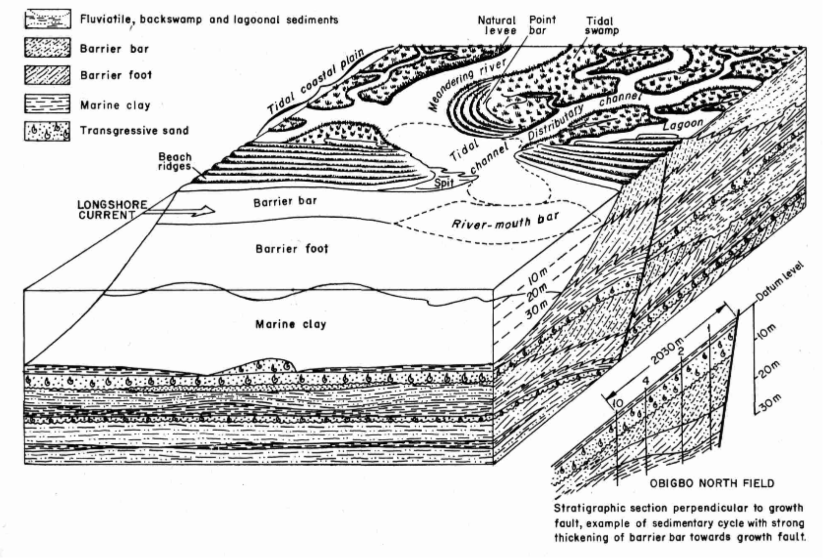


Figure 3.6 - Typical cross section
(Ref: Sedimentological aspects of oil fields in the Niger delta, K.J. Weber, 1971)

Section 3 – Boundary conditions for IDSP

Geomorphology and sedimentation

- The seaside location of Ibom DSP is situated in a zone of coastal accretion, which is illustrated by Figure 3.7.

Figure 3.7 Signs of coastal accretion in onshore vegetation

Section 3 – Boundary conditions for IDSP

Geomorphology and sedimentation – coastal dynamics

- In the influence zone of the Cross River estuary, sedimentation patterns are less stable and coastal morphology is very dynamic.
- The fast changes of the coastline are well illustrated by the two photographs below:

Figure 3.8 - Illustration of dynamic coastline development

Bathymetry

Admiralty Chart 1387 "Calabar to Bata" shows at scale 1:350,000 the bathymetry in the Bight of Bonny seawards of the Calabar estuary.

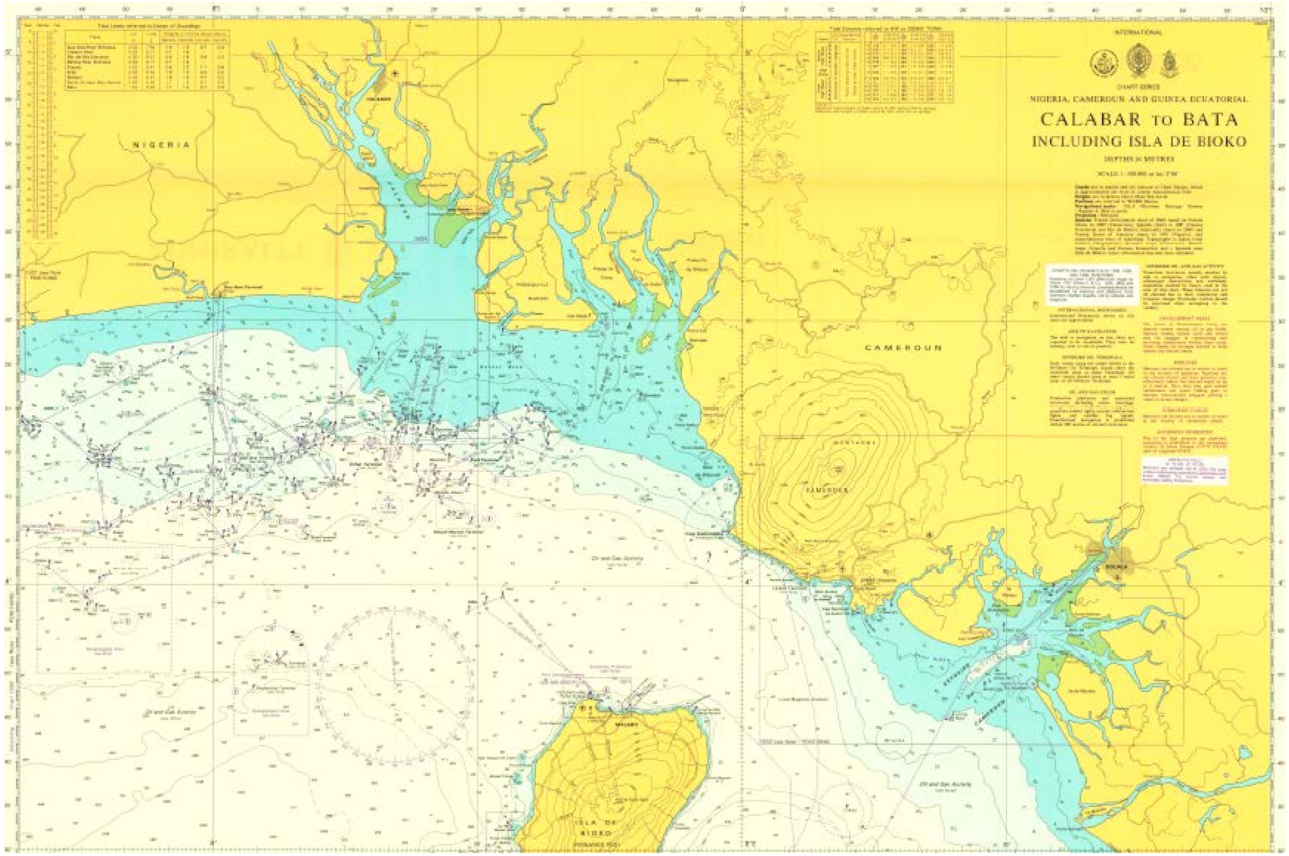


Figure 3.9 - Admiralty Chart 1387 (partly)

Bathymetry

- Admiralty Chart 3433 “Approaches to Calabar” shows at scale 1:50,000 the bathymetry in the Calabar estuary with more detail, however this chart does not extend as far westwards as the preferred location for the development of Ibom Deep Sea Port.
- During development of the Master Plan the Admiralty Charts have served as indication for depths to be expected.
- During the OBC, a bathymetric survey has been executed to verify the depths and has largely confirmed the charted depths.
- The Chart shows the position of the existing Calabar Fairway Buoy at 4° 18'32"N, 8° 14'51"E (source: NPA), which serves as a reference for the alignment of the Ibom Access Channel (red dot).
- The Fairway Buoy depicts the border between the Calabar Channel and the port’s nautical approach from the deep sea.
- Latest reported depth at the Calabar Fairway Buoy is -23.5 meter CD (source: NPA)

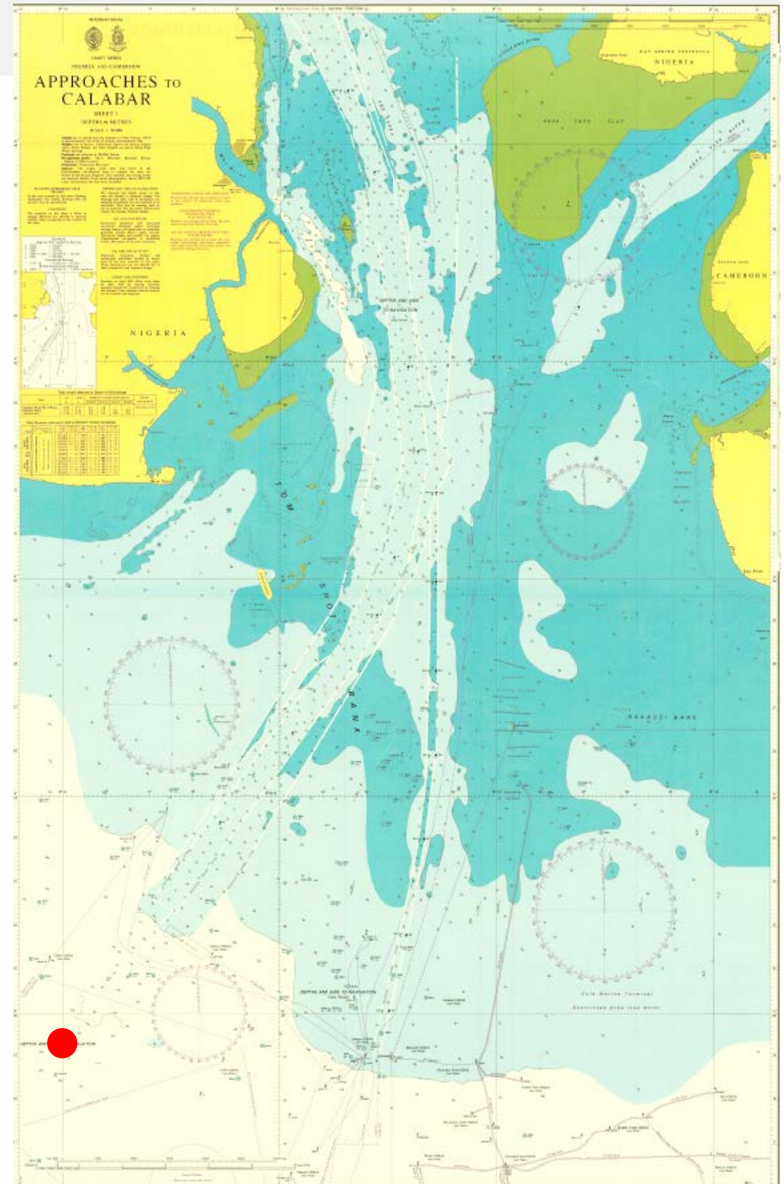


Figure 3.10 - Admiralty Chart 3433

Section 3 – Boundary conditions for IDSP

Bathymetry

- A bathymetric reconnaissance survey is executed in a.o. the nearshore area south of the preferred location for the Ibom deep sea port. It covers in a wide spacing the area where the access channel is to be projected.
- The Calabar Fairway Buoy is positioned just east-southeast (ESE) from the UNA_N anchorage (red dot)
- Generally speaking the bathymetric results confirms the depths of the Admiralty Charts. The seafloor slopes gently from the shoreline to -20 m at approximately 20 km south of the shore, further decreasing to -23.5 at the existing Calabar Fairway Buoy some 24 km from the coast.
- Generally the eastern side of the surveyed region is shallower than the western side, due to the Calabar estuary in the northeast.

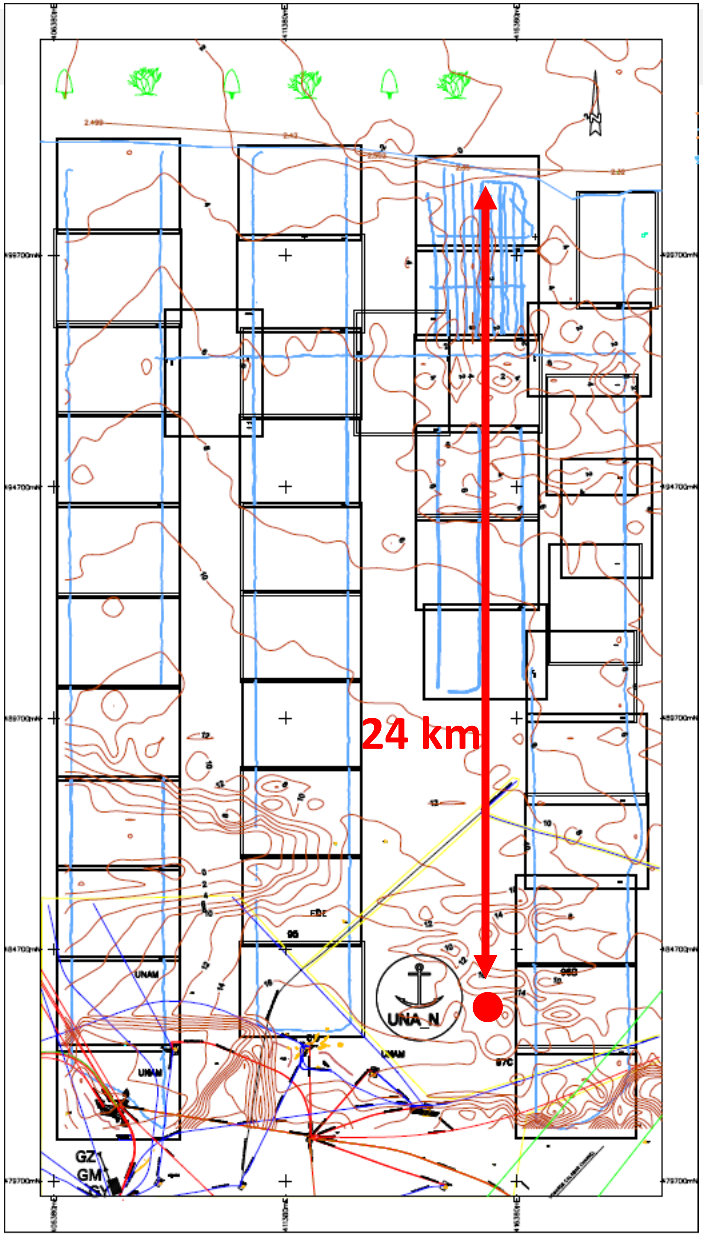


Figure 3.11 - Results from bathymetric survey in the nearshore area

Oil Infrastructure

- An extensive oil infrastructure is present in the region, especially in the zone with -18 to -50 m water depth.
- The vessels coming from the high seas to the Ibom Deep Sea Port have to cross this zone.
- Limited dredging works are expected in this zone, as these are required for depths up to -18 meters (to be elaborated).
- The position of the existing Calabar Fairway Buoy (red dot) indicates
  - that vessels are already safely traversing this area to and from Calabar
  - that vessels coming from Calabar can safely reach the fairway buoy
  - that the NPA, together with DPR are maintaining a navigational corridor for the safe passage of vessels between the fairway buoy and the high seas

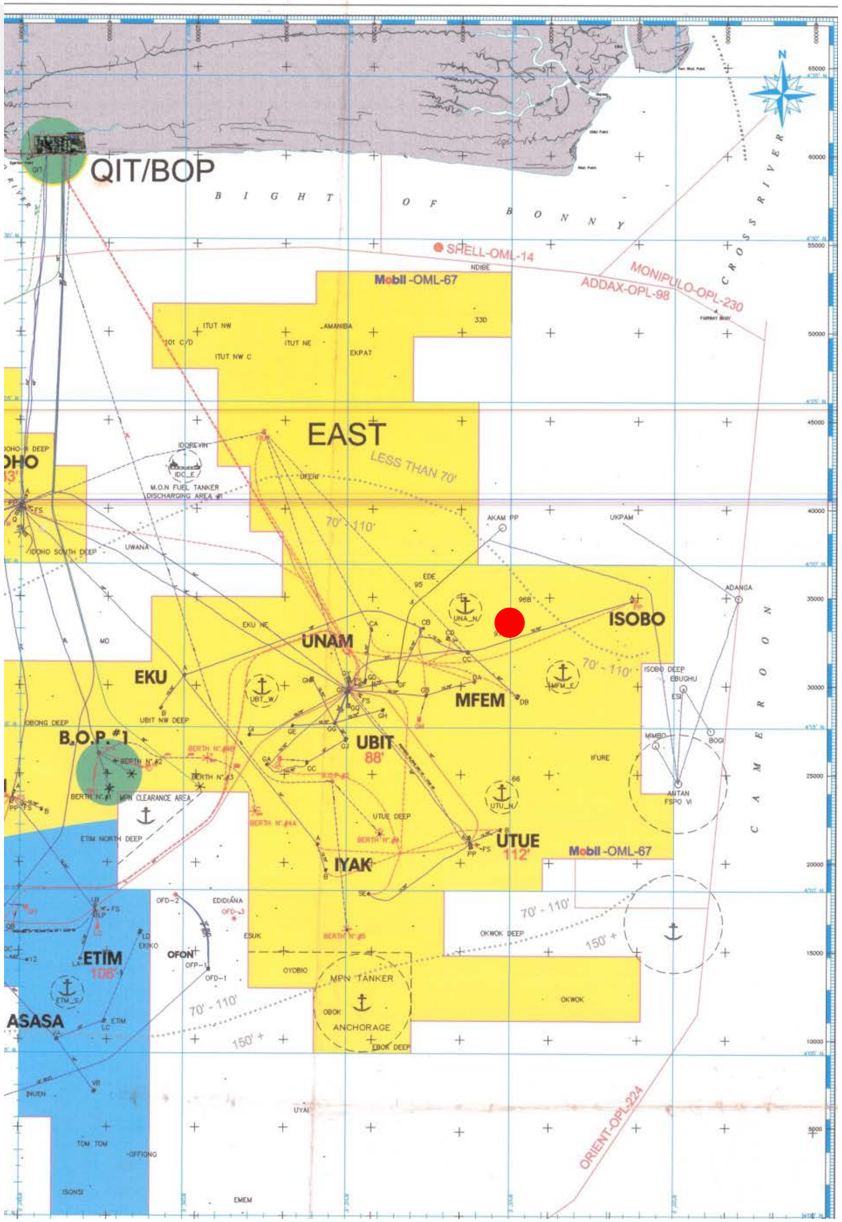


Fig 3.12 - Map showing oil infrastructure (source: Mobil Oil).

Contents

Considered location alternatives

- 5 location alternatives were considered, which are shown in Figure 4.1, below.
- Alternative 5 ("Oron") was excluded at an early stage being outside the Ibom Industrial City boundary and too far up the estuary with consequent large dredging costs
- Alternatives 1 to 4 were compared in a multi-criteria analysis (MCA), both for 2035 and Phase 1.

- Figure 4.1 – Port location alternatives

Comparison of alternatives

The comparison of alternatives for the Master Plan is summarized in Table 4.1 below, demonstrating that Location 1 (Seaside) is the preferred location. For Phase 1 a comparison of alternatives has been made as well, that confirms Location 1 to be the preferred location . The full Location Alternatives Study can be found in OBC Supporting Documents TF-2.

	Location 1 (Seaside	*Location 2 (West Point)*	*Location 3 (Okposo)*	*Location 4 (Tom Shot)*
Compliance with TPoR	0	0	0	0
Nautical accessibility	0	0	0	-
Flexibility of development	+	-	0	-
Environmental impact	+	0	0	--
Social impact	+	-	0	--
CAPEX 2035	+	0	0	-
Maintenance costs	+	0	0	-
Time to market	+	-	-	-
Risks & opportunities	+	0	-	--
(Total score)	(+7)	(-3)	(-2)	(-11)

Table 4.1 – Comparison of port location alternatives

Defining the exact location of Ibom DSP

- Based on nautical charts, deep water is to be expected closer to the shore in western direction; this pattern has been confirmed by the survey, although not fully consistent (shallow parts locally).
- Positioning of Ibom DSP and/or FTZ further west, outside of Ibom Industrial City boundaries should only be considered if advantages are substantial (less dredging for access channel, significantly reduced costs).

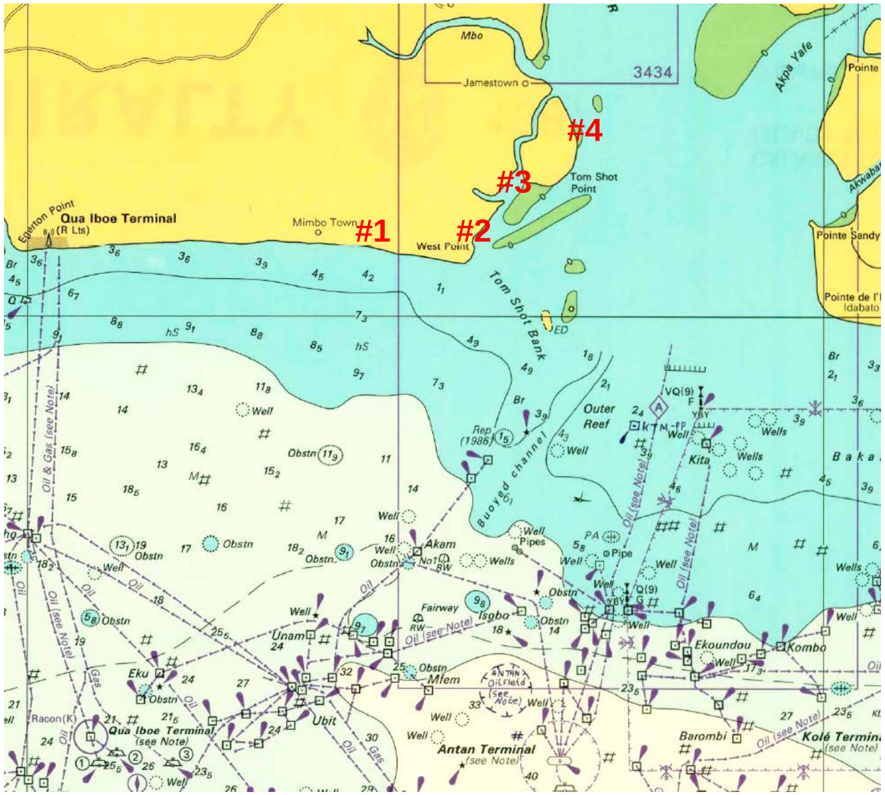


Figure 4.2 – Part of nautical chart indicating bottom contour lines

Defining the exact location of Ibom DSP

- As a final choice for the OBC phase, a location in the SW-corner of IIC area has been adopted (see also next pages).
- The exact location of Ibom DSP can be ‘fine-tuned’ in the FBC phase, with available detailed data on topography, bathymetry, geotechnical research, environmental and social aspects (in full ESIA).

Figure 4.3a – Indicative locations for IDSP and FTZ

Defining the location of the project's concession area

- Based on the selected location of IDSP in the SW-corner of the IIC area, the following coordinates have been selected as boundary limits for the IDSP. An extensive description of the project location's coordinates is presented in OBC Supporting Documents TF-10.
- The exact project coordinates can be 'fine-tuned' in the FBC phase, with available detailed data on topography, bathymetry, geotechnical research, environmental and social aspects (in full ESIA).

Figure 4.3b – Indicative boundary limit for IDSP concession area within the IIC

Point	UTM system	Degree, Minutes, Seconds system[1]
1. (north-west)	N508900, E409500	4°36'13.04"N, 8°11'2.80"E
2. (north-east)	N508900, E416450	4°36'13.25"N, 8°14'48.35"E
3. (south-east)	N500356, E416450	4°31'35.01"N, 8°14'48.64"E
4. (south-west)	N500356, E410600	4°31'34.80"N, 8°11'38.81"E
5. (west)	N502250, E410600	4°32'36.48"N, 8°11'38.74"E
6. (west)	N503500, E410500	4°33'17.18"N, 8°11'35.45"E
7. (west)	N505000, E410500	4°34'6.03"N, 8°11'35.40"E
8. (west)	N508500, E409450	4°35'59.97"N, 8°11'1.20"E

1) Degree, Minutes, Seconds system is converted from the UTM system coordinates. UTM should therefore be considered as the reference system. Consequently, minor deviations might appear for the Degree,Minutes, Seconds system's coordinates due to transformation.

Concession area

- The proposed boundaries for the concession area (including co-ordinates) are indicated below; the shape of the FTZ may be adjusted (less wide, longer) if an access channel further west would be preferred.

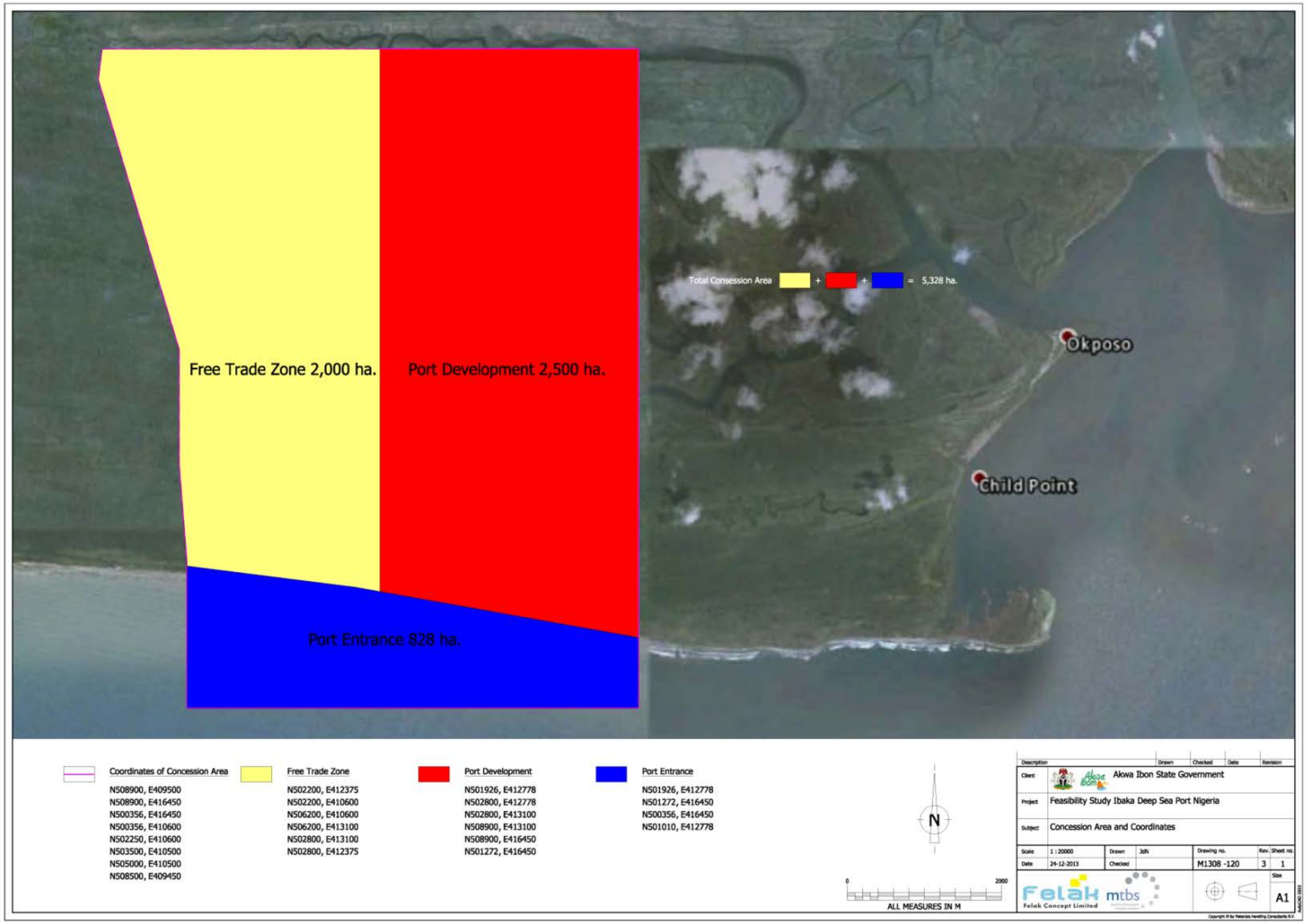
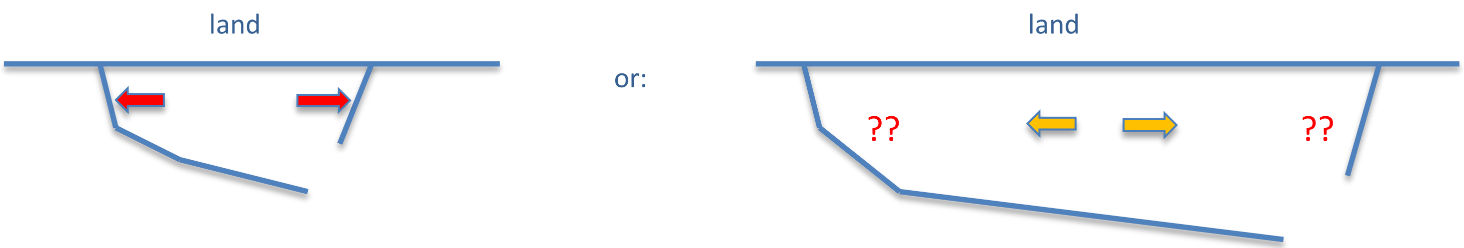


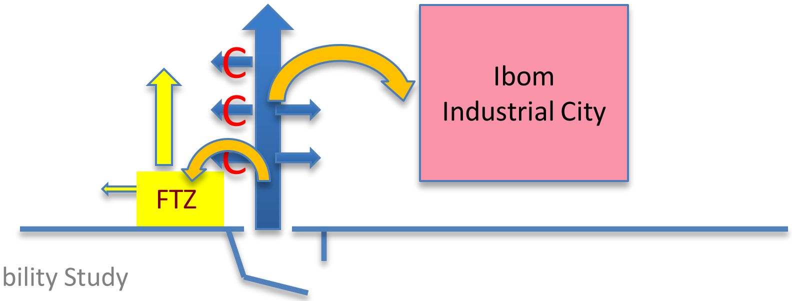
Figure 4.4 – Indicative boundaries for the concession area

Smart development of the seaside location: the 'dig-in' concept

- Accommodating unpredictable future port developments at an exposed seaside location usually leads to spatial constraints and high extra costs for next stages of development, or huge initial investments:



- At location 1, the availability of a very large area for development further inland has lead to a different concept: the dig-in port, which has large benefits when compared with other greenfield ports in Nigeria.
- This concept minimizes the initial costs for breakwaters and reclamation and provides flexibility for step-by-step, just-in-time, relatively cheap, future development.
- This is a proven concept, e.g.: comparable port developments took place in Dubai (Jebel Ali), Kaohsiung and TaiChung (Taiwan), Dunkirk (France), Durban Dig-Out Port (South Africa-under planning) and Ain Sukhna (Egypt).
- The dig-in concept also creates an upward for beneficial use of dredged material (sand) at each step of port expansion: this material can be used for soil improvement, roads, construction, etc., both at the future port terminal, in the Free Trade Zone and for development of Ibom Industrial City.



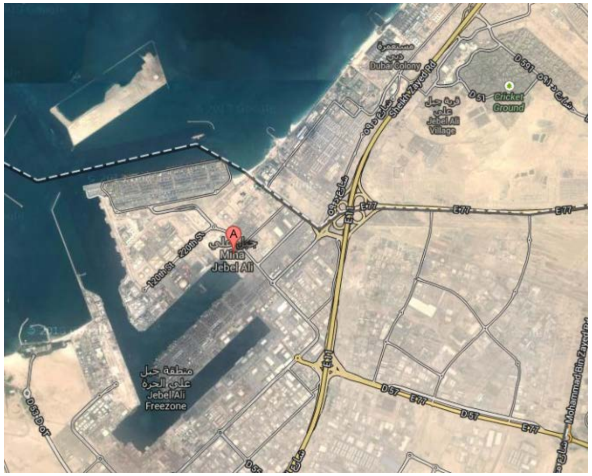
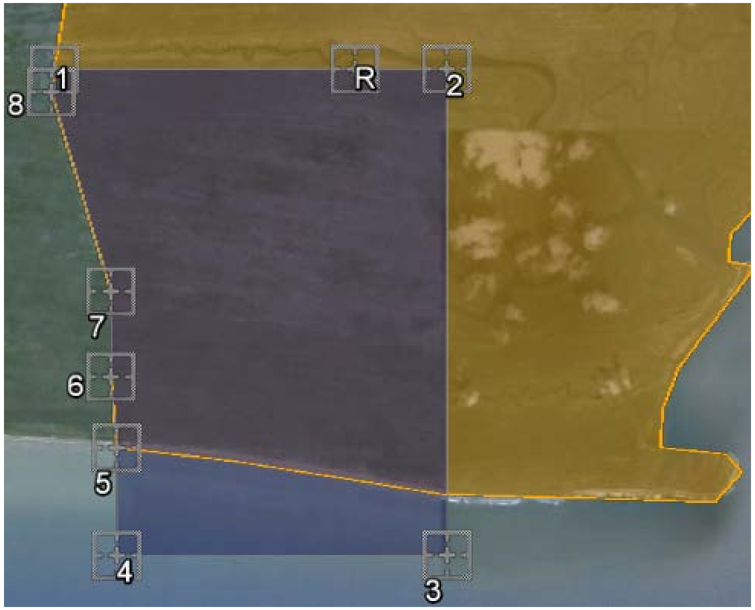


Figure 4.5 - Example of ‘dig in’ ports: from left to right: Jebel Ali (UAE), Durban (SA, under planning) and Ain Sukhna (Egypt)

Defining the exact location of the project's road connection

- The relative western orientation of the concession area within the IIC provides the opportunity to bypass the creek system in the eastern part of the IIC. Therewith, this solution limits costs for soil improvement and brides for road, rail and pipelines
- Based on the selected location of IDSP in the SW-corner of the IIC area, a road connection point has been selected on the northern boundary limit of the IDSP. The figure on the left provides this road connection point "R".
- The figure on the right shows an indicative alignment (in blue) between port site and existing road network. Additional information on the project road coordinates is present in OBC Supporting Documents TF-10.



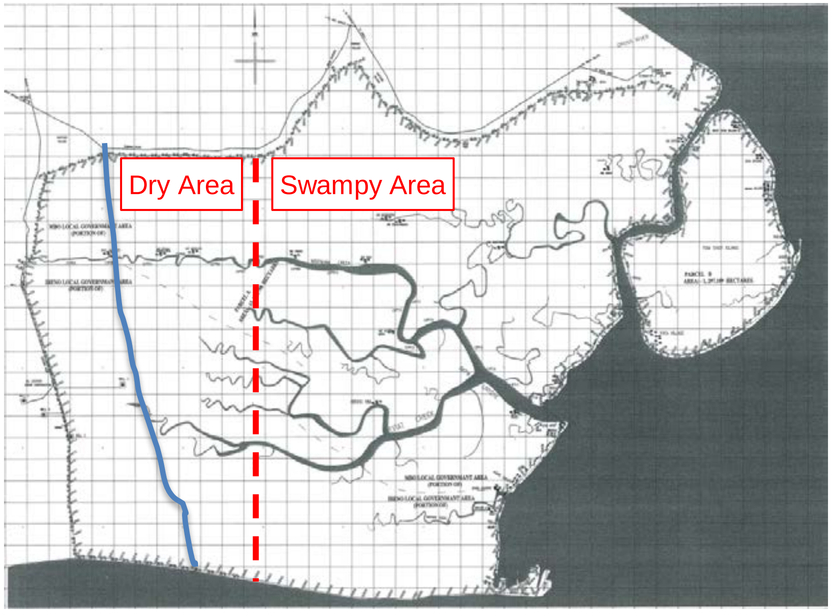


Figure 4.6 – indicative hinterland road connection point and alignment for access road to seaside port location

Point	UTM system	Degree, Minutes, Seconds system
R. "Road Connection"	N508900, E414825	4°36'13.19"N, 8°13'55.62"E
C. "Connection to Highway"	AKSG to supply	AKSG to supply

Contents

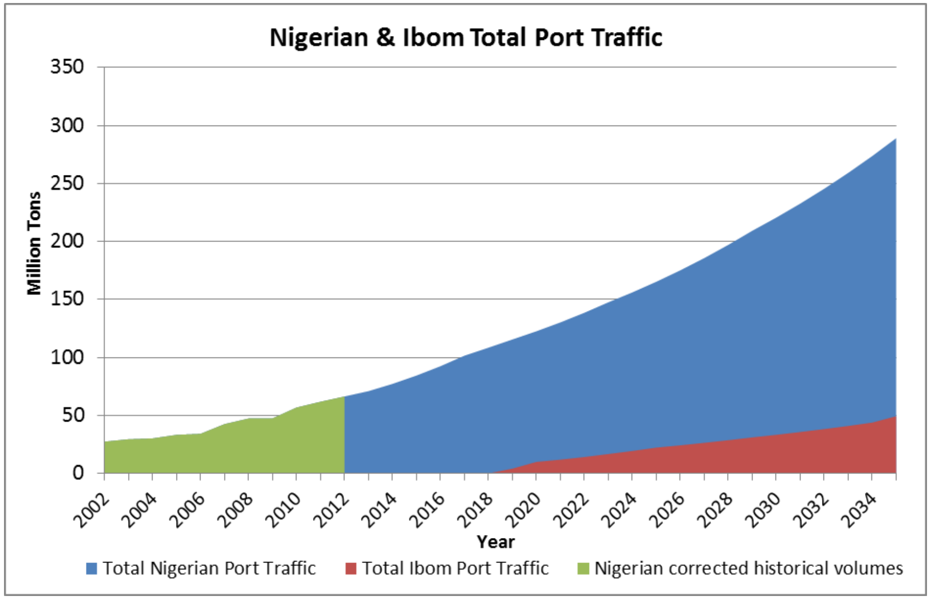
Main objectives and function of the Master Plan

- The Ibom DSP Master Plan for 2035 is a port plan representing a feasible outcome of Ibom DSP development in the period 2018 – 2035.
- The Master Plan for 2035 is based on international-standard design practices and on port operation technology deemed appropriate for a country in transition like Nigeria.
- The Master Plan for 2035:
  - meets all requirements set in the TPoR.
  - accommodate all cargo throughput predicted for 2035 by the traffic forecast.
  - provide flexibility for variations in speed and scope of development.
  - allow for ample port expansion beyond 2035 (be 'future-proof').
  - be a guideline for efficient land use by the future port authority / PDMC.

- All CAPEX and OPEX required to materialize Master Plan 2035 are used as input for the OBC financial model; generating input for the OBC is an important objective of the MP in this phase.
- The Master Plan, the pre-feasibility design and all cost estimates are based on desk studies, bathymetric surveys and expert assumptions.
- Uncertainty in planning and design parameters (e.g. no geotechnical survey data available) have been allowed for by conservative design and risk factors.
- The adopted traffic forecast and the main operational and port planning assumptions that have lead to the Master Plan for 2035 are listed on the following pages.

Adopted traffic forecast (medium growth scenario)

Demand & Capacity Development: National & Regional Demand (left) & Ibom DSP Demand (right)



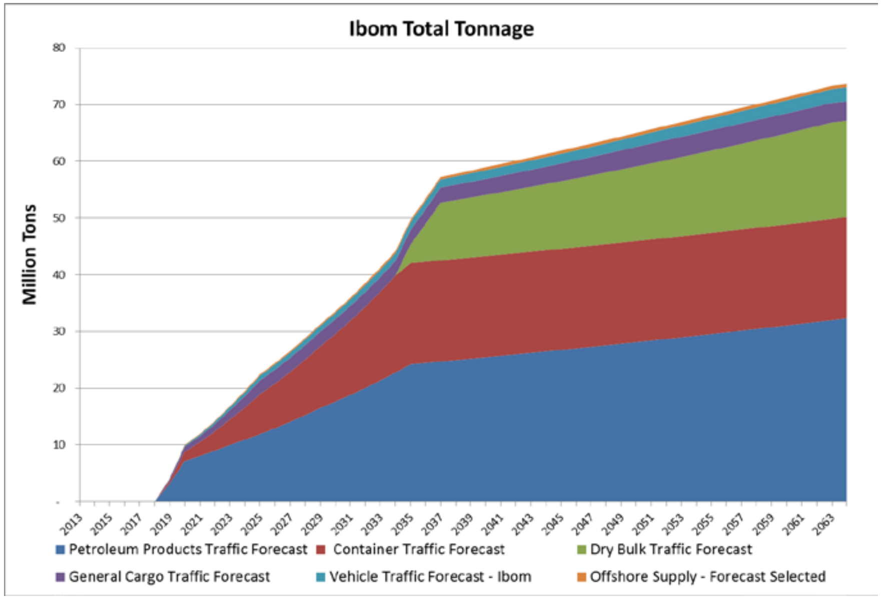


Table 5.1 – Forecast in line with scenario medium economic growth

Port planning assumptions – Vessel dimensions

- The table below shows the design vessel dimensions applied for the Master Plan over the planning period
- In the course of time, the average size of vessels calling at Ibom DSP will increase with the growth of annual throughput. The following assumptions have been made for the period up to 2035.

Commodity	DWT	LOA (m)	Draught (m)	Beam (m)
Containers	40 – 100,000	230 – 350	11.0 – 15.0	32 – 45
General cargo	10 – 40,000	130 – 200	8.0 – 13.0	20 – 30
Ro-ro	10 – 25,000	150 – 210	8.0 – 11.0	23 – 32
Dry bulk	20 – 100,000	160 – 250	9.5 – 15.0	23 – 40
Liquid bulk deepsea	50 – 100,000	190 – 250	13.5 – 15.0	33 – 45
Liquid bulk coastal	5 – 10,000	100 - 130	6.0 – 8.0	16 - 21
Supply vessels	3 – 4,000	60 – 80	7.0 – 8.0	22 – 26

Table 5.2 - Characteristic vessel dimensions

Section 5 – Master Plan Ibom DSP

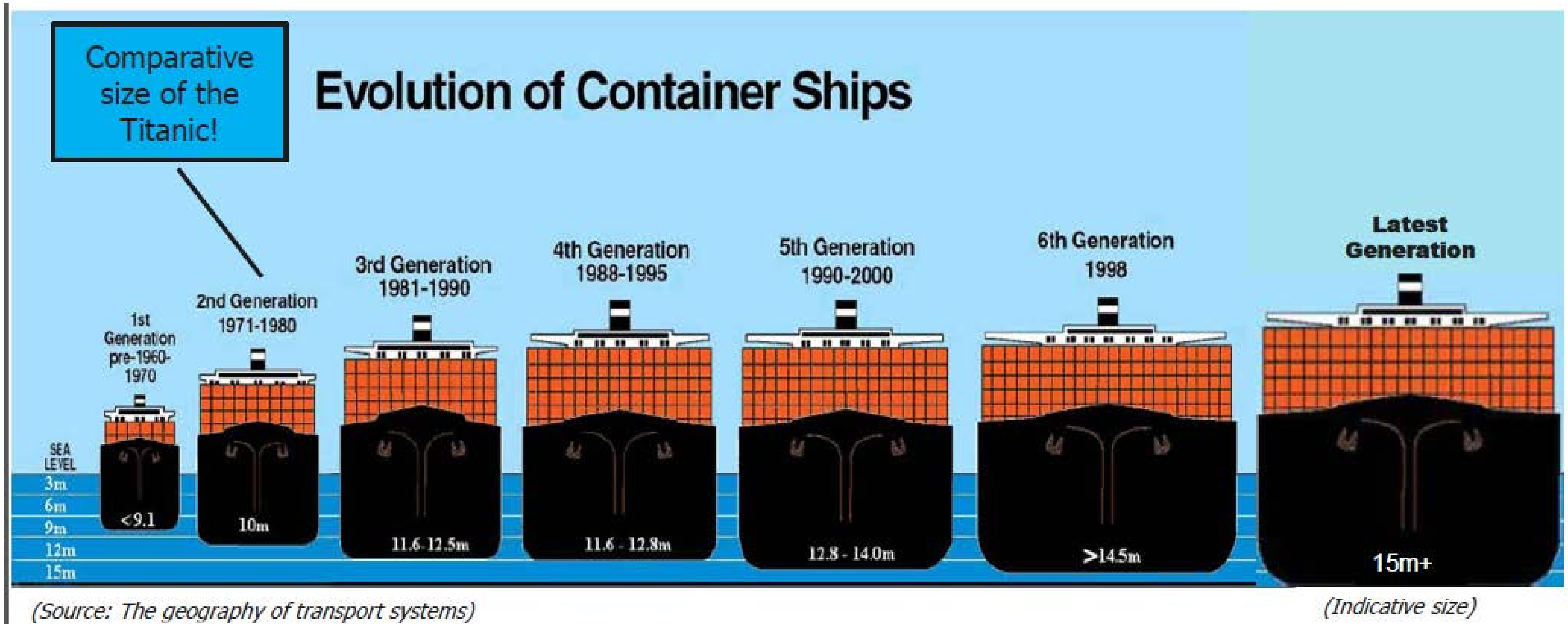
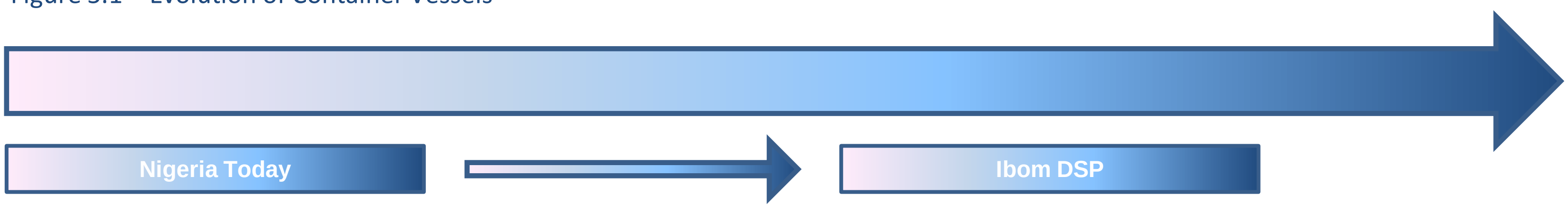


Figure 5.1 – Evolution of Container Vessels



- Ibom DSP will redefine the Nigerian port sector by offering deep sea draft allowing 6th generation vessels
- Ibom DSP will be amongst the deepest draft port in Sub Shara Africa, at par with for example announced port developments Durban Dig Out Port (South Africa) and the new Port of Tema (Ghana).

Port planning assumptions – Call sizes

- The table below shows the average call sizes applied for the Master Plan over the planning period
- Over the course of time, the average call size will increase with the growth of annual throughput and the growth of the size of vessels at Ibom DSP. The following assumptions have been made for the period up to 2035.

Commodity	Unit	Average call size (in+out)
Containers	TEU	1,000 - 2,000
General cargo	Tons	2,000 – 6,000
Ro-ro	Vehicles	800 – 1,400
Dry bulk	Tons	40,000 – 60,000
Liquid bulk deepsea	Tons	60,000 – 80,000
Liquid bulk coastal	Tons	3,000 – 5,000
Supply vessels	Tons	200 – 1,000

Table 5.3 – Adopted average call sizes

Port planning assumptions – Berth productivity

- The table below shows the average berth capacity applied for the Master Plan over the planning period
- Over the course of time, the effective berth productivity per hour will increase with larger throughput, vessels and call sizes, experience, improvements in equipment, systems and procedures. The following assumptions have been made for the period up to 2035.

Commodity	Unit	Effective berth productivity
Containers	TEU/hr	80 – 130
General cargo - steel	tons/hr	130 - 210
General cargo - other	tons/hr	90 – 120
Ro-ro	vehicles/hr	120 – 150
Dry bulk (unloading cement/grain)	tons/hr	800 – 1,100
Dry bulk (unloading other cargoes)	tons/hr	400 – 700
Liquid bulk (unloading oil products)	tons/hr	3,000 – 5,000
Liquid bulk (loading coasters)	tons/hr	300 – 500

Table 5.4 – Adopted effective hourly berth productivities

Development of berth productivity

Berth productivity will increase over time; as an example productivity growth at the container berth is shown in Figure 5.2.

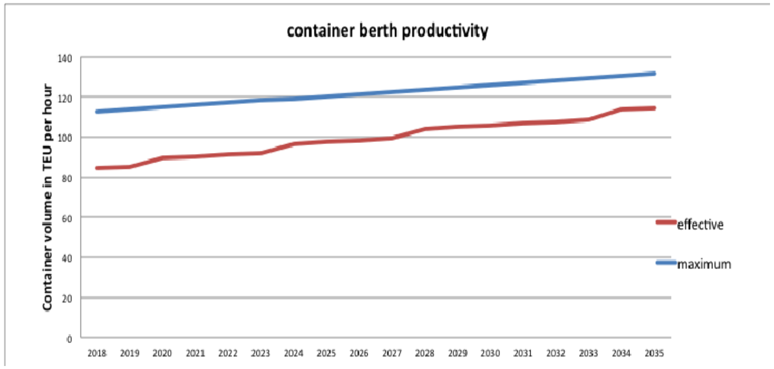


Figure 5.2 – Container Berth Productivity

Maximum hourly productivity:

- assumes that all available cranes (3 per berth) are operational during the full periods of time that ships are being served and containers are being handled with average crane productivity (25 to 30 moves per hour).
- The growth of the maximum productivity is related to the growth in average crane productivity in time (due to larger call sizes and improvements in equipment, systems and procedures).

Effective hourly productivity:

- assumes that all available cranes (3 per berth) are operational during parts only of the periods that ships are being served and containers are being handled with average crane productivity.
- The growth of the effective productivity is caused by the increased average crane productivity and the increasing flexibility with an increasing number of berths, allowing exchange of cranes between berths and consequently a more intensive use of the cranes

The increasing periods of time ships are being served (higher acceptable berth occupancy percentage, due to a a larger number of berths) is not reflected in the graphs. This is another factor which has a positive effect on the (annual) productivity of a berth when more berths are available in a berth group.

As an illustration the annual berth productivity has been indicated on the next page.

Development of berth productivity

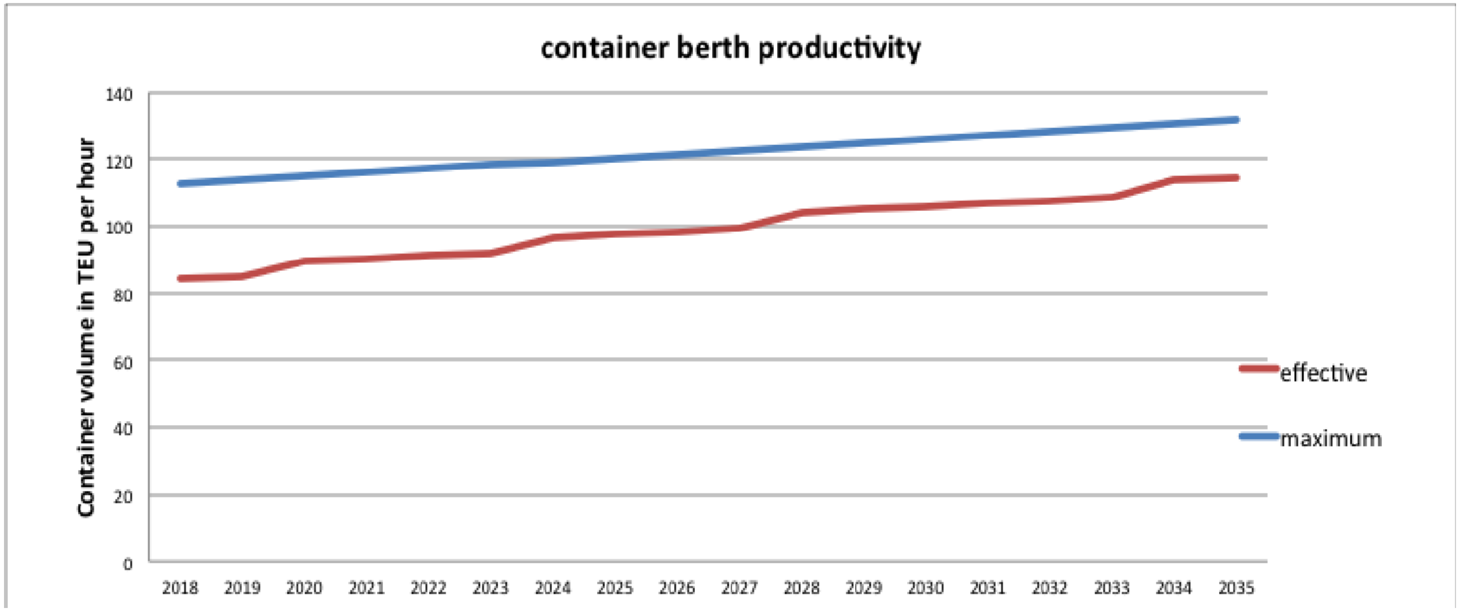


Figure 5.3 – Container Berth Productivity

Assumptions:

• Effective days per year:	361 (4 days downtime per year)
• Effective hours per day:	22 hours (loss due breaks, shift changes)
• Acceptable berth occupancy in case of 4 berths:	65%
• Effective capacity per hour:	115 TEU/hour

Annual berth capacity in 2035:	115 * 22 * 361 * 65% = 590,000 TEU
Annual terminal capacity in 2035:	4 * 590,000 = 2.36 M TEU per year

Port planning result: Required number of berths and jetties (Year 2035)

- The described operational and port planning assumptions -result in the following berth requirements for the Master Plan 2035.
- For purpose of future flexibility in quay-use the guaranteed depth at the berths is uniform at CD – 16.5 m for Container, Breakbulk and Dry Bulk and CD – 8.80 m at the OSB berths

Commodity	Required # of berths	Berth length (m)	Guaranteed Berth depth (CD - m)	Quay length (m)
Containers	4	350	16.5	1,400
Breakbulk, incl Ro-ro	6	250	16.5	1,500
Dry bulk (cement)	2	300	16.5	600
Dry bulk (grain/sugar)	2	300	16.5	600
Dry bulk (other)	2	300	16.5	600
Supply vessels	6	200	8.8	1,200
Total quay length				5,900
	Required # jetties			
Liquid bulk (deep sea)	2		16.5	

Table 5.5 – Required berths and jetties in Ibom DPS in the Master Plan 2035

Section 5 – Master Plan Ibom DSP

Space allocation and design principles of the Master Plan: Terminal Allocation

- Terminalisation & specialisation: Concentration of berths of one cargo segment in one berth group.
- Containers and break bulk : terminals are adjacent to each other. In the course of time when the port develops, adjacent breakbulk berths will be transferred into container berths.
- Space: a spatious area behind the container terminal (away from the quay) is available for terminal related activities such as parking, storage of empties, container repair.
- Dry bulk berths at lee side of port with respect to prevailing SW winds, in order to avoid possible dust from dry bulk terminals to disturb other port operations.
- Oil product jetties: are projected at inner side of breakwater, upwind of and at sufficient distance of the main turning circle. Oil vessels consequently can be accommodated quite close to port entrance. Pipeline corridor parallel to breakwater transfers cargo to tank farm.
- Tank farm : storage of oil products is located at a certain distance from other main port activities for safety reasons on protected and sea facing location
- OSB: close to the port entrance to concentrate large-numbered but small-sized OSB vessel away from the main basin.
- LNG: possibility for future (optional) LNG-jetty at safe, separated location near port entrance (> 500 m from axis of access channel) and for a liquifaction plant just east at a safe distance from the port complex.
- Dry dock: possibility for future dry dock and shipyard at the north-western side of the port area
- Marine Services: berths along a jetty are provided for maritime service providers close to the projected Harbour Master building / control tower, overlooking the harbour entrance.
- Security: separate berths and land area is provided for naval security (FOB) function (navy vessels) near the east harbour dam and close to the port entrance ensuring Ibom DSP security profile.
- Multi-modal transport infrastructure (road, rail, pipeline) is provided; road and railway access to all terminals.

Space allocation and design principles of the Master Plan: Nautical considerations

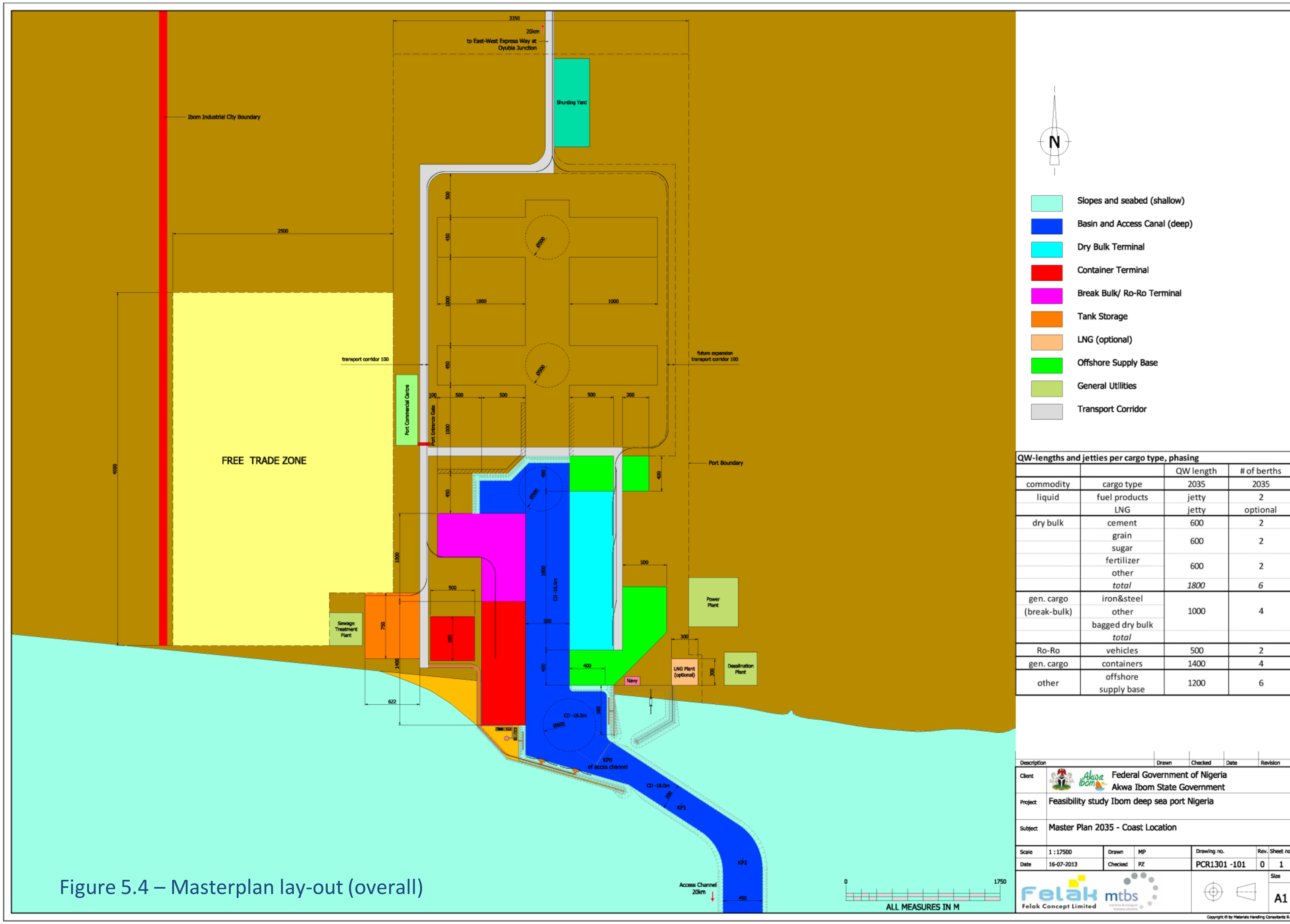
- In Phase 1, single lane access channel is sufficient to allow efficient access to the Ibom DSP, connecting the port basin with deep (CD – 18.0 m) water . At a later stage, double lane access channel ensures unhampered access for vessels which need the access channel simultaneously.
- The width of double lane access channel at bottom is 450 m; bottom level is CD – 18.0 m (under keel clearance or UKC is 20% in exposed waters).
- The width of fairway between heads of breakwater and harbour dam (port entrance) is 300 m, to reduce wave penetration in the port.
- Bottom level within harbour area (inner harbour, harbour basin) is CD -16.5 m (UKC is 10% in protected waters).
- The channel is clearly marked with appropriate buoys at distances of approximately one sea mile (1,800 m) along both sides of the channel.
- Location control in access channel will be supported with leading lights indicating the axis of the access channel sections and by harbour lights on the ends of breakwater and (east) harbour dam.
- Pilots board the vessel from pilot tenders when the vessel is sailing in the access channel.
- Tugs are fastened to incoming vessels and the vessel is assisted/controlled in the access channel outside the harbour entrance, which is possible in view of mild wave climate. The vessel assisted by tugs may turn in the turning circle located within the breakwater protected area. Vessels may also pass the harbour basin and turn in the turning circle at the rear side of the basin (Phase 2).
- During turning of the larger vessels in the main turning circle and passage through the port entrance, passage of other vessels may be limited to a certain extent. Minimum safety distance of 100-150 m from edge of main turning circle to nearest berths (safety).
- The width of the main harbour basin is such that smaller type vessels can turn within the harbour basin.
- Length of main harbour basin limited to some 1,800 to 2,000 m (to second turning circle), in order to avoid vessels to sail astern over a long distance.

Space allocation and design principles of the Master Plan: General

The following design and space allocation principles have been adopted in the elaboration of the Master Plan:

- Free Trade Zone (FTZ) is projected as a vast and rectangular area adjacent to the port. The area is provided with basic infrastructure as roads and utilities which provide a flexible framework for small and larger plots for open and covered storage, for offices, warehoused and light industries. An empty container depot including repair facilities might be projected within this area as well.
- Main utilities as power plant, desalination plant, waste water treatment plant, adjacent, however just outside the port complex.
- Central gate for the Ibom DSP and the Free Trade Zone (FTZ) and individual gates for the various terminals and for the FTZ, each with their own dedicated security and logistic requirements.
- A Port Commercial Centre for companies and commercial entities with activities that do not need to be projected within the port area (banks, hotel, restaurants ,services) is projected just outside the main gate.
- In view of the expected sand transport along the coast from west to east (literal drift), sedimentation will take place at the west side of the breakwater, while erosion may take place at the east side of the port. The natural phenomena can be used to a certain extant in providing land area west of the breakwater.

The dig-in concept and the listed principles , lead to the IDSP and FTZ Master Plan as shown on next two pages.

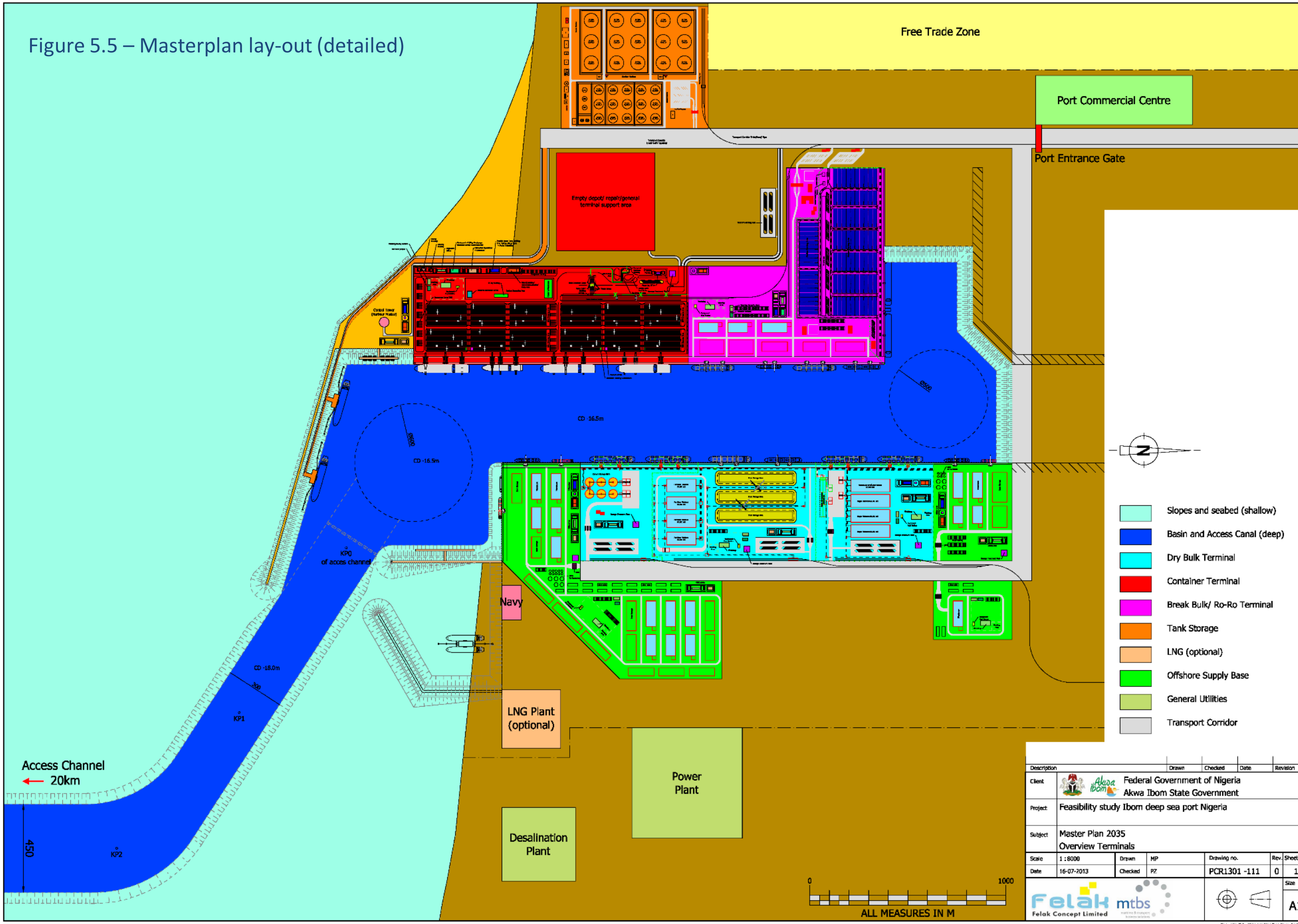


QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2035	2035
liquid	fuel products	jetty	2
	LNG	jetty	optional
dry bulk	cement	600	2
	grain sugar	600	2
	fertilizer other	600	2
	total	*1800*	*6*
gen. cargo (break-bulk)	iron&steel other bagged dry bulk	1000	4
	total		
Ro-Ro	vehicles	500	2
gen. cargo	containers	1400	4
other	offshore supply base	1200	6

Figure 5.4 – Masterplan lay-out (overall)

Figure 5.5 – Masterplan lay-out (detailed)



Nautical Accessibility: Comparison with Other Ports

- Multiple turning basins in Port
- Turning basins at entrance of Port
- Comparison: Port of Rotterdam and Port of Antwerp

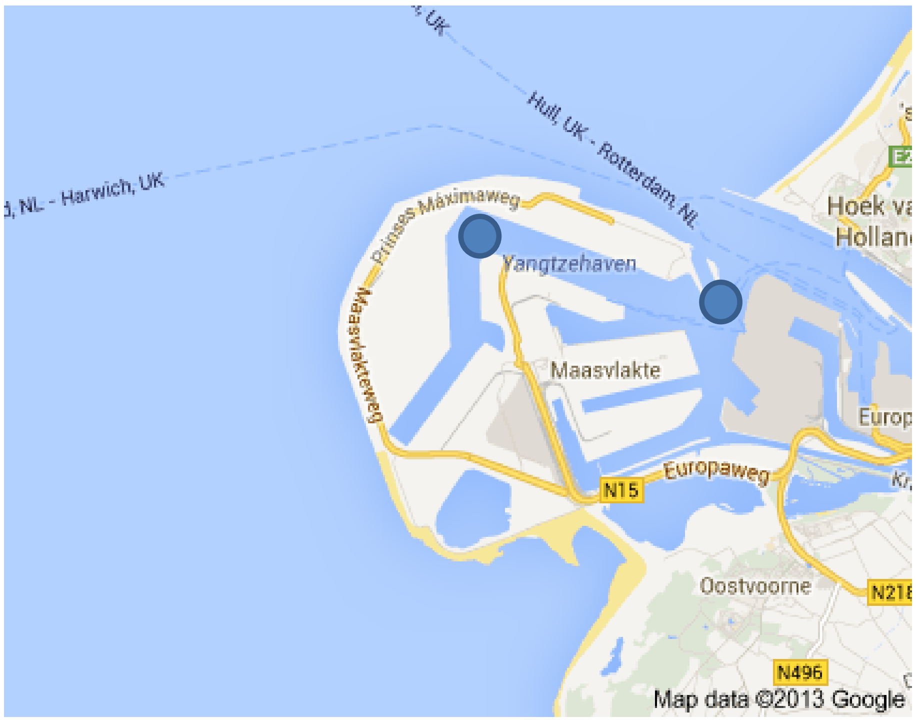


Figure 5.6 – Port Nautical Access Rottedam (left) and Antwerp (right)

Space allocation and design principles of Phase 1 development (1)

For the Phase 1 development basically the same design and space allocation principles have been adopted as for the Master Plan. Particular elements are the following:

- The proposed lay-out for Phase 1 should fit in all developments foreesen for the Master Plan for 2035.
- Containers, general cargo and Ro-ro may be combined on a multi-purpose terminal initially.
- The multi-purpose terminal quay wall should be fit for dedicated container operations in the future (e.g. loads of quay cranes).
- One lane (single) access channel, with width of 300 m at bottom level of CD – 18.0 m. Based on the expected vessel movements, the one way lane will need to be transformed in a double lane in the period between 2023 and 2027, dependent on the fleetmix encountered and the requirements set by the Harbour Master on safety and acceptable waiting times for vessels).
- Rail access will not be available in Phase 1.
- Utilities like power plant, desalination plant and water treatment plant will not be available in Phase 1. The individual terminals will have their own facilities to cope with requirements related to power, potable water and waste water.

The following elements are optional in Phase 1:

- Maximum vessel draft of 13.0 m (instead of 15.0 m from start); with bottom levels of CD -15.6 m (access channel) and CD -14.3 m (harbour basin and berths).
- Construction of the dry bulk terminal.

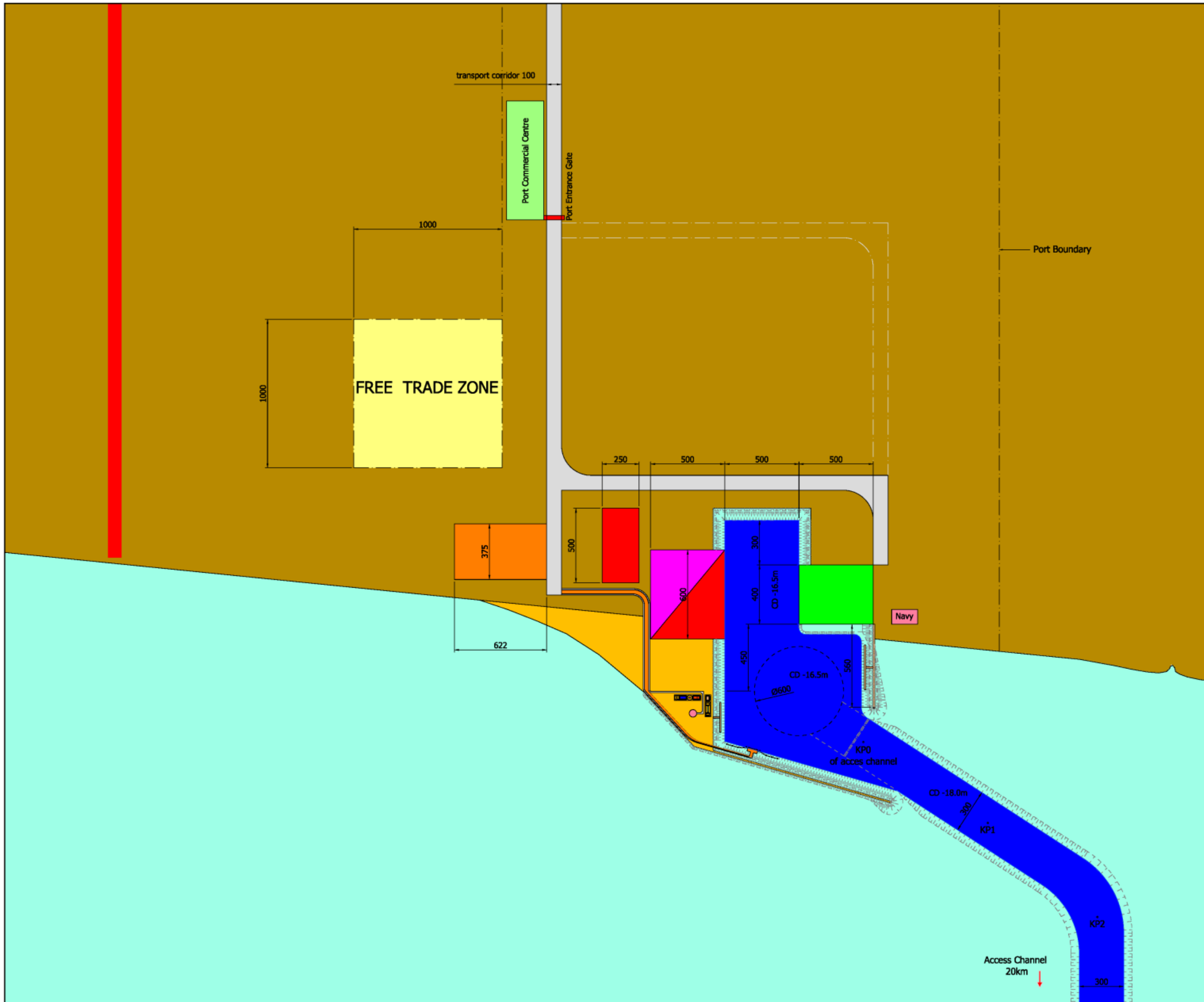
Phased development: Required number of berths and jetties in Phase 1

- The described operational and port planning assumptions -result in the following berth requirements for the Master Plan Phase 1.
- For purpose of future flexibility in quay-use the guaranteed depth at the berths is uniform at CD – 16.5 m (or CD - 14.3 m; see below) for Container, Breakbulk and Dry Bulk and CD – 8.80 m at the OSB berths.
- In the Bidding Procedure, Phase 1 will have as optional items (between brackets in the table):
  - Larger first phase developments for selected terminals: containers, breakbulk/RoRo, and liquid bulk
  - Dry Bulk berths: yes/no
  - Basin depth: CD – 14.3m or CD – 16.5 m

Commodity	Required # berths	Berth length (m)	Guaranteed Berth depth (CD -)	Quay length (m)
Containers	1 (2)	350	16.5 (14.3)	350 (700)
Break bulk, incl ro-ro	1 (3)	250	16.5 (14.3)	250 (750)
Dry bulk (cement)	0 (1)	300	16.5 (14.3)	0 (300)
Offshore Supplies	2	200	8.8	400
Total quay length				1,000 (2,150)
	Required # jetties	Size Tank Farm (ha)		
Liquid bulk (deep sea)	1	15 (30)	16.5 (14.3)	

Table 5.6 – Required berths and jetties in Ibom Port in Phase 1 (optional items between brackets)

Overview – Phase 1 (minimum scope, reference design)



N

- Slopes and seabed (shallow)
- Basin and Access Canal (deep)
- Dry Bulk Terminal
- Container Terminal
- Break Bulk/ Ro-Ro Terminal
- Tank Storage
- Offshore Supply Base
- General Utilities
- Transport Corridor

QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2020	2020
liquid	fuel products	jetty	1
dry bulk	cement		
	grain		
	sugar		
	fertilizer		
	other		
	total	*0*	*0*
gen. cargo (break-bulk)	iron&steel	250	1
	other		
	bagged dry bulk		
	total		
Ro-Ro	vehicles		
gen. cargo	containers	350	1
other	offshore supply base	400	2

Description	Drawn	Checked	Date	Revision

Client	Federal Government of Nigeria Akwa Ibom State Government
Project	Feasibility study Ibom deep sea port Nigeria
Subject	Reference Layout 1

Scale	1 : 12500	Drawn	MP	Drawing no.	Rev.	Sheet no.
Date	16-07-2013	Checked	PZ	PCR1301 -103	2	1

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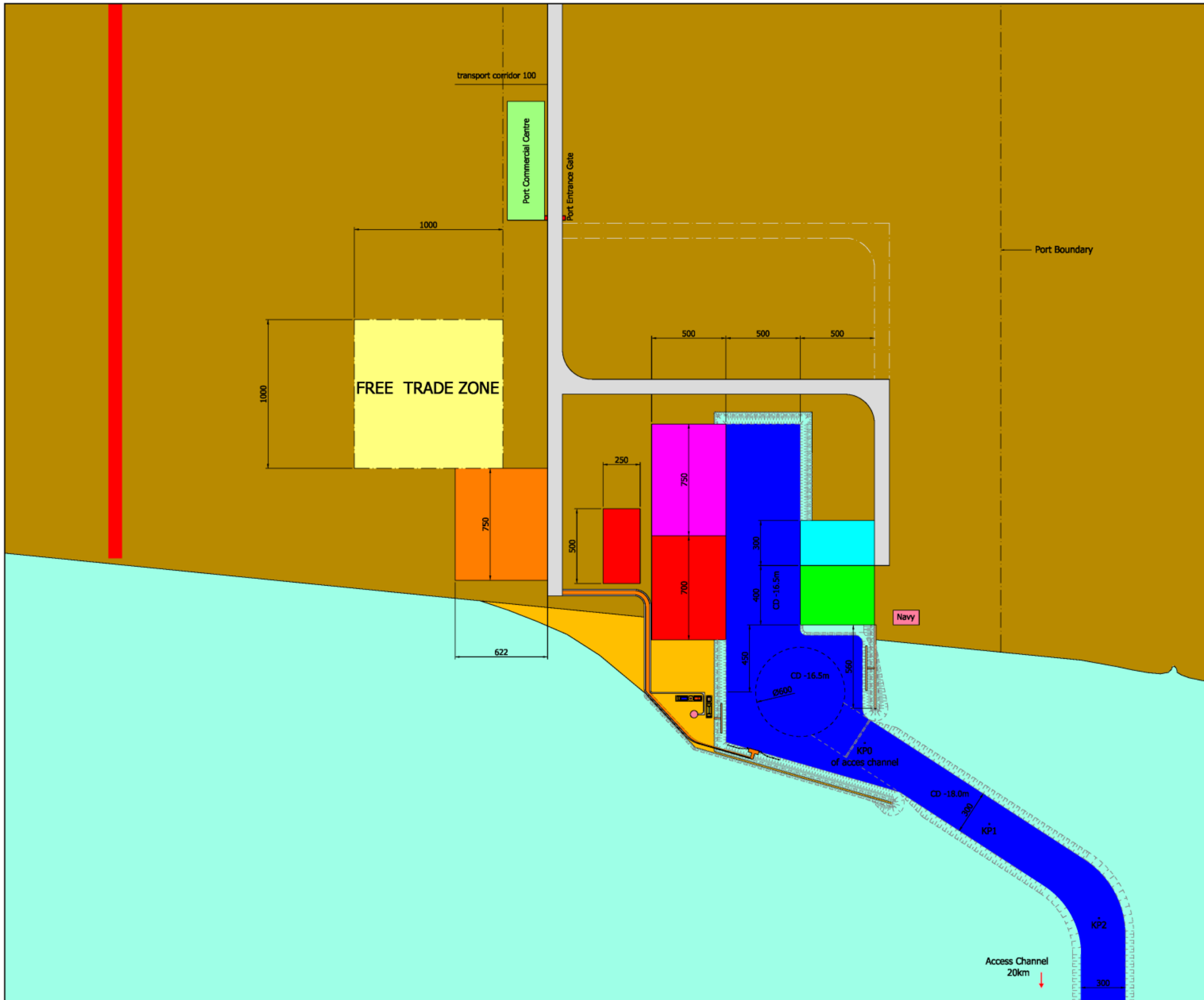
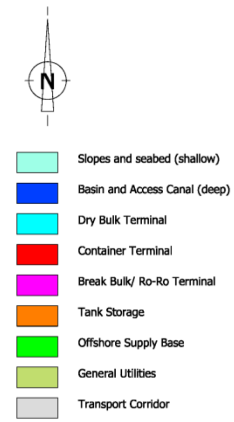
Figure 5.7 – Lay-out Phase 1 (minimum scope)

Overview – Phase 1 (maximum scope, reference design)





QW-lengths and jetties per cargo type, phasing

		QW length	# of berths
commodity	cargo type	2020	2020
liquid	fuel products	jetty	1
dry bulk	cement	300	1
	grain		
	sugar		
	fertilizer		
	other		
	total	*300*	*1*
gen. cargo (break-bulk)	iron&steel	500	2
	other		
	bagged dry bulk		
	total		
Ro-Ro	vehicles	250	1
gen. cargo	containers	700	2
other	offshore supply base	400	2

Client: Federal Government of Nigeria, Akwa Ibom State Government
Project: Feasibility study Ibom deep sea port Nigeria
Subject: Reference Layout - 2
Scale: 1 : 12500 | Drawn: MP | Drawing no.: PCR1301 -102 | Rev.: 1 | Sheet no.: 1
Date: 19-08-2013 | Checked: PZ | Size: A1

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Figure 5.8 – Lay-out Phase 1 (maximum scope)

Phased development: future expansion possibilities

For port expansions beyond 2035 there are two possibilities:

- Inland, with space for 4 additional port basins and more than 8 km of extra berth length (as indicated in large scheme of Master Plan 2035).
- Seaside, by extending the breakwater along the access channel, providing additional sheltered area and possibility for extension of LNG and / or liquid bulk terminals, and for modification of the harbour entrance if necessary in view of vessel traffic intensity.
- The extension of the breakwater also opens the possibility for an extra port channel, along with and possibly connected to the OSB developments; the seaside expansion options are roughly indicated in the sketch below:

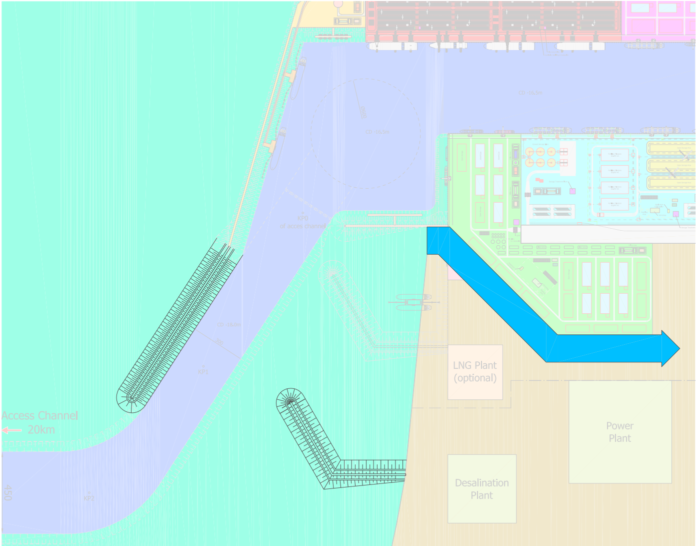


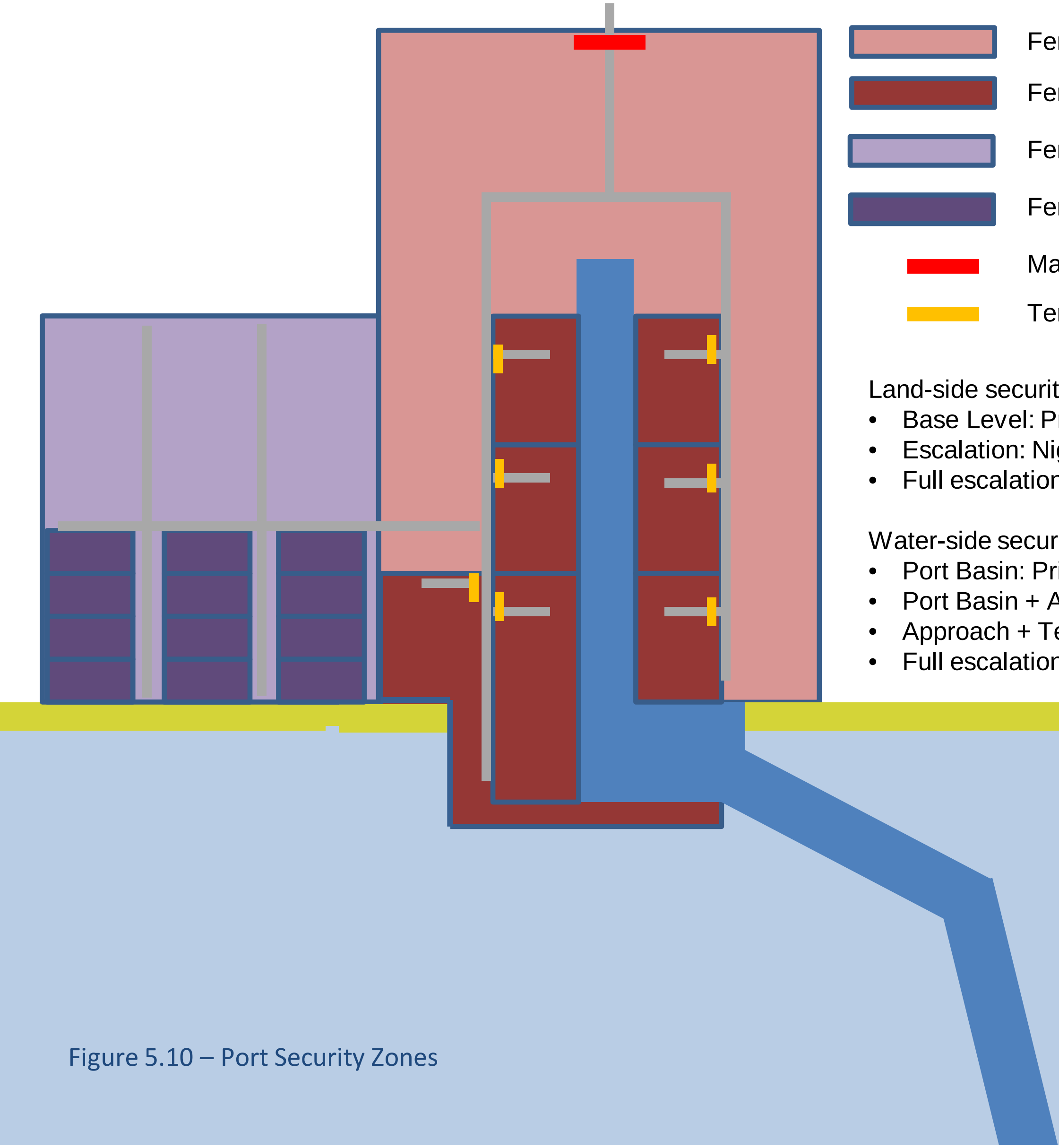
Figure 5.9 – Possible port expansion options

Section 5 - Master Plan for 2035 – Port Security Measures

Various security measures shall be in place during the operational phase of the project

- Perimeter wall fence: The port has a perimeter wall fence in order to prevent unauthorised persons from gaining entry into the port. The individual terminals shall also have their own fencing and gates in place. This also applies to the FTZ and the individual FTZ tenants.
- Access Control: The access control gates are manned by PDMC security operatives, supported by the NPA where needed. All the port users are properly screened at the gate to ensure that only those with port permit and have genuine business to carry out are allowed access to the port.
- Light: The entire port premises are well illuminated at night for the safety of the persons, the vessels , the vehicles and the facilities in the port. There are also back-up generators in the event of power failure.
- CCTV: There are Closed Circuit Televisions installed all in the port to monitor the activities of port users. The CCTV is manned 24 hours by the PDMC security department, together with the NPA if needed. The individual terminals shall also have their own CCTV systems in place. This also applies to the FTZ and the individual FTZ tenants.
- Patrol: A combined team of PDMC private security and, if needed, the Security Personnel and Port Police carry out joint patrol of the common user area and water fronts at regular intervals.
- ISPS Code Compliance: The port and the individual terminals shall be ISPS Code compliant. All visiting vessels to the port are boarded by qualified PFSOs to carry out Declaration of Security (DOS). There are quarterly inspections of all port facility by the Presidential Implementation Committe on Maritime Security and Safety (PICOMSS).
- Control of Piracy: The Nigerian Port Security Department collaborates closely with other government security agencies namely; the Marine Police and the Nigerian Navy, to regularly patrol (also provide air surveillance) the water front and channels to curtail the menace of piracy in the port. In addition, the port management provide high speed patrol boats to assist the security agencies in their patrols/surveillance.
- A dedicated and modern equipped FOB-Navy base is projected at the sea-entrance of the Port

Section 5 - Master Plan for 2035 – Port Security Perimeters



- Fenced Port Perimeter [ISPS zone]: PDMC
- Fenced Terminal Perimeter [customs zone]: PDMC / Terminal
- Fenced FTZ Perimeter [customs zone]: PDMC / FTZ Manager
- Fenced FTZ Tenant Perimeter: FTZ Tenant
- Main Port Gate [Security / ISPS / Toll]: PDMC
- Terminal Gates [Security / Customs / TOS]: PDMC / Terminal

Land-side security mandates:

- Base Level: Private Security by PDMC / SubCons
- Escalation: Nigeria Port Police Command (NPPC)
- Full escalation: Nigerian Army

Water-side security mandates:

- Port Basin: Private security by PDMC / SubCons
- Port Basin + Access Channel: Nigerian Marine Police (NMP) + NIMASA
- Approach + Territorial Waters: Nigerian Navy + NIMASA
- Full escalation: Nigerian Navy

Figure 5.10 – Port Security Zones

Access Channel

- The Ibom Access Channel is projected from the new Ibom Fairway Buoy in NNE direction to port entrance
- The Ibom Fairway Buoy is projected in a straight line with the existing Calabar Access Channel and the existing Calabar Fairway Buoy.
- The Ibom Access Channel is aligned just west of the existing Oil Infrastructure, assuming an expanded 1500 m (in stead of 500m) safety distance from the channel to the objects.
- At the Ibom Fairway Buoy, the Ibom Access Channel meets the Calabar Access Channel and from there the existing Calabar approach shall be used until the high seas by both Calabar and Ibom-bound vessels.
- The nautical approach routes are covered on page C1-58 and in OBC Supporting Documents TF-10.
- the location of offshore oil and gas infrastructure in the region: platforms and sub-sea oil and gas pipelines and manifolds, both operated and abandoned (see visual below);
- Nautical simulations, further hydrological surveys and DPR confirmations are required during FBC stage to verify the proposed alignment of the Ibom Access Channel.
- If needed, there is ample space to re-align the Ibom Access Channel to a more Western or Eastern route.
- See OBC Supporting Documents TF-10 for more details on this topic.

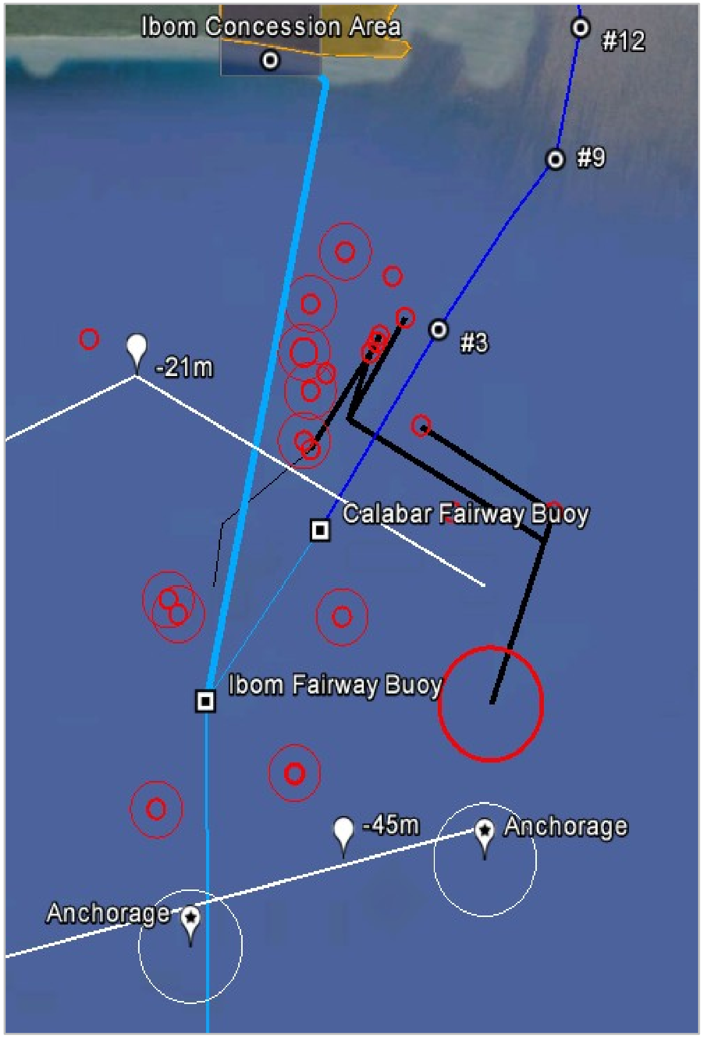
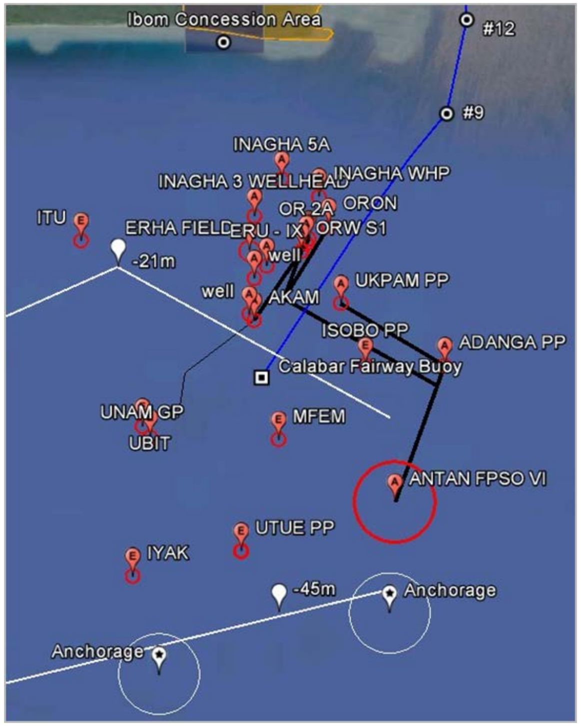


Figure 5.11a - Proposed alignment of access channel

Access Channel & Oil/Gas Industry

- Overall, the channel crosses 3 oil blocks:
    - OML-14 from Shell: no assets in the direct vicinity of the channel
    - OML-123 (or OPL-98) from Addax: only the AKAM platform and connecting pipelines in the direct vicinity of the channel
    - OML-67 from ExxonMobil: no assets in the direct vicinity of the channel
- The channel passes the platporms with increased (from 500m) 1500 meter safety zone.
- The channel crosses the 12" oil pipeline connected to this platform at some 2,000 meters South of the -18 meter line; therefore this pipeline does not require any repositioning.
- Nautical simulations, further hydrological surveys and DPR confirmations are required during FBC stage to verify the proposed alignment of the Ibom Access Channel.
- If needed, there is ample space to re-align the Ibom Access Channel to a more Western or Eastern route.
- See OBC Supporting Documents TF-10 for more details on this topic.



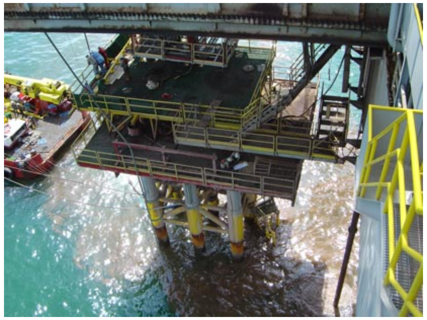


Figure 5.11b – Details of the Ibom Access Channel near the existing Calabar Fairway Buoy (top), the AKAM Production Platform (left) and the ADANGA Wellhead Platform (source: Addax)

Access Channel

- The Marine Disposal Area is drawn at a location that fulfils the following criteria:
  - Away from shipping routes and oil infrastructure.
  - Relatively close to port basin and access channel, in order to limit the spoil transport distance hence dredging/disposal costs.
  - Approx 5 km away from the access channel to prevent disposed material to be transported by prevailing currents back to the access channel significantly.

- The bathymetric survey results, though being limited in surface coverage and with some uncertainty as to accuracy and reference levels, generally confirm the volumes of the access channel as used in determining the dredging costs, given the uncertainty of 30% on the dredging CAPEX as indicated in section 10.
- The spacing of the survey lines is too large to evaluate details or draw cross sections based on the interpolation.
- Table 5.7 shows the volumes calculated for the access channel (Phase 1 , 300 m wide at CD-16.2 m). Side slopes are assumed at 1:7. These values are derived from the survey line at longitude $8^0$13’ E.

kp from	kp to	d_actual	d_new	d_dredge	Width	Profile	Profile
km	km	m to CD	m to CD	m	m	m3/m1	Mm3/section
0	1	2.8	16.2	13.4	300	5277	5.3
1	2	3.6	16.2	12.6	300	4891	4.9
2	3	4.3	16.2	11.9	300	4561	4.6
3	4	5.0	16.2	11.3	300	4261	4.3
4	5	5.7	16.2	10.6	300	3944	3.9
5	6	6.4	16.2	9.9	300	3634	3.6
6	7	7.1	16.2	9.1	300	3310	3.3
7	8	7.8	16.2	8.4	300	3014	3.0
8	9	8.2	16.2	8.0	300	2848	2.8
9	10	8.5	16.2	7.7	300	2725	2.7
10	11	8.9	16.2	7.3	300	2563	2.6
11	12	9.5	16.2	6.7	300	2324	2.3
12	13	10.3	16.2	5.9	300	2014	2.0
13	14	11.0	16.2	5.2	300	1749	1.7
14	15	11.7	16.2	4.6	300	1510	1.5
15	16	12.5	16.2	3.8	300	1223	1.2
16	17	13.4	16.2	2.8	300	895	0.9
17	18	14.4	16.2	1.8	300	563	0.6
18	19	15.5	16.2	0.7	300	213	0.2
19	20	16.6	16.2	0.0	300	0	0.0
20	21	17.0	16.2	0.0	300	0	0.0
21	22	17.0	16.2	0.0	300	0	0.0
						sum Mm3	**51.5**

Table 5.7 - Dredging volume calculated for access channel (Phase 1, CD-16.2m; allowing .6 m for dredging tolerance)

Access Channel and Nautical Approach

- The nautical approach towards the access channel of the IDSP has to cross a zone with oil/gas infrastructure.
- Research has shown there is ample space for vessels to navigate through this area between the high seas and the existing Calabar Fairway Buoy (red dot).
- Only a few (2) pipelines have been identified at sufficient depths (<20 meters) and can therefore be crossed safely
- Existing Platforms, FPSO sites and their safety zones do not pose any threat to the accessibility of the Calabar Fairway Buoy from the high seas.
- From this moment, NPA shall need to take into account the future Ibom port when assessing requests (through DPR) of oil companies seeking to move or install oil and gas related assets in the region. Similar to what they have been doing in relation to the accessibility of Calabar.
- Nautical simulations and further hydrological surveys are required during FBC stage to verify the data of the oil companies.
- In case unidentified assets are discovered, there is ample space to manoeuvre around it.
- See OBC Supporting Documents TF-10 for more details

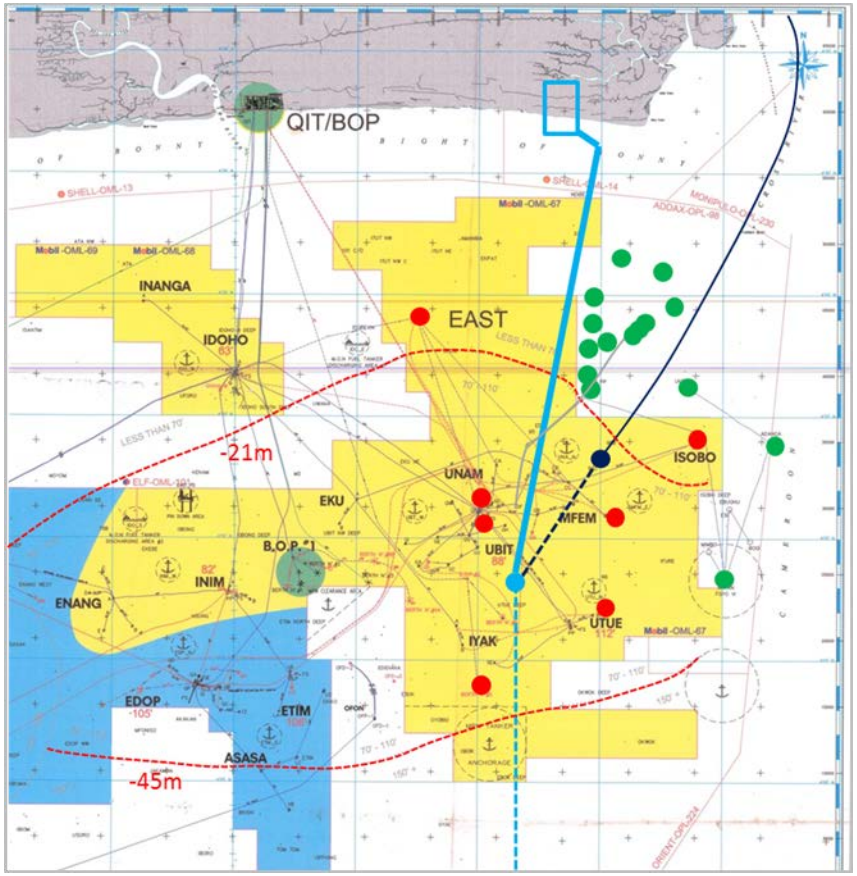


Figure 5.11c - Proposed alignment of access channel and nautical approach

Contents

Section 6 – Verifications and optimizations of port lay-out

Verification tools: nautical simulations and wave penetration studies

- Two types of design verifications have been applied to check the initial lay-out of the port entrance, which was used in the site selection exercise:
  1. Nautical manoeuvring simulations
  2. Wave penetration modelling

- The design elements that were verified are:
  - Design and orientation of the breakwaters
  - Location and size of the harbour basin and turning basin
  - Geometry and lay-out of the access channel

- The results have been used to confirm and optimize the chosen lay-out and design, in order to assure the feasibility of the Master Plan and Phase 1.

- NB: The Master Plan and Phase 1 lay-outs shown in Section 5 already include the optimizations and represent the recommended configurations for development of Ibom Deep Sea Port.

Nautical manoeuvring simulations – methodology, scope and conclusions

- Real time manoeuvring simulations were performed, using the SHIP NAVIGATOR simulator.
- Simulations included two types of readily available vessels, with the following characteristics:

	Unit	Container vessel 12,600 TEU	Bulk carrier 155,000 DWT
Length over all	(m)	366.50	282.00
Beam	(m)	48.20	45.00
Draught	(m)	13.00	17.00

Table 5.8 – vessel characteristics as used in manoeuvring simulations

- It is noted that since use was made of existing database vessels:
  - These vessels are a bit larger (LOA and/or B) than the design vessels for Ibom DSP (conservative approach / 'future-proof').
  - The different draft of the vessels was corrected mathematically in the model to simulate identical UKC conditions.

- Environmental conditions included ebb and flood currents and significant shallow water (near shore) wave heights of 1.0 and 1.25 m (regular operational conditions) and 2.0 m (extreme condition, 1/yr.).

- Conclusions of the study are that, with some modifications of the access channel bend / turn, the port can be entered safely with wave heights up to 1.5 m , meaning that there will be less than 1% downtime per year to enter the port (criterion in Technical Program of Requirements).

Nautical manoeuvring simulations – methodology, scope and conclusions (2)

- Tugs are assisting/controlling the vessel prior to the moment the vessel turns in the direction of the port entrance.
- The vessel assisted by the tugs move in 15 minutes from the bend in the access channel to the heart of the turning circle. In this period of entering the (relatively narrow) port entrance, hindrance may be encountered by vessels departing the port.
- The turning procedure takes another 10 to 15 minutes, in which period the turning vessel occupies part of the turning circle area.
- During this period of turning some hindrance may be encountered, although a large part of the calling vessels can pass the turning circle area during the turning procedure of the design vessel.
- Transit time from the Port entrance (i.e. The final channel bend) through the turning circle into the port basin is approximately 30-40 minutes.
- The simulations assume the access channel to be oriented in S-N direction; In the FBC phase detailed nautical modelling will be carried out on the final channel alignment
- Full details are given in OBC Supporting Documents TF-5. Some characteristic runs are shown on the following pages, on which the port entrance has its initial form, before optimization (sharp bend in access channel, close to head of southern breakwater).

Section 6 – Verifications and optimizations of port lay-out

Nautical manoeuvring simulations – Container vessel, flood, initial lay-out of port entrance

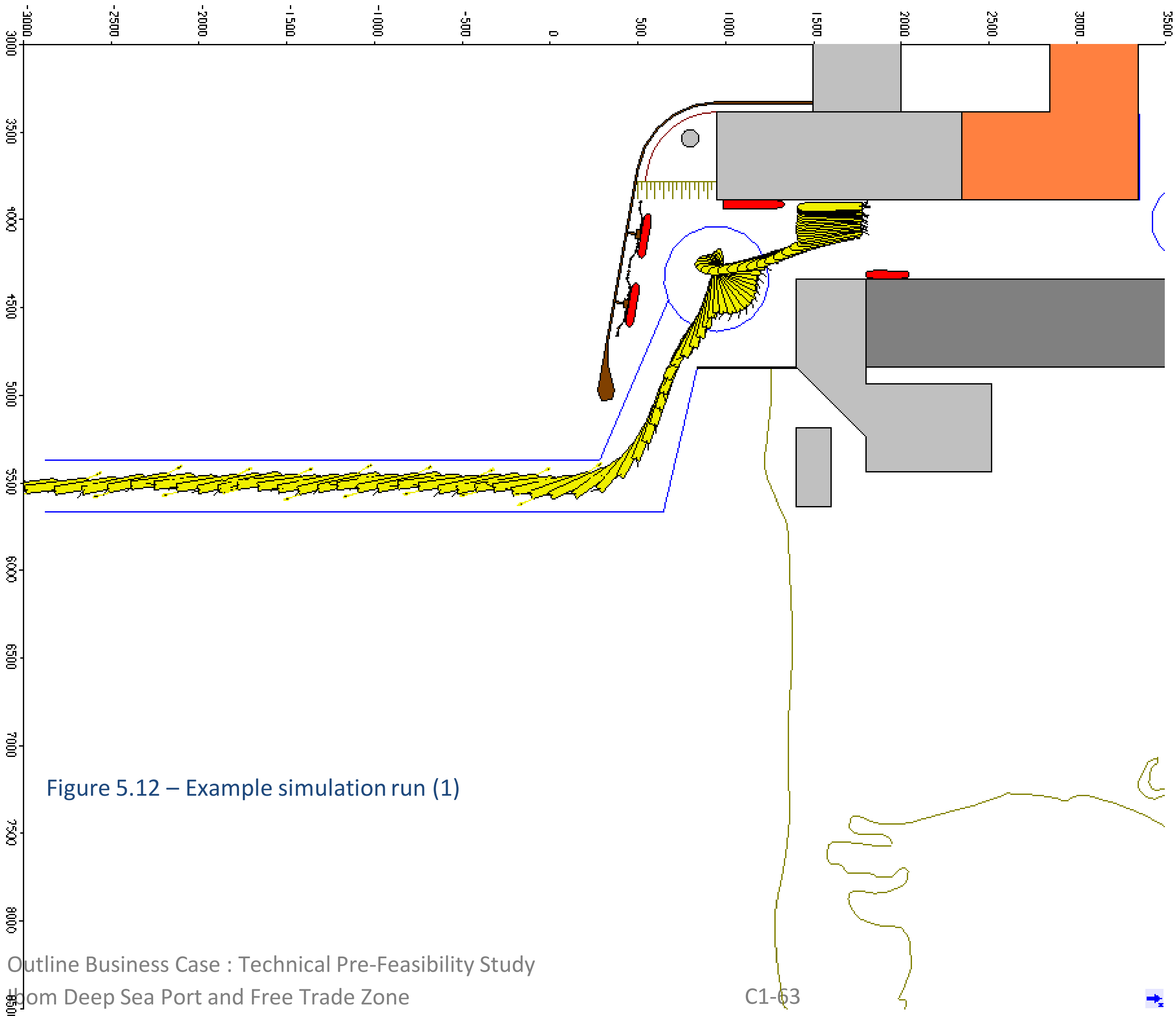


Figure 5.12 – Example simulation run (1)

Section 6 – Verifications and optimizations of port lay-out

Nautical manoeuvring simulations – Bulk carrier, ebb, initial lay-out of port entrance

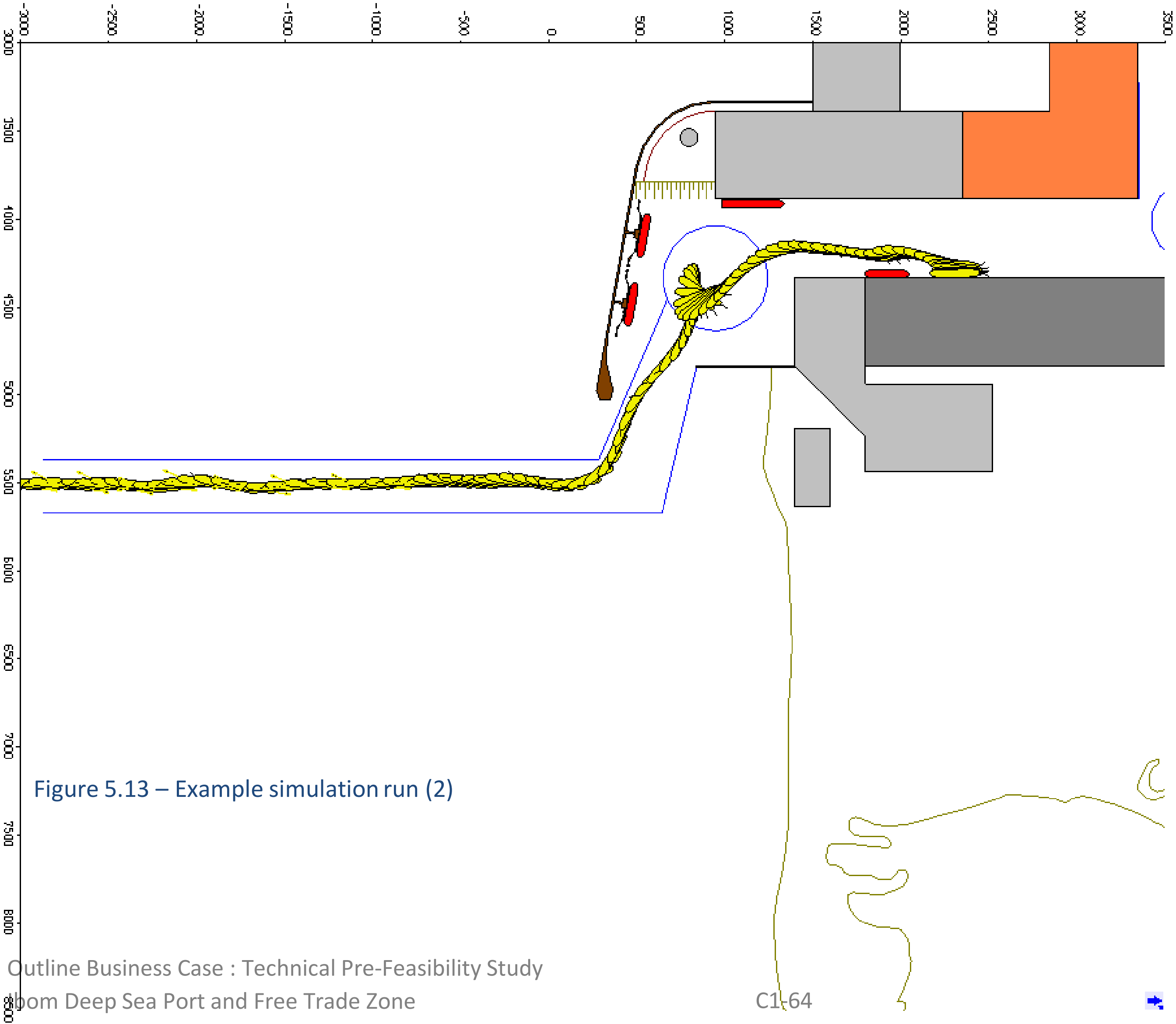


Figure 5.13 – Example simulation run (2)

Section 6 – Verifications and optimizations of port lay-out

Nautical simulations – ebb, optimized access channel bend

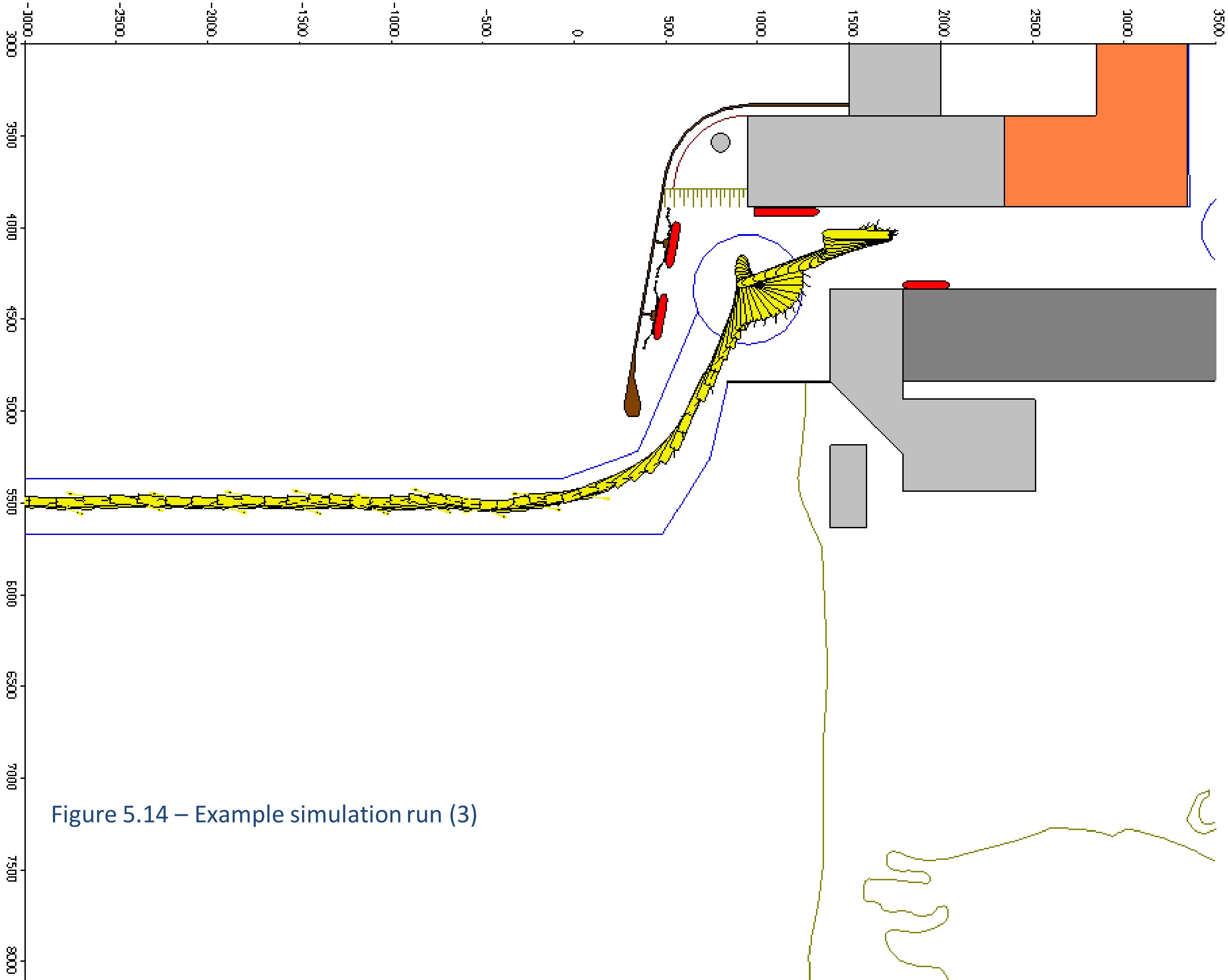


Figure 5.14 – Example simulation run (3)

Wave penetration studies – methodology and scope

- Sufficient shelter from the almost constant waves (swell) at the seaside location is of key importance for the functioning of Ibom DSP.
- A study with an elementary, but proven model (ref. Shore Protection Manual, CERC, US) has been performed to assess wave penetration at different locations in the harbour basin, using the initial port lay-out from the location study.
- Calculated wave conditions at the various locations in the basin are shown in Tables 6.1 and 6.2 (next page).
- Given the calculated wave conditions it was decided to apply two modifications to the port design:
    1. Apply a deck-on-piles type of quay wall (with a rough revetment slope), for the container terminal. This will make sure wave penetration further into the main basin will be strongly reduced.
    2. Relocate the jetty for maritime service providers from the northern breakwater (close to point 6) to the area south of the container terminal (point 4). The berth for navy vessels remains at the northern breakwater, as these are less sensitive to wave agitation.

- It is recommended to enhance the wave penetration studies in the FBC-phase of port design, using more sophisticated and detailed models, to confirm and further refine the findings of this study.

- In case the LNG-terminal would be developed in the future, wave heights at the jetty should be carefully assessed, in combination with the alignment of the additional breakwater.

Wave penetration studies – results

Location	H_s [m]	T_p [s]
1	0.56	10.8
2	0.16	10.8
3	0.16	10.8
4	0.10	10.8
5	0.16	10.8
6	0.24	10.8

Table 6.1 - Wave conditions for operational conditions (Hs = 0.8 m)

Location	H_s [m]	T_p [s]
1	1.4	17
2	1.29	17
3	0.48	17
4	0.4	17
5	0.4	17
6	0.88	16.7

Table 6.2 – Extreme wave conditions for 1/1 yr (Hs = 2.0 m)

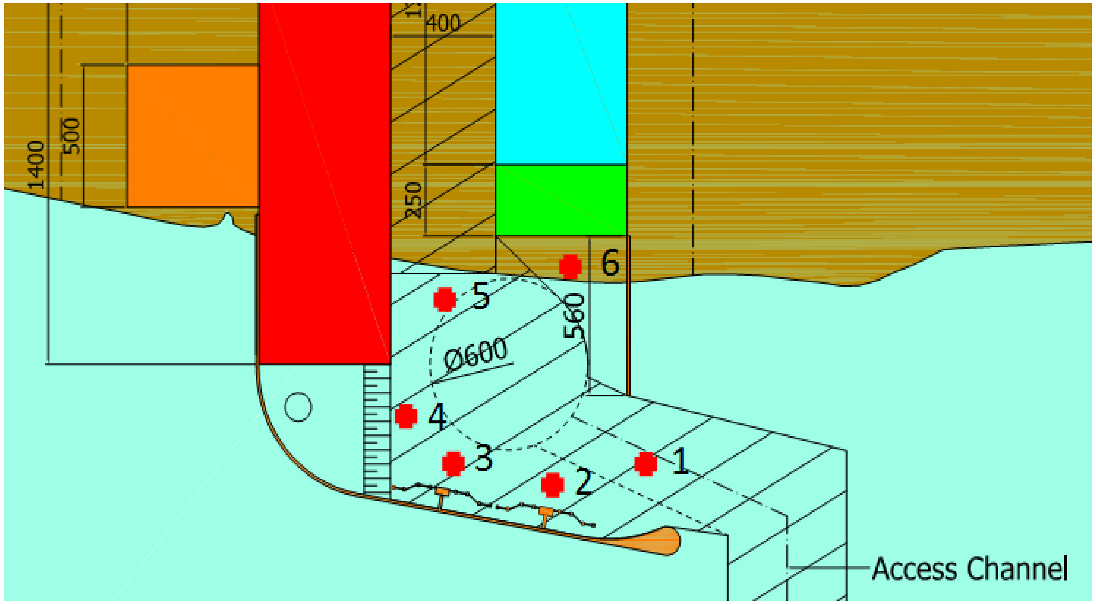


Figure 6.1 – wave study locations

Summary of main considerations on nautical safety aspects

In the optimized Master Plan design of the port entrance and access channel (shown once more in figure beside), nautical safety issues have been addressed as follows:

- The access channel has a smoother bend towards the port entrance, which can be navigated under nearly all wind and wave conditions.
- The last part of the access channel has a width of 300 m, to reduce wave penetration, and allows for one way traffic; if necessary with more traffic the largest part of this stretch can be widened to 450 m.
- The access channel is aligned with the centre of the first (main) turning basin, which has a 600 m diameter and sufficiently large distances to the berths around it (oil jetties: upwind of basin, gives extra safety).
- In case of an incident with a vessel in the turning basin, the space around it is large enough for other vessels to pass by.
- A large width of the main harbour basin has been chosen (500 m) to serve as a safe fairway to the future expansion area larger design vessels (if any).
- A possible LNG-jetty (2 berths) is located in a separate location, at a distance of more than 500 m to the axis of the main access channel.
- A second turning basin is foreseen around the year 2030, at the northern end of the main harbour basin; its 500 m diameter in a more sheltered location it can accommodate all large vessels, relieving the main turning basin and easing traffic through the port entrance.
- The choice of vessels to use the first or the second turning basin will depend on the allocated berth, but also on traffic and weather conditions (discretion of Harbour Master).

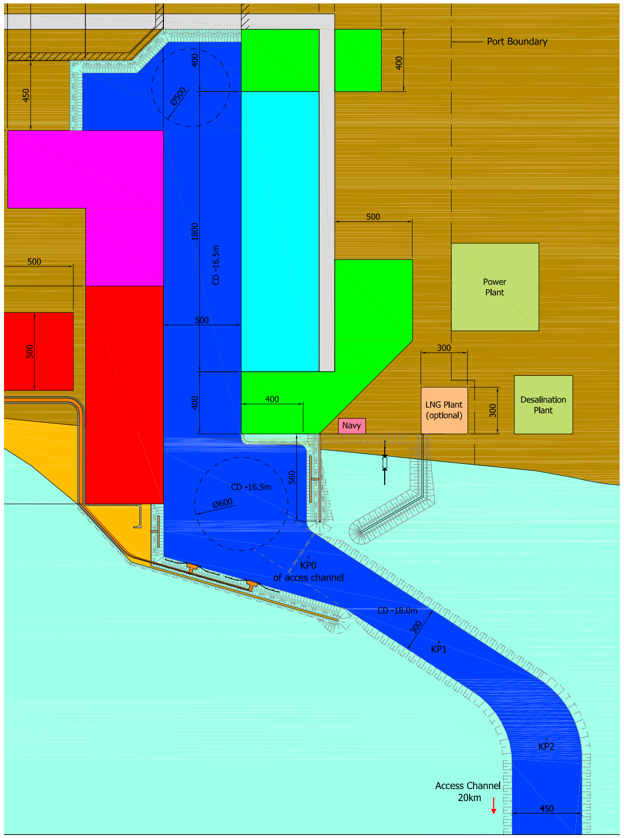


Figure 6.2 – Master Plan

Contents

General assumptions regarding terminals

Types of terminals

- In line with traffic forecast and Master Plan, Ibom DSP facilities will include terminals for containers, break bulk, dry bulk and liquid bulk cargoes.
- In addition, an offshore supply base (OSB) is foreseen to serve the oil & gas industry in the wider area.
- Dry bulk (optional in Phase 1) and liquid bulk commodities will be handled at dedicated terminals, with dedicated ship-to-shore handling equipment, from start of operations.
- Containers, steel and iron products, project cargo, break bulk and vehicles could be handled at a multi-purpose terminal until volumes justify dedicated terminals for these commodities.
- The vast majority of import cargoes and all export cargoes will be buffered in the storage areas at the terminals prior to loading to and after unloading from vessels; covered and uncovered storage areas will be available for the various commodities as temporary buffer locations.

Hinterland transport

- Containers, general and bulk cargoes will be delivered to and picked up from the terminals by road trucks only, in the first phase of development.
- At a later stage, railway will be connected to all terminals; the liquid bulk terminal will also be connected to the national pipeline network for oil products.

Reference lay-outs

- The operational set-up and the resulting lay-out drawings presented in this section must be considered as reference lay-outs, with the purpose to demonstrate the operational feasibility of the presented Master Plan.
- Each of the future concessionaires will select their own operational set-up as well as their terminal lay-out based on his specific preferences and operational experience.

Dwell times assumptions in 2035

- To arrive at the operational plans, storage parameters have been utilized that are listed in Table 7.1.
- The values in the table refer to dwell times assumed for the year 2035; the dwell times for general cargo (containers, break-bulk, vehicles) will be larger initially, more similar to present day dwell times in Nigeria.
- The dwell time for Ro-ro has been assumed to be low in 2035 in order to avoid congestion of the terminal area; sufficient space is assumed to be available in the vicinity of the terminal (FTZ), at lower storage tariffs.

Commodity	Dwell time (days)	Peak factor	Storage height
Containers (full)	5	1.25	Max 4 TEU
Containers (empty)	14	1.25	Max 6 TEU
General cargo	12	1.25	1.8 m
Iron and steel	12	1.25	1.8 m
Ro-Ro	4	1.25	n.a.
Dry bulk (fertilizer)	15	1.30	4.0 m
Dry bulk (grain, cement)	15	1.30	(silo's)
Liquid bulk	30	1.30	(tanks)

Table 7.1 – Assumed dwell times for all cargo types in the year 2035 (source: Consultants estimate)

Section 7 - Operational Plan for Ibom DSP

Container terminal set-up and operations

- Ship to shore handling is foreseen by rail-mounted gantry cranes (Post-Panamax size), with 3 STS (ship-to-shore or quay) cranes per berth (app. 1 per 120 m quay).
- Transport between the quay area and the stacking area will be performed by tractor-trailer units. Rubber-tyred gantries (RTG's) will be used for all stacking operations and container transfer (internal and external).
- Separate stacking areas for reefers, IMO (dangerous cargo) and out-of-gauge containers are foreseen.
- There is a relatively large imbalance in containerized cargoes, leading to a large share of empties, with long dwell time.
- Only limited stacking area has been made available for empty containers on the terminal; part of the empties will be stored at an empty depot outside the terminal.
- The empty depot is situated at a separated location close by the terminal, where also space is provided for container repair and supporting activities; additional empty depots may be developed in the Free Trade Zone.
- A relatively large customs inspection zone has been integrated in the terminal, its size and use will depend on custom regulations.
- A separate pre-gate parking area for trucks is located close by, but outside the terminal premises.
- A rail terminal and handling area has been integrated at the back end of the terminal.

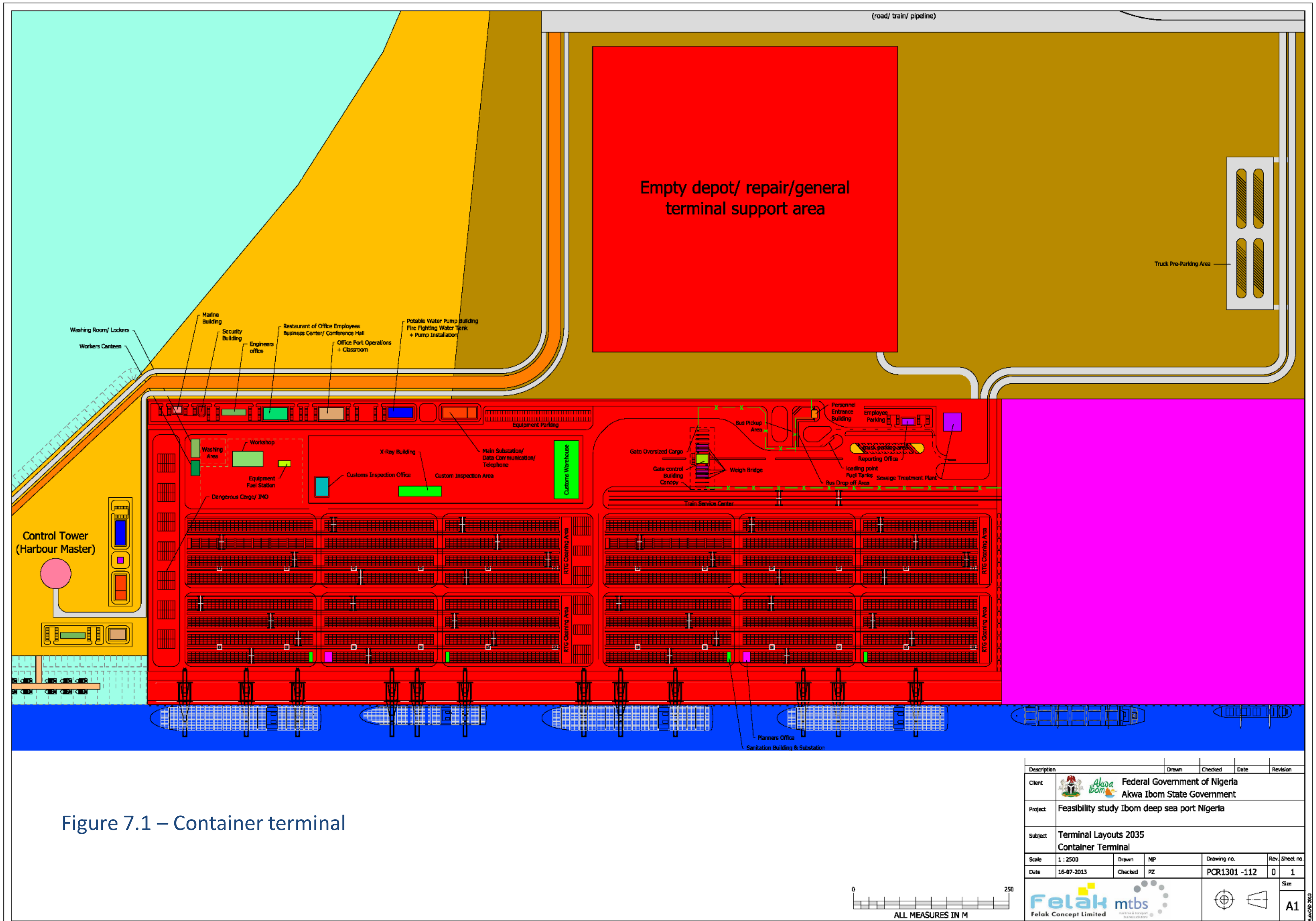


Figure 7.1 – Container terminal

General cargo terminals (break bulk and Ro-Ro) - set-up and operations

- General cargo is basically split up in three commodity types; steel and iron, vehicles and other general cargo
- Commercial fishery cargoes and processing activities, although not identified separately in the traffic forecast, may also be part of the general cargo terminal and the FTZ; additional facilities for local fishermen may be part of ESIA compensation schemes, but should be separated from the commercial port area.
- All break-bulk cargo is handled from ship-to-shore by mobile cranes on pneumatic tyres (2 cranes per berth of 250 m), and possibly partly by ship's gear (derricks).
- Cargo is transported between quay and storage area by tractor-trailer combinations or lift trucks; type (open or covered) and size of storage areas on the terminal will vary with cargoes handled.
- Car carriers for vehicle import are assumed to use quarter or side ramps, which can be lowered on the quay and allow for vehicles to be driven to parking / storage areas on the terminal.
- Dwell times for vehicles at the Ro-ro terminal will be have to be reduced as volumes grow, to avoid excessive parking areas on the terminal; additional area may be provide outside the port (FTZ).
- Both the break-bulk and the Ro-Ro terminal are connected to the railway, adding a modality option to the hinterland transport.

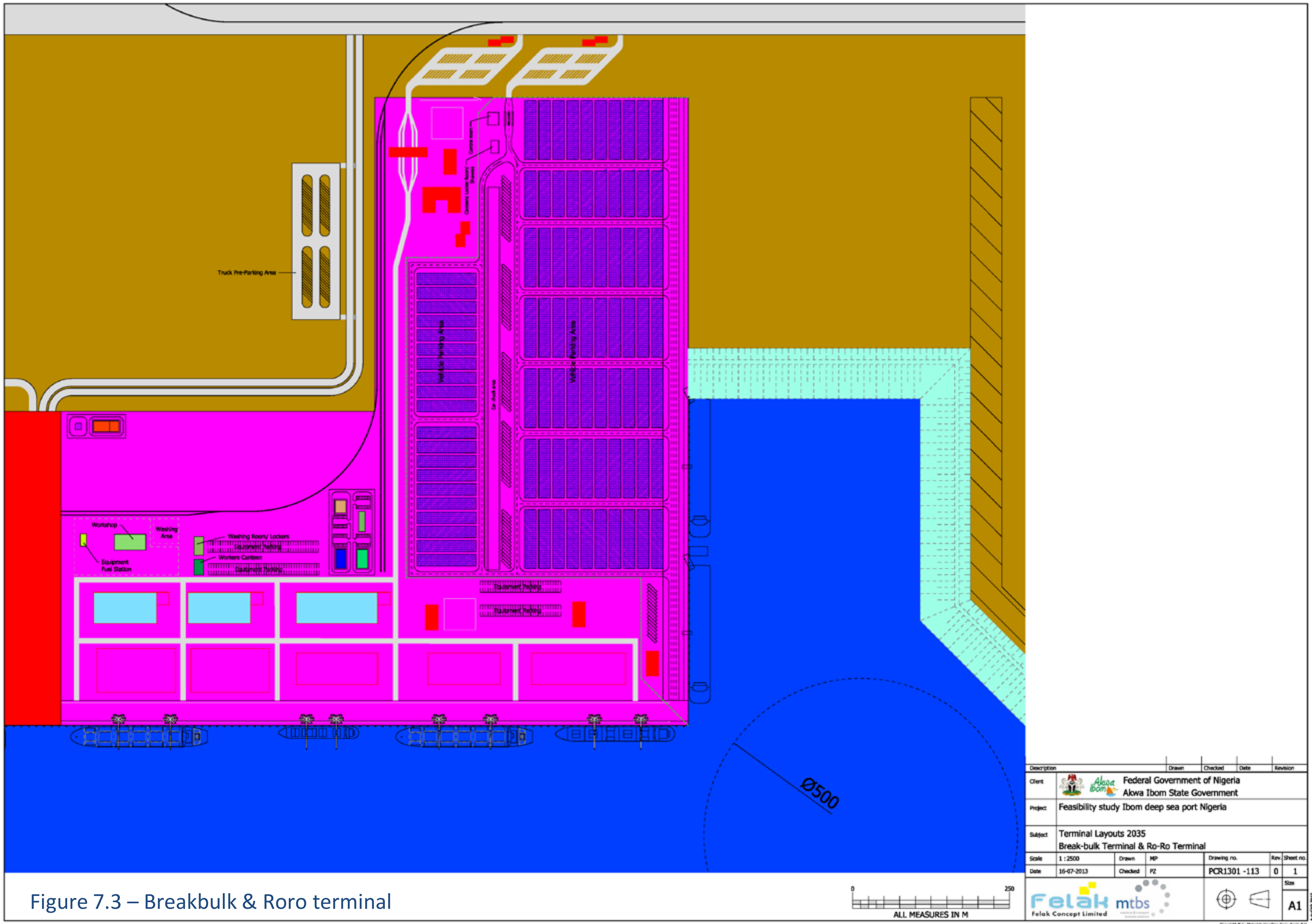


Figure 7.3 – Breakbulk & Roro terminal

Liquid bulk terminal - set-up and operations

- The liquid bulk terminal at IDSP is projected for the handling of oil products such as diesel, gasoil and kerosene.
- Liquid bulk tankers (both deep sea and coastal vessels) will be (un)loaded at the two jetties, consisting of mooring dolphins and a central platform with loading arms and auxiliary equipment.
- The fuel products will be pumped to storage tanks in the large tank farm onshore, holding a variety of tank types and sizes for the various products, at a safe distance from other terminals.
- The tank farm and the jetties are connected by a bundle of pipelines, situated on a pipe rack / bridge along the breakwater, going underground in a pipeline corridor onshore.
- At the tank farm a number of loading bays is foreseen to fill up trucks for transport to the hinterland.
- At a later stage of development the tank farm will also include a rail terminal and a connection to the national pipeline network for fuel products, using the Ibom DSP transport corridor.

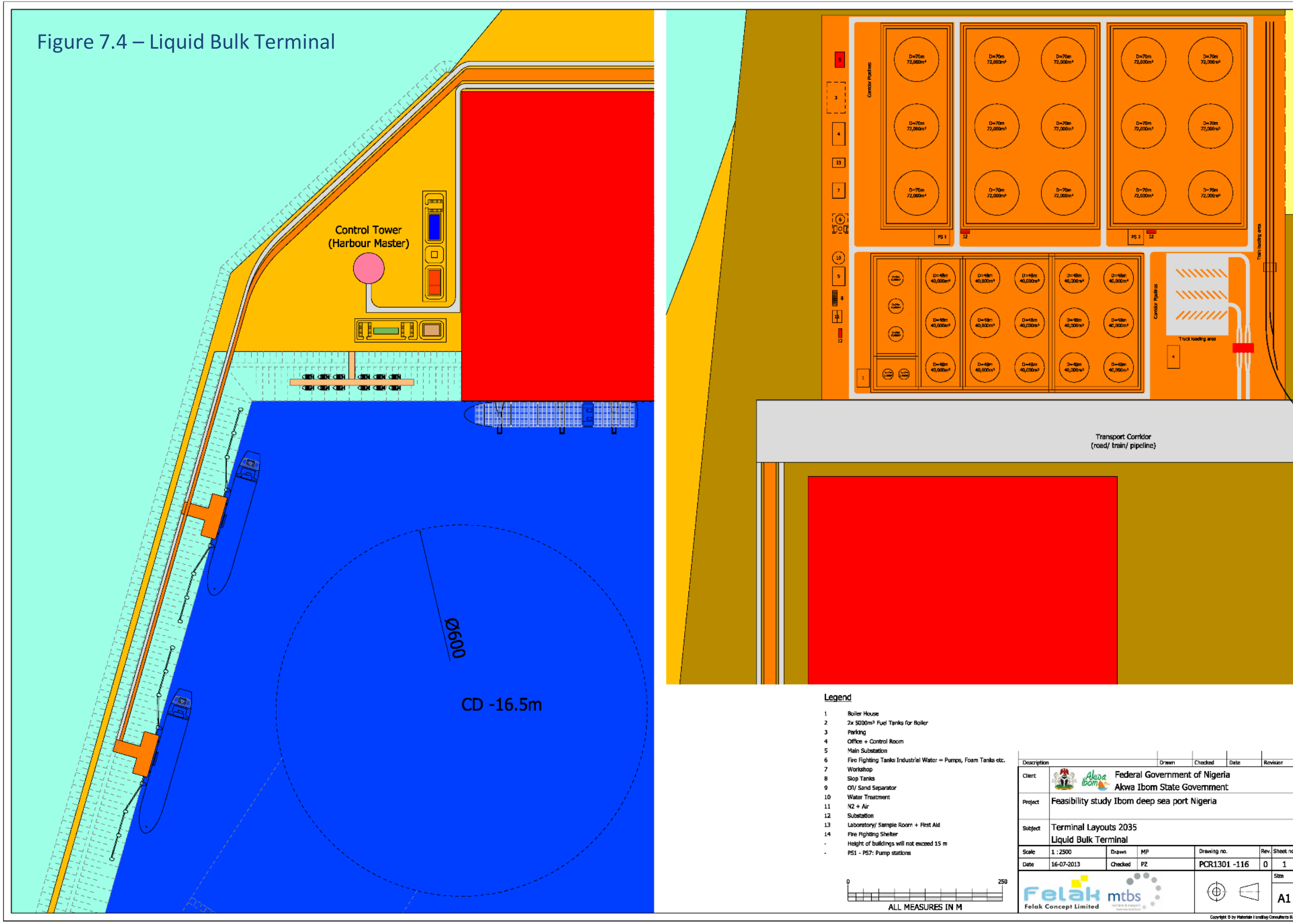


Figure 7.4 – Liquid Bulk Terminal

Dry Bulk terminal set-up and operations

- The dry bulk complex is assumed to be set up as series of separate terminals, for the various cargo types foreseen: cement, food products (grain and sugar) and other dry bulk cargoes, like fertilizers.
- Regarding ship to shore handling, cargoes with low specific weight and viscosity (grains, cement) may be handled by quay based pneumatic systems or vertical (chain or vertical screw) conveyors.
- Grabs are foreseen as unloading equipment for the handling of fertilizer and other bulk products.
- Storage is foreseen in silos for cement, sugar and grain; fertilizers will be stored in covered sheds, whereas open storage areas are foreseen for other dry bulk cargoes (e.g. construction materials).
- Horizontal transport between the quay area and storage facilities will for all dry bulk cargoes be dealt with by conveyor belt systems
- At the terminals for grain, sugar and cement bagging facilities have been foreseen; a small part of the bagged bulk commodities is expected to leave the port as general cargo on coastal vessels.
- For hinterland transport, all dry bulk terminals have their own separate road accesses, gates and integrated railway terminals.

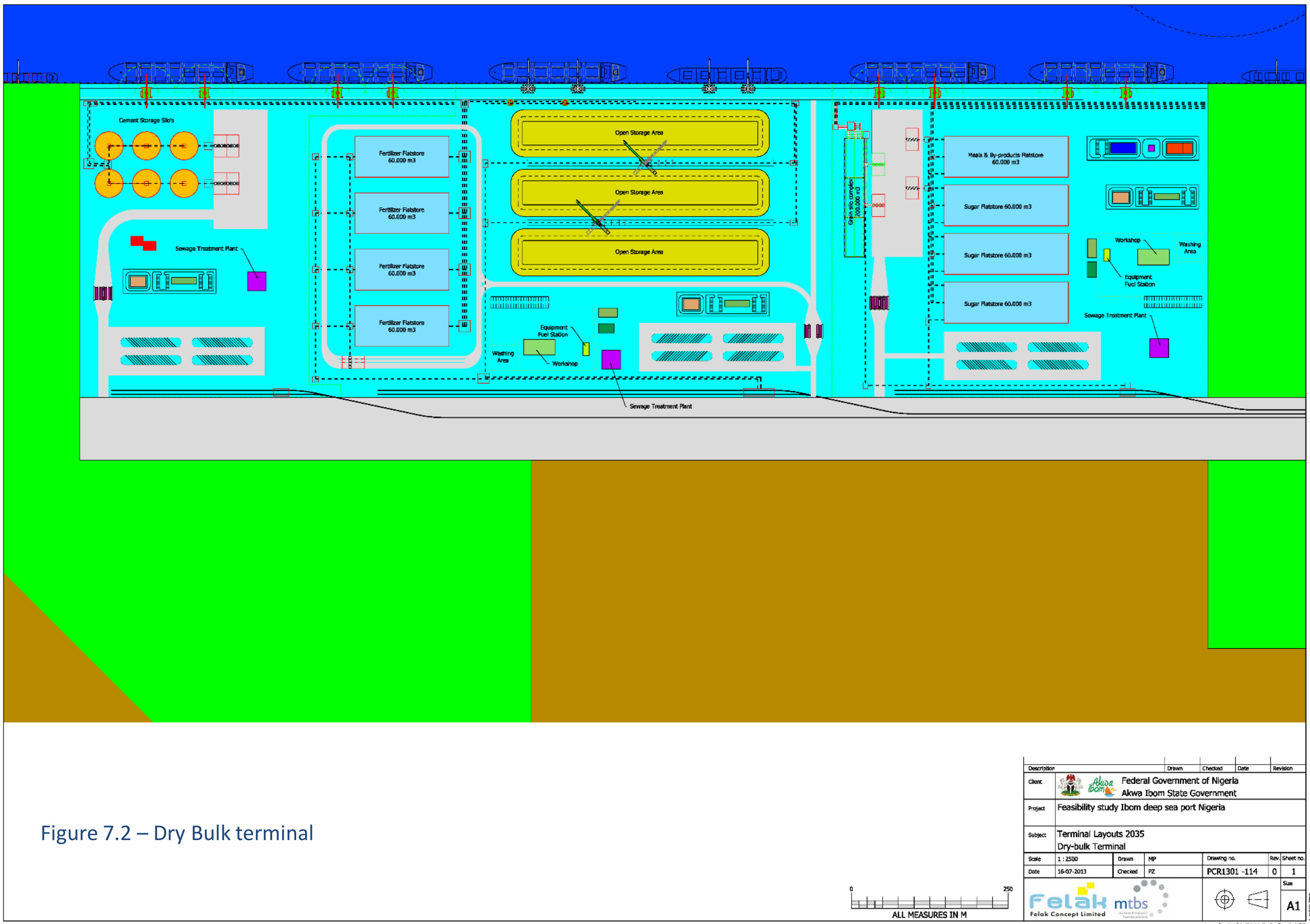


Figure 7.2 – Dry Bulk terminal

Offshore Supply Base (OSB) - set-up and operations

- The OSB is developed in ‘blocks’ of quay wall and terminal area, covering app. 32 ha per block
- The first two blocks of the OSB are developed at the same location, close to the port entrance; the third block is situated north of the dry bulk complex
- The exact location of the third block and / or further developments will depend on timing and scale of development of the dry bulk terminals
- Each block consists of two parts: a dedicated, one-user part and a multi-user part
- The dedicated user part has 200 m quay wall (2 berths) , where ship to shore handling is performed by 2 mobile cranes, and app. 10 ha of area close behind it
- The common user part also has 200 m quay wall with two berths, with a common user quay area of app. 2 ha; more area (app. 4 x 5 ha, assuming 4 different users) is available onshore
- The OSB land side plots consist largely of lay-down and storage areas (open and covered), some bentonite silos, some buildings and workshops, and internal and access roads
- The OSB is not connected to the railway, as there are no large cargo volumes to be handled

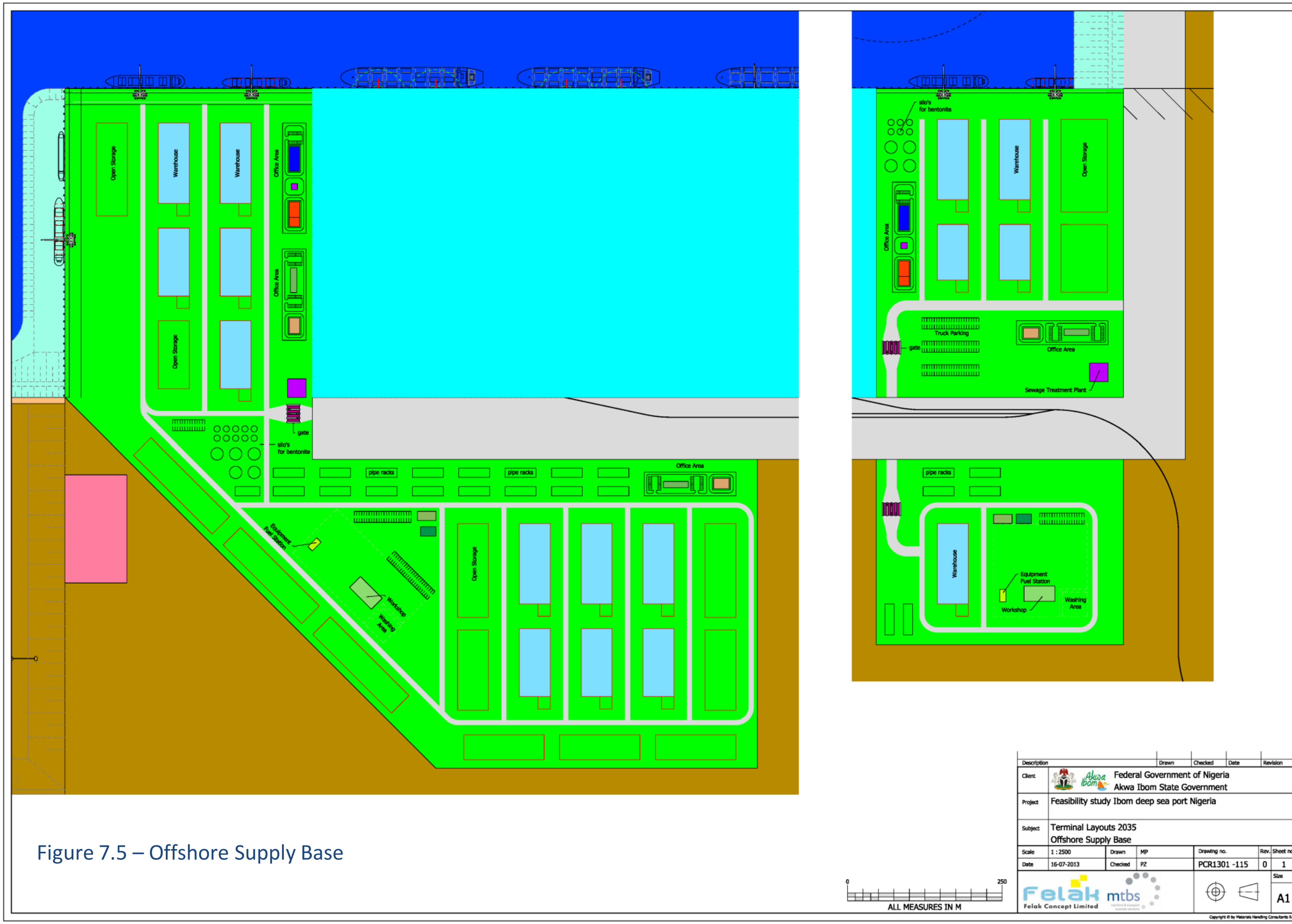


Figure 7.5 – Offshore Supply Base

Maritime service providers and Harbour Master

- The berths and facilities for maritime service providers (tugs, pilots, service and inspection vessels, NIMASA etc.) are located in the area at the control tower, close to the port entrance.
- The available berth length is app. 400 m: 200 m at the outer, deeper side of the jetty and 2 x 100 m at the inner side of the jetty; other berth configurations are possible, if required.
- On land some specific buildings and facilities are foreseen for maritime service providers; the area has its own access road.
- Harbour Master and operational staff of the PDMC may be housed in the Harbour Master office including a control tower (control room, offices) at a convenient level to overlook the port entrance and part of the access channel.
- All other non-operational PDMC staff and service providers will be located at the Port Commercial Centre, just outside the landside port entrance gate.
- Navy berths and facilities are at the northern breakwater (east harbour dam), with possibility for a separate land side road access.

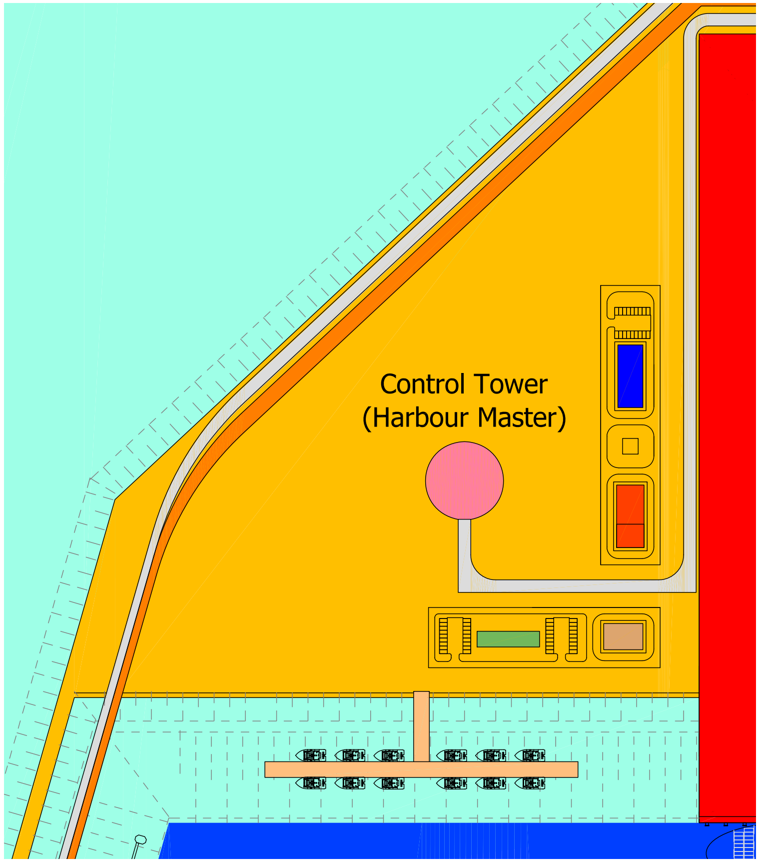


Figure 7.6 – Location for maritime service providers

Free Trade Zone & Port Commercial Centre

- The Free Trade Zone is located behind the Container Terminal and the Breakbulk/RoRo terminal. The Port Commercial Centre is located conveniently between the Port Terminals and the Free Trade Zone
- The available FTZ area is around 1,000 hectares, which is developed in a phased approach and which may be expanded further north if demand further increases.
- The FTZ is aimed at basic activities, including distribution, packing/repacking, small value added activities, container stuffing/stripping, container repair, equipment repair, etc.
- Tenants in the Free Trade Zone can develop their own plots (superstructure, equipment) and the FTZ management company is expected to provide basic infrastructure (land, utilities, roads).
- The Port Commercial Centre is used to house the PDMC management (non-terminal-related); to provide office space for port users (e.g. shipping lines) and public services (e.g. customs, NPA, health services); to provide facilities for those who work in or visit the port/FTZ (e.g. hotel, restaurants, bars, park, pool, shop, conference rooms, etc).

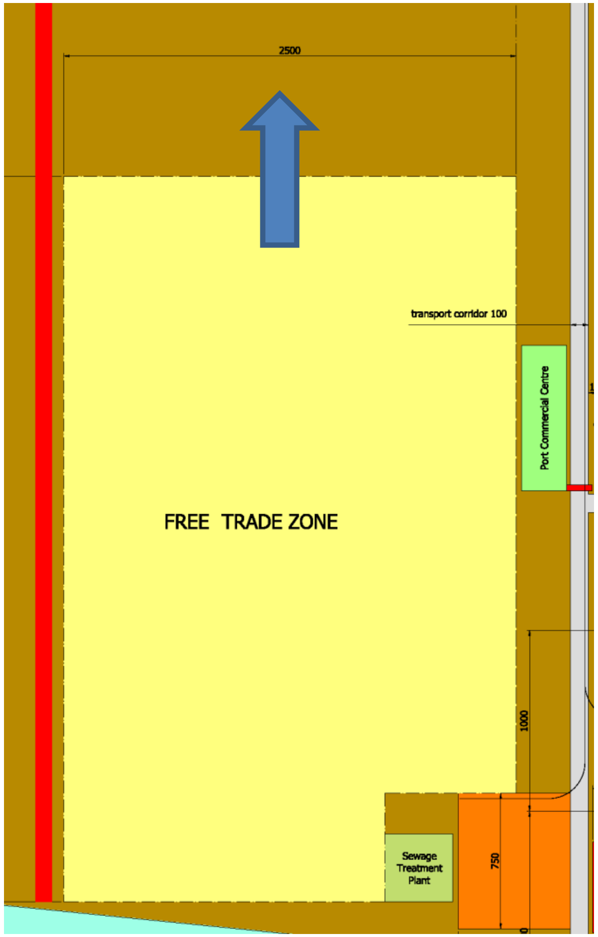


Figure 7.7 – Free Trade Zone

Contents

Section 8 – Design of breakwaters, quay-walls and jetties

Starting points for Feasibility Design

- Breakwaters, quay walls and jetties are the main maritime structures to be considered and will, together with the dredging and reclamation works, largely determine the construction costs of Ibom DSP.

- Functional requirements for all three structure types have been described in the Technical Program of Requirements (TPoR, Section 2, Supporting Document TF-1).

- Alternative structure types for breakwaters and quay walls have been considered at a previous stage and preferred structure types have been chosen (in conjunction with NPA and international standards):
  - breakwater: rubble mound type
  - quay walls: combined wall type or concrete deck on piles type

- Environmental conditions that affect the design are described in the Basis of Design document (see Section 3). Specific design assumptions and standards are given in the design reports (OBC Supporting Documents TF-6).

- Note that all presented designs are based on desk-research assumptions concerning geotechnical conditions, that will be verified when extensive geotechnical and geophysical surveys have been completed in the FBC Phase. Appropriately conservative design-factors have been applied to incorporate the consequent OBC design uncertainty.

- Detailed descriptions of design and calculations are given in OBC Supporting Documents TF-6, the main features are presented in the following pages.

Breakwater design

- Rubble mound breakwater type, built-up of loose materials which provide flexibility for settlements to be expected during lifetime.
- The core of the breakwaters consists of medium grainsize sand, assumed to be available from the access channel to be dredged.
- Main breakwater: sand core is covered by filter layers of quarry-run and rock (10-60 kg, 300-1000 kg), with an armour layer of 0.75 m^3 X-blocks (pre-fabricated concrete elements) on top, and a crest elevation of CD +8.7 m.
- The northeastern breakwater has the same build-up, but top layer of rock (300-1000 kg) is sufficient, as this location is less exposed to wave attack; crest elevation is CD +4.1 m.
- Construction of the breakwaters takes place ‘in the dry’, making use of a large sand dam for the main breakwater (to be build up from material dredged in the access channel).
- The seaward facing protection of the main breakwater extends to the western end of the reclaimed port areas; Westward from that point a beach is reclaimed as a soft sea defence structure.

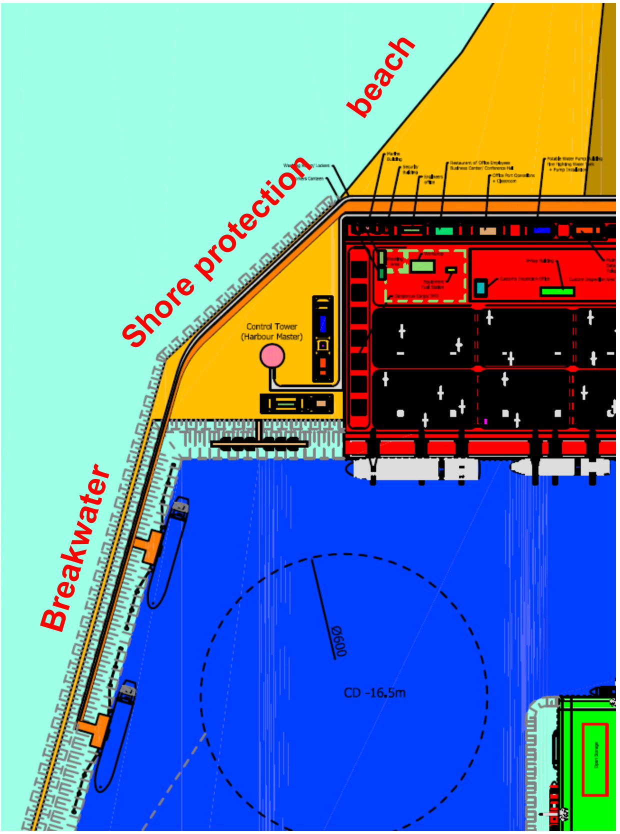
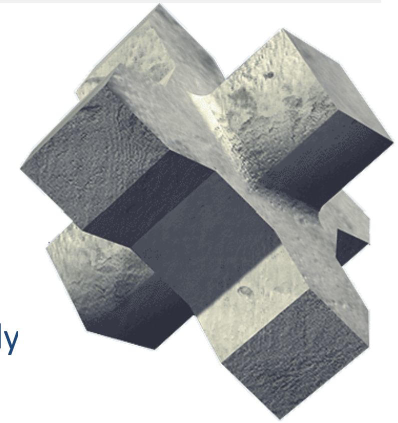


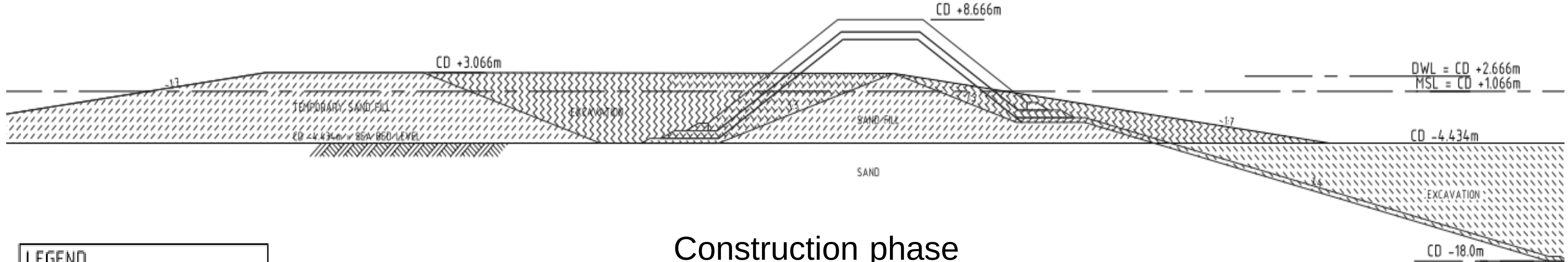
Figure 8.1 – Main breakwater and shore-protection

Breakwater design – main assumptions

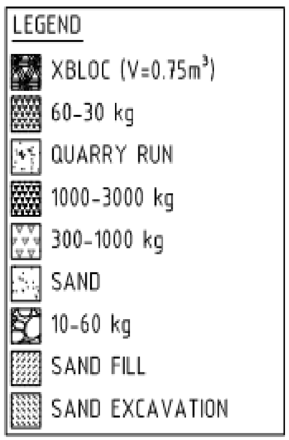


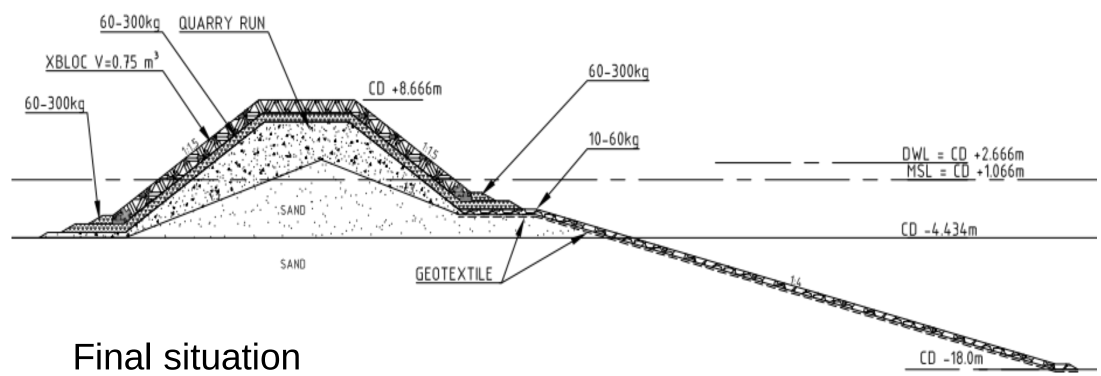
- Sand and concrete for armour units are sufficiently available.
- X-blocks are non-reinforced concrete units (picture on the right), assumed specific density ρs = 2400 kg/m3.
- Large rock material is usually scarce; it is assumed that rock until 300-1000 kg is sufficiently
- The assumed specific rock density is ρ_s = 2650 kg/m3.
- Standard rock gradings are assumed as described in the Rock Manual [Ref. 7, Sup.Doc. TF-6].
- The typical breakwater cross-sections are derived for straight sections (trunk). For specific areas (corners, roundheads) locally other dimensions may apply and need to be designed in the detailed design stage.
- The crest elevation is determined based on mean wave overtopping criteria.
- Breakwater sections are designed for design storm with 1/100 per year return period (storm with 1% chance of being exceeded in any 1 year).
- For the design of the armour layers, perpendicular wave attack has been assumed (conservative approach).

Typical cross-section – Main breakwater



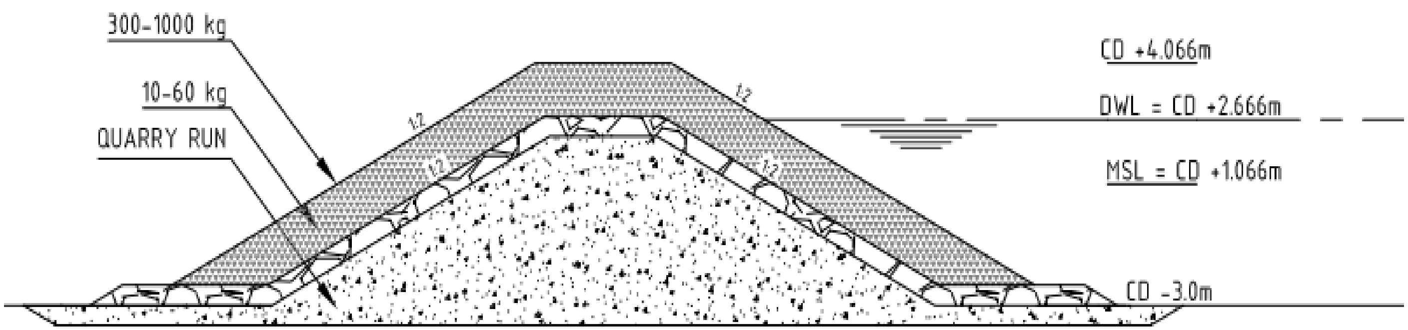
Construction phase





Final situation

Typical cross-section – Northeastern breakwater



Quay-wall design – main dimensions and assumptions

- The elevations and heights of quay walls for all cargo types are given in the following table.

Terminal	Top level quay	Nautical Guaranteed Depth	design level used for masterplan and estimate *)	design level of cross section as drawn
	[m CD]	[m CD]	[m CD]	[m CD]
Container	+5.0	-16,5	-17.1	-16.5
General Cargo/Breakbulk	+5.0	-16,5	-17.1	-14.5
General Cargo/Steel	+5.0	-16,5	-17.1	-14.5
RoRo	+5.0	-16,5	-17.1	-12.5
Dry Bulk	+5.0	-16,5	-17.1	-16.5
Offshore Supply Base	+5.0	-8.8	-9.4	-9.4

*) Including allowance for dredge tolerance and maintenance buffer

- The assumed soil profile for quay wall designs is presented in the table below (see also BoD, Sup.Doc. TF-2).

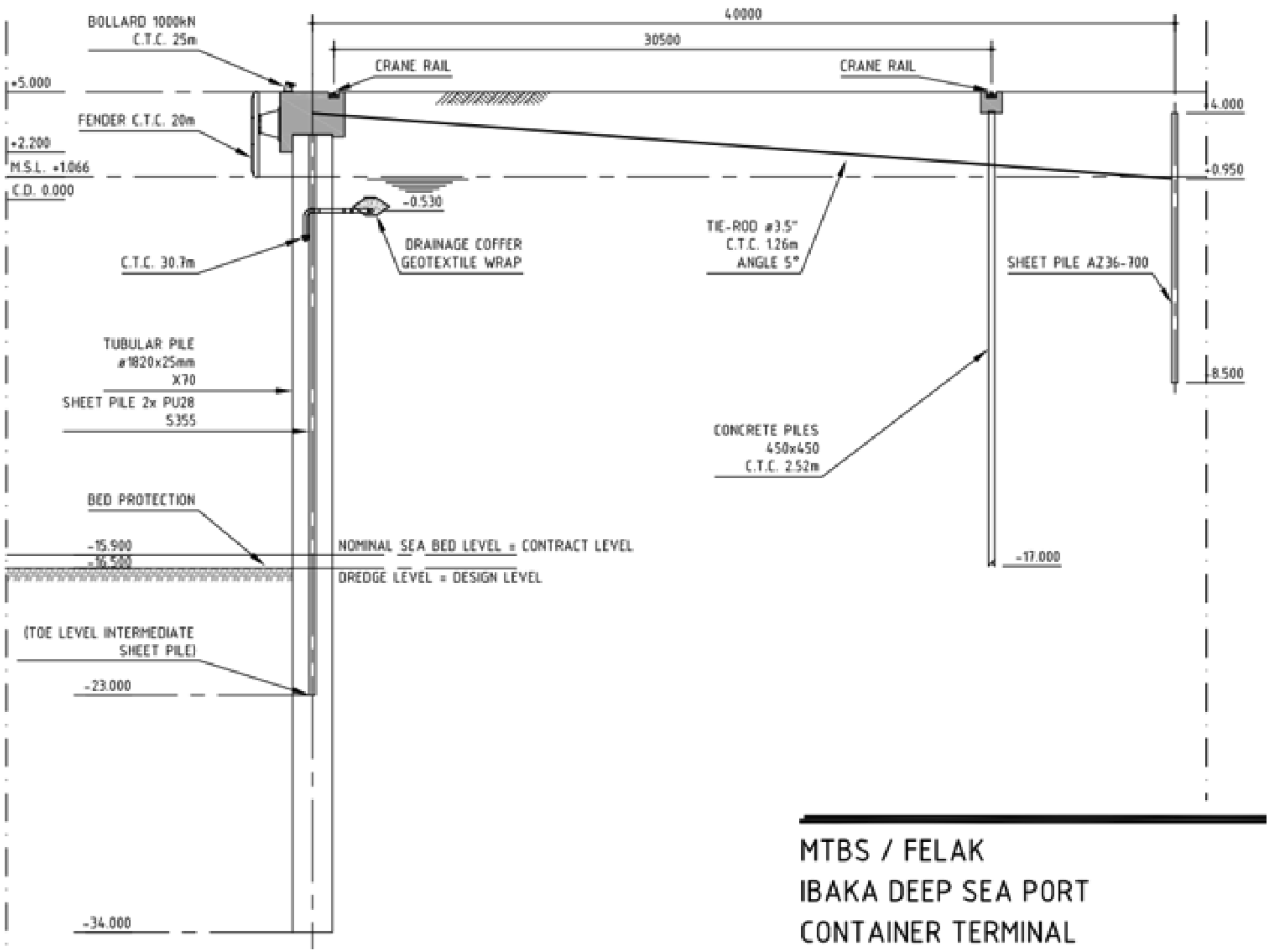
ID	Description	top level [m+CD]	γ [kN/m²]	γ_{sat} [kN/m²]	φ' [°]	c' [kN/m²]
1	MUD, clayey, soft		13	13	15	0
2	Sand, loose		17	19	27.5	0
3	Sand, medium dense		18	20	30.0	0

Quay-wall design – combined wall

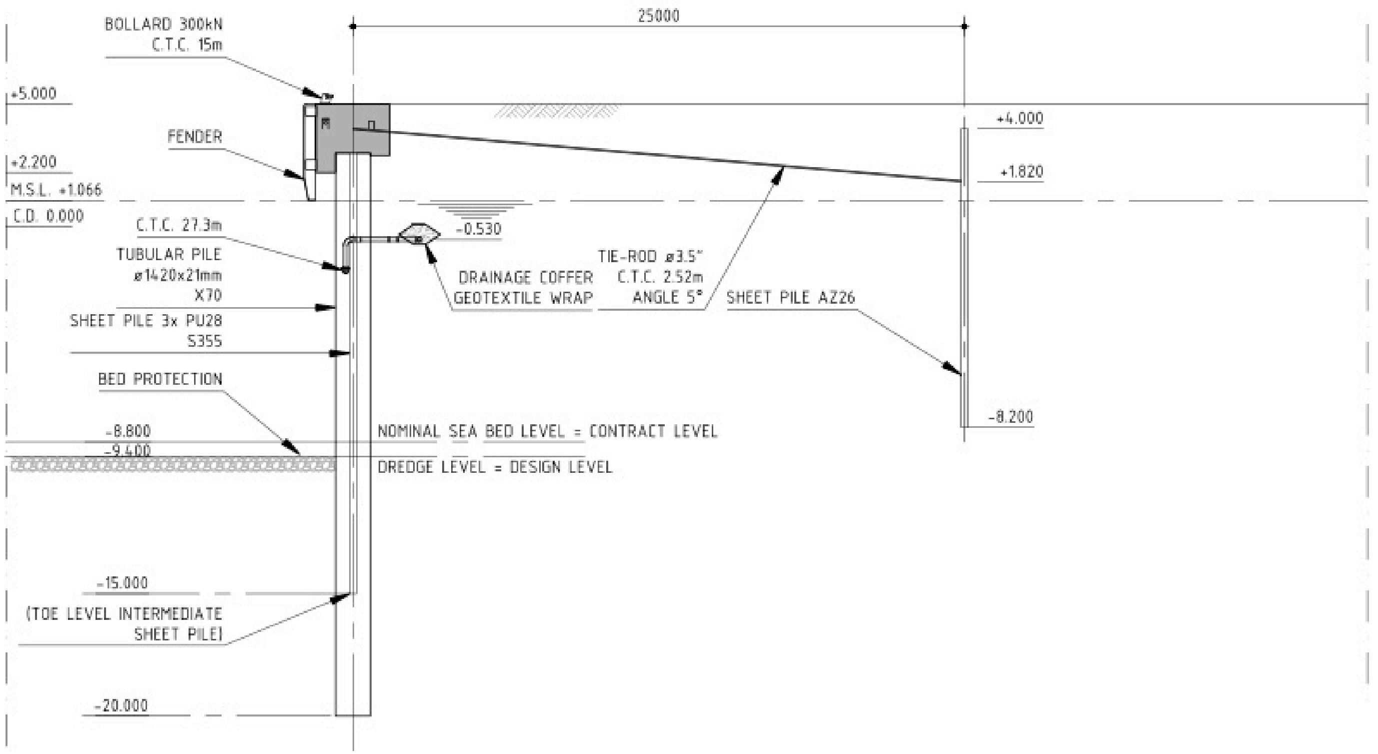
- The combined wall structure type is a proven concept, that is relatively simple and easy to construct.
- The front wall consists of a combination of steel tubular types and sheet piles, with an in-situ made concrete beam on top; the front will is stabilized horizontally by a sheet-pile anchor wall and tie-rods.
- The land sided crane rail (in case of gantry cranes, for containers and dry bulk) is founded a concrete beam supported by pre-fab concrete piles
- The combi-wall is coated in the splash zone; in addition the application of a system of cathodic protection is strongly advised, in order to prevent future problems with corrosion.
- Alternatively, the front wall may be constructed as a diaphragm wall, which is less sensitive to maintenance, but more complex in construction.
- The variation in loading types and construction depths for the various terminal types is addressed through adaptation of dimensions of the main structural elements (diameter and length of piles, steel thickness, etc.
- Detailed descriptions of design and calculations are given in OBC Supporting Documents TF-6, the main features are presented in the following slides (cross sections for other terminals are similar to the two shown):

Section 8 – Design of breakwaters, quay-walls and jetties

Quay wall design – combined wall, container terminal



Quay wall design – combined wall, offshore supply base

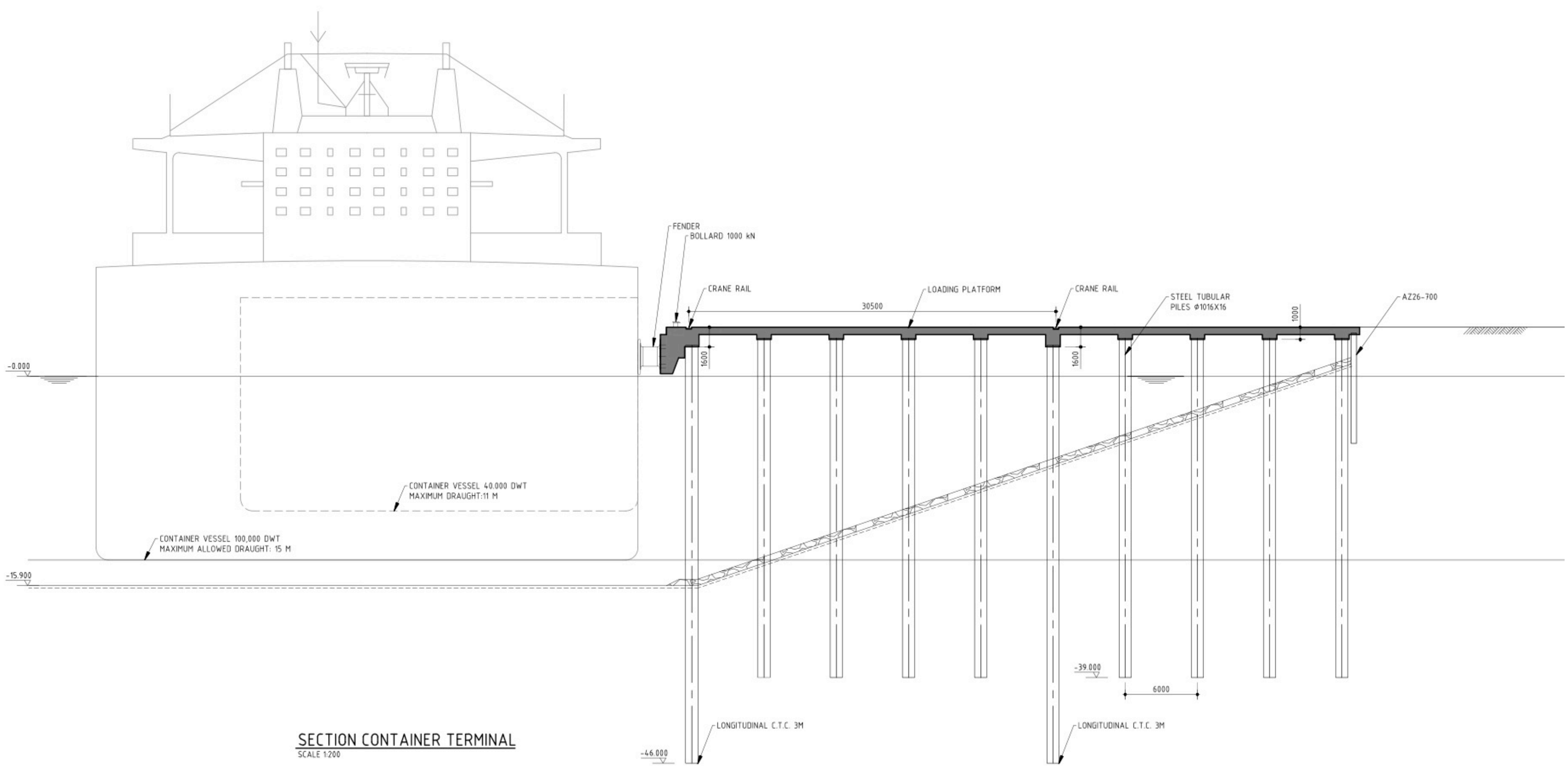


COMMENTS
UNITS IN mm
HEIGHT MEASUREMENTS IN m
ANGLES IN DEGREES
REFERENCE LEVEL = CD
C.T.C. MEASUREMENTS IN m

Quay-wall design – deck on piles

- This alternative quay wall type is chosen to reduce wave reflection within the harbour basin, at the most exposed location (container terminal).
- The quay wall structure consists of a pre-fab concrete deck on steel tubular piles.
- To absorb the horizontal forces from berthing or moored vessels, either breasting piles with fenders are applied, or oblique ("raker") piles are supporting the fenders and bollards positioned on the concrete deck. This detail is not shown in the cross section shown on the next slide.
- The slope under the deck should be gentle and have a rough revetment (e.g. rock, 60-300 kg), to maximize wave energy dissipation.
- Alternatively, concrete piles are also a possibility, either made in-situ (with a 'lost' tubular steel casing) or prefab type; the choice will depend on maintenance demands and reliability
- Detailed descriptions of design and calculations are given in OBC Supporting Documents TF-6~~.~~

Quay wall design – deck on piles, container terminal



Jetty design

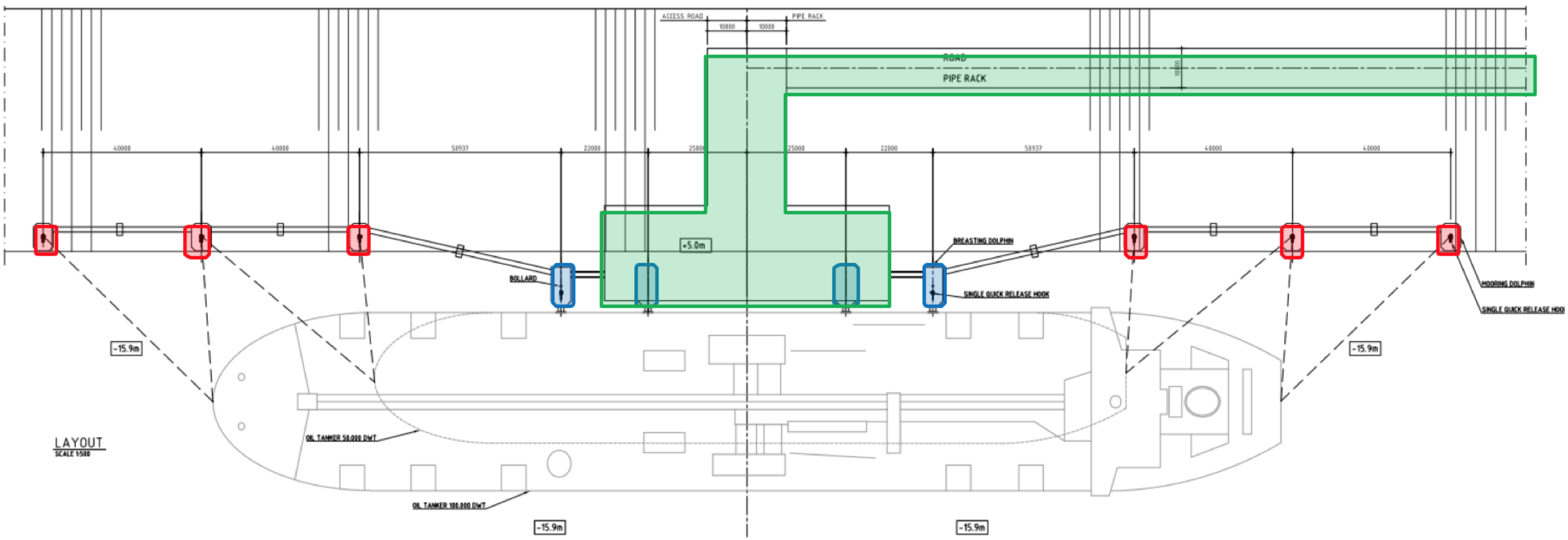
Each jetty consists of the following components:

- a trestle with a roadway and pipe rack, plus service ducts, lighting
- a loading platform (sometimes referred to as jetty head) with:
    - loading arms
    - fire fighting towers
    - light poles
    - some storage tanks and pumps
    - pipe supports

The layout in general is presented in Figure 8.2.

In this figure the mooring dolphins are shown in red, the breasting dolphins in blue and the platform (including trestle) in green.

Jetty design – general lay-out



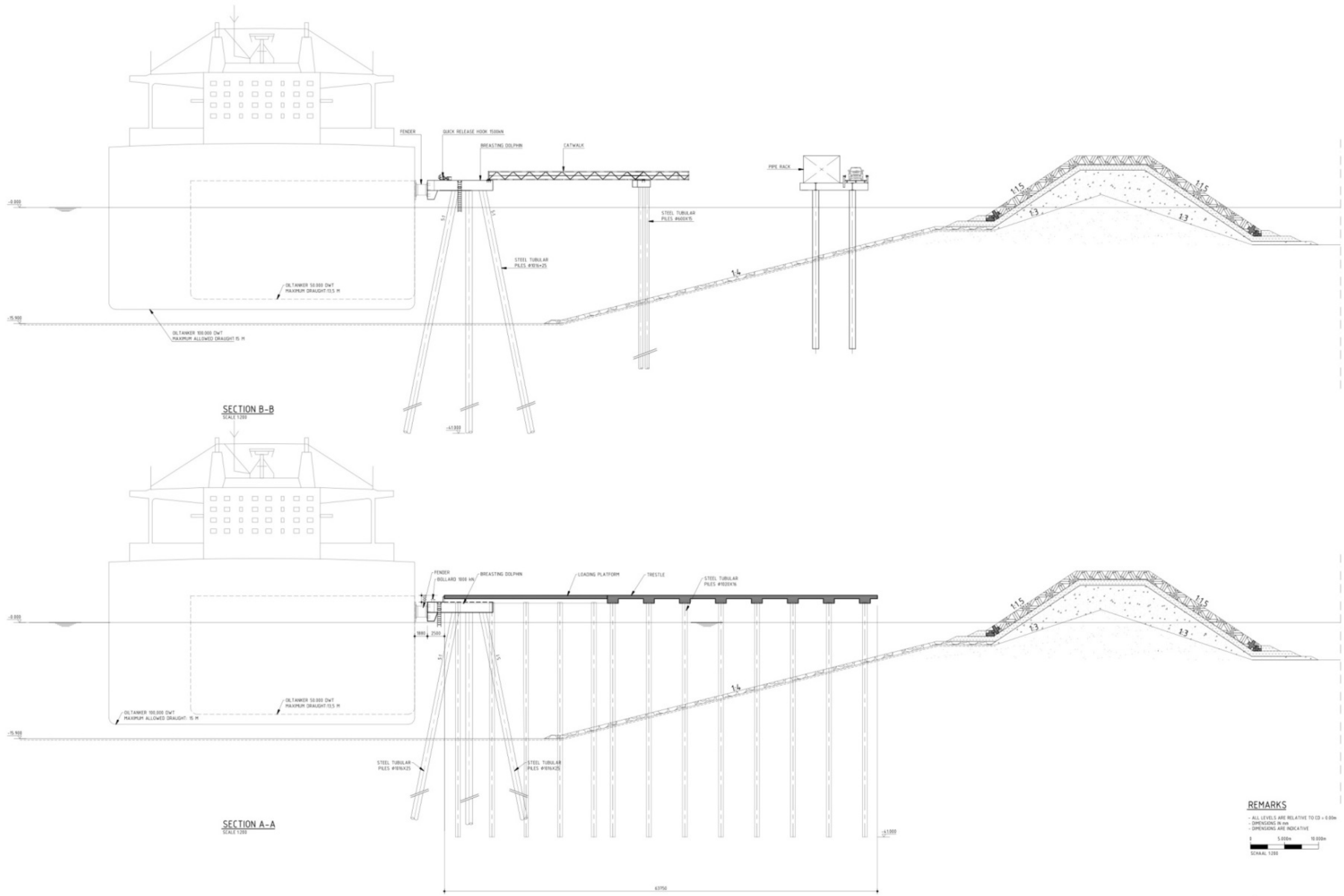
Jetty design

The main layout can be described as follows:

- the mooring dolphins are positioned in a straight line parallel to the berthing line.
- four breasting dolphins are arranged in such a way that the smallest and largest vessels can moor safely.
- the position of the mooring dolphins has been chosen so that the vertical angle of the mooring lines does not exceed the maximum recommended value of 25°. The length of the mooring lines is in the recommended range of 35-50 m.
- catwalks will provide an access to the mooring and breasting dolphins from the loading platform.
- the operational zone for loading and offloading consists of a loading platform and a trestle.
- the trestle will provide an access to the loading platform and support the pipe rack for the pipelines that connect the loading arms with the onshore facilities.
- The piperack is not projected on top of the breakwater as this results in a complex and expensive structure combining two distinctively different functions.

Detailed descriptions of design and calculations are given in OBC Supporting Documents TF-6, typical cross sections of the jetty are presented on the following page.

Jetty design - typical cross-sections of trestle (above) and platform (below)



Contents

Section 9 - Construction methodology and planning

Introduction

- In this section the assumed methods for construction of breakwaters, quay walls and terminal areas in Phase 1 of IDSP development are described.
- The chosen methods are adapted to the scope of works in Phase 1, the specific characteristics of the seaside location and the assumed quality of subsoils, both on- offshore.
- The construction methodologies described below are also valid for construction works in the next phases of IDSP development, after Phase 1.
- All construction methods and proposed types of equipment are based on frequently used international port construction practices.
- The assumed methodology will have to be checked and, if necessary, modified once detailed survey results have been made available and more is known about the availability of materials (e.g. quarry stone).
- The final choice of construction methodology and planning will be up to the selected contractor, assuming an EPC ‘design & construct’ contract is awarded by the PDMC.
- Contractor shall implement an extensive Health, Safety & Security Plan during realization of the Works. Security measures including fencing of all work and housing areas, 24/7 armed guarding of all work areas and onboard of all vessels, floodlights, and proper armed patrol protection for personnel transfer outside the gate.
- For this stage of the project, the proposed methods en sequences of construction works have been used to derive the construction planning (presented at the end of this section) and the cost estimates in Section 10.

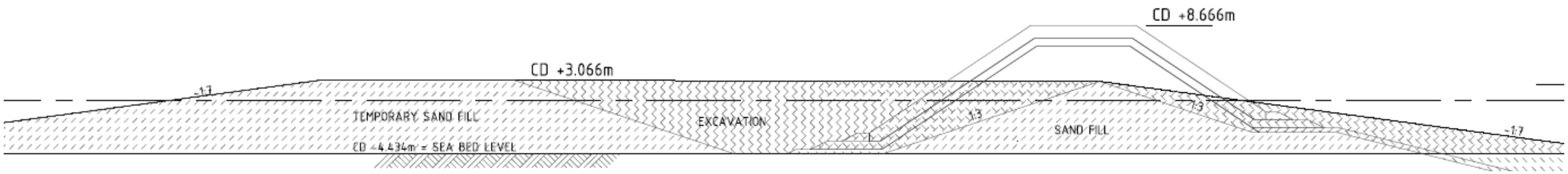
Section 9 - Construction methodology and planning

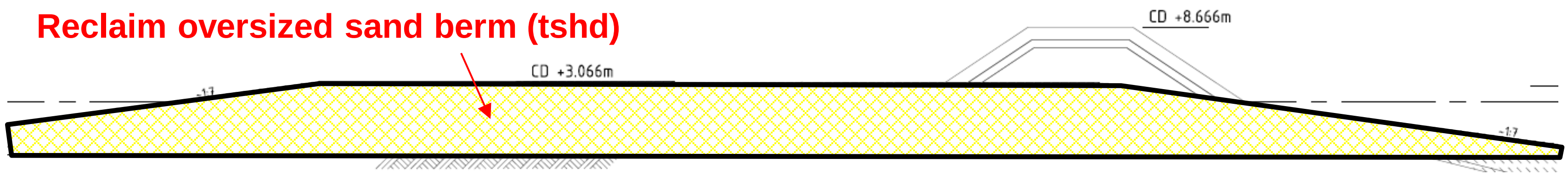
Breakwater construction

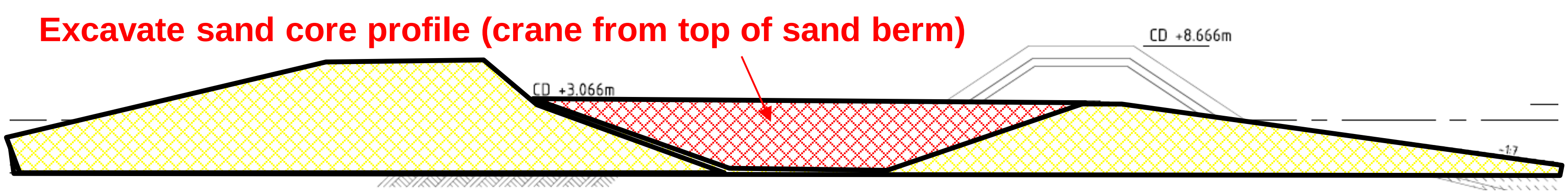
- The breakwater & sea defence system consists of 4 types of structures:
  - Main breakwater (south): armour layer of concrete X-blocs, on both outer and inner slope.
  - Shore protection (southwest, in front of reclaimed area): armour layer of X-blocs on outer slope.
  - Beach nourishment (west): a natural, sandy sea defence (building with nature).
  - Secondary breakwater (northeast of port basin): armour layer of rock gradations.
- It is anticipated that construction of the main offshore breakwater and south-western shore protection will take place in the following sequence:
  - Construction of an oversized sand berm, to provide shelter from the ocean swell for all construction activities of the breakwater (and the port area behind it).
  - Transport rock gradations from quarry to offloading site / storage location in sheltered area.
  - Excavate the sand berm with hydraulic cranes and place quarry run layer.
  - Place filter layers on outer and inner slope.
  - Produce X-blocs (prefab concrete, from local plant) and place into position (outer slope and crown).
  - Rehandle the sand berm in front of breakwater and pump towards the beach profile west of port area.
- The secondary breakwater consists of quarry run and rock gradations, and is constructed in the same period

- Taking advantage of the shelter provided by the initial sand berm of the main breakwater, the secondary breakwater can be constructed with land based equipment, expanding south from the existing shoreline

Breakwater construction (1)

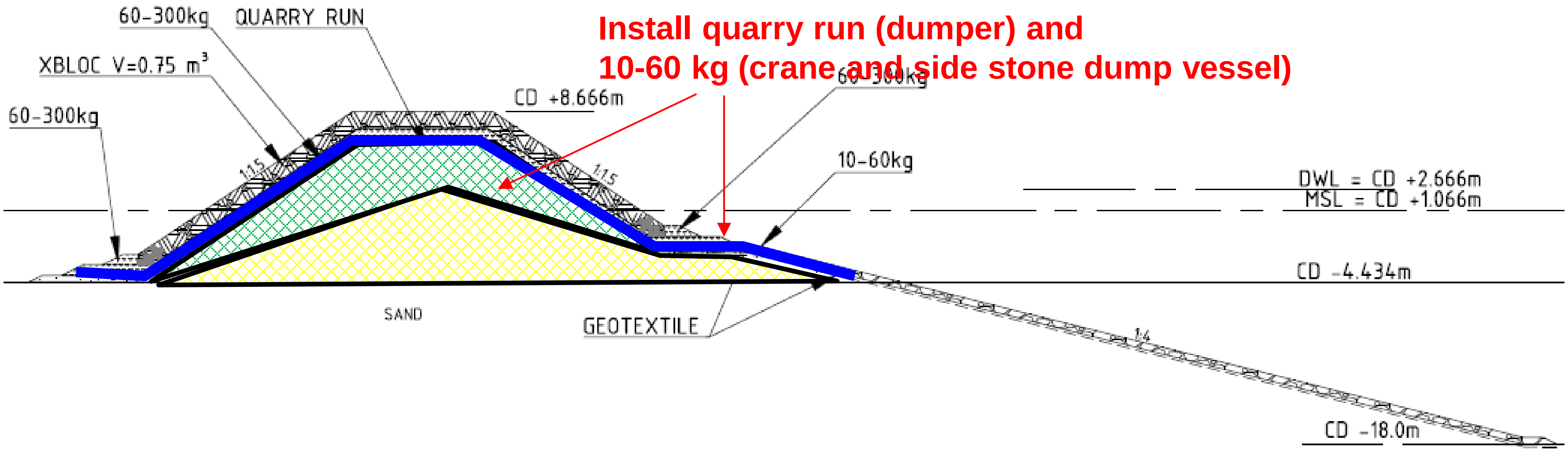


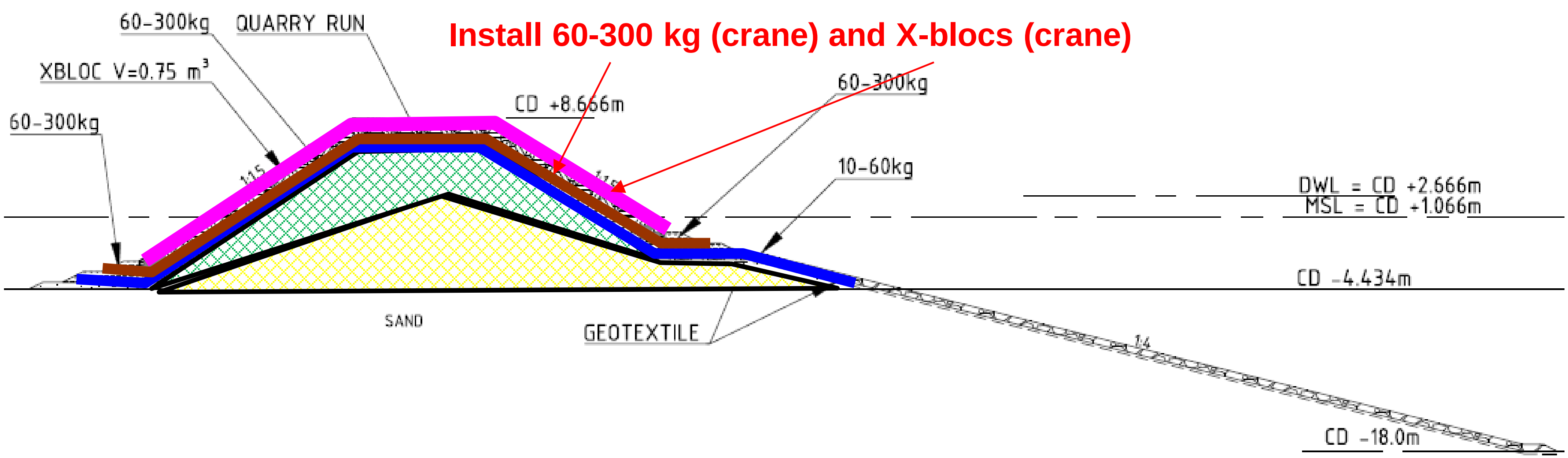




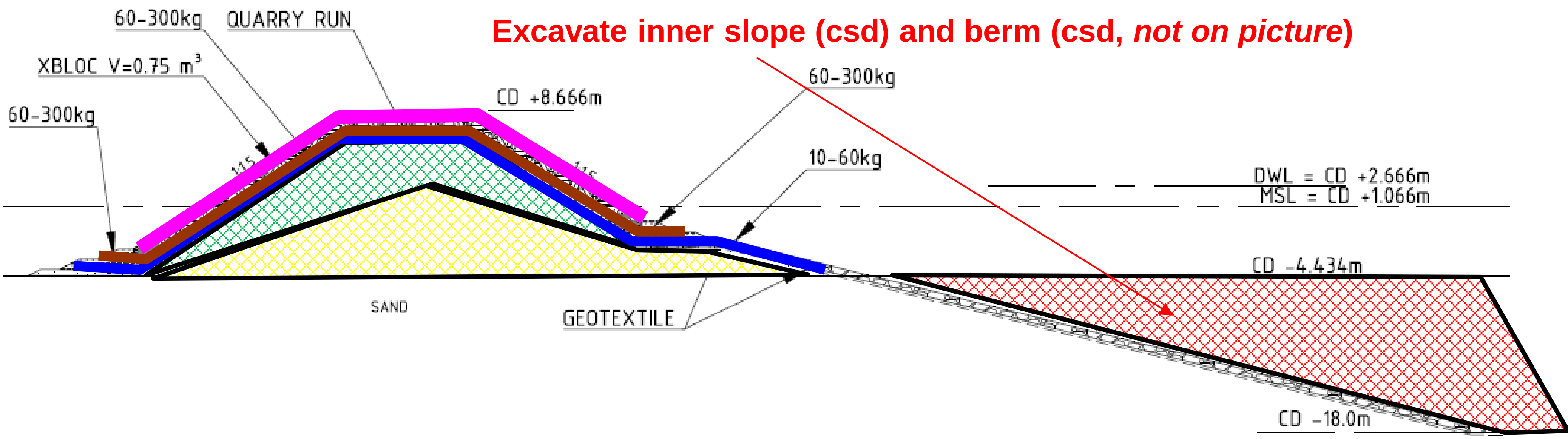
Section 9 - Construction methodology and planning

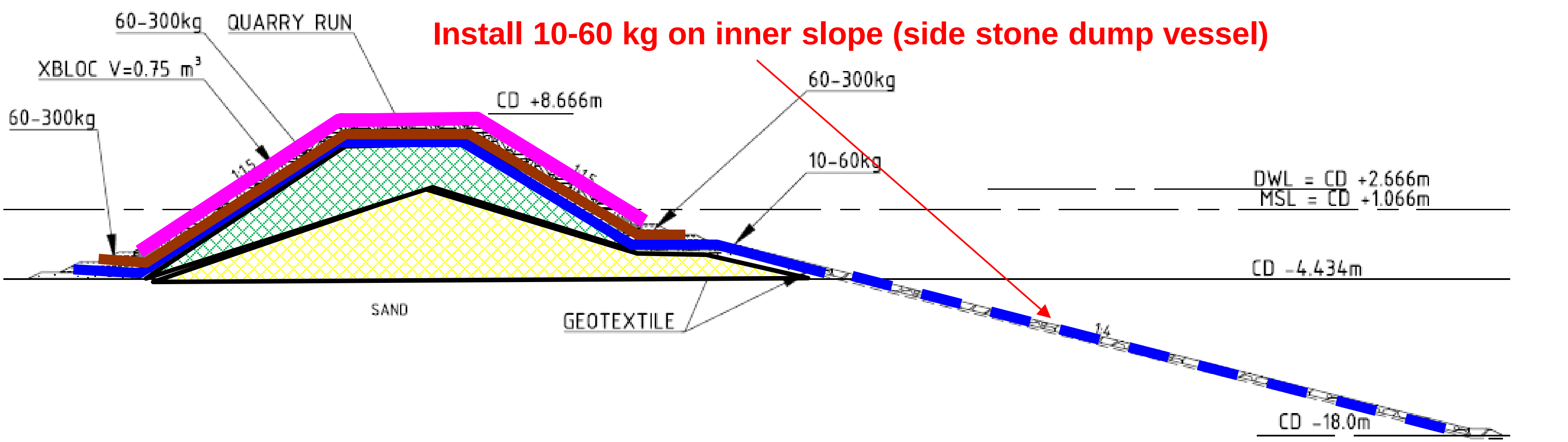
Breakwater construction (2)





Breakwater construction (3)

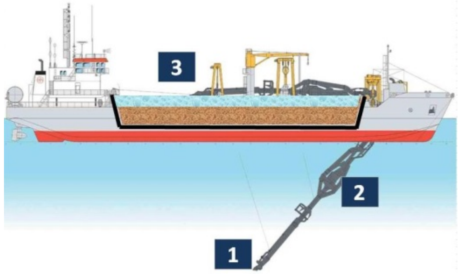




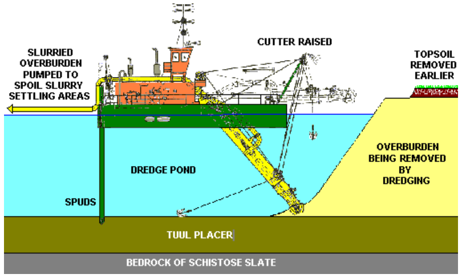
Dredging and reclamation

- Conservative assumptions have been made on the suitability and cost implications for re-use of dredged material in reclamation. The on- or offshore soil investigations will be carried out in the FBC Phase and will be used to verify these assumptions.
- The dredge level is 0.6 m below Guaranteed Nautical Depth (GND), including the total allowance for dredging tolerance and maintenance buffer.
- Dredging of the access channel and port basin will be done in 3 main steps:
    - Phase 1a: Dredging port basin to GND of CD -14.3 m and access channel to 300 m width, with a GND of CD -15.6 m.
    - Phase 1b: Deepening port basin to GND of CD -16.5 m, access channel to GND CD -18 m.
    - Phase 2: Widening of access channel from 300 to to 450 m.

- The dredging of the channel will be carried out by a Trailer Suction Hopper Dredger (“TSHD”) . The draghead (1) excavates the seabed material, which is pumped up (2) and stored in the hull or “Hopper” (3). When the hopper is full the TSHD sails to the dumpsite and dumps the dredged material



- Inside the sand berm protected port basin, the dredging is carried out by a Cutter Suction Dredger (“CSD”) . The cutter excavates the seabed material, which is pumped up and either stored in a barge or pumped away by pipelinesstored in the hull or “Hopper” (3). When the hopper is full the TSHD sails to the dumpsite and dumps the dredged material



Dredging and reclamation

- Within Phase 1a the following sequence of activities is foreseen:
  - Dredge with trailer suction hopper dredger (tshd) in access channel; re-use sand for berm construction (breakwater): 5 months.
  - Bush clearing and removal of unsuitable topsoil of port area (basin, terminal area and infra corridor).
  - Dredge harbour basin with cutter suction dredger (csd) (200 m wide channel) and re-use sand for reclamation: 8 months.
  - Dredge with tshd in access channel; re-use sand for reclamation: 24 months.
  - *Following reclamation*: application of temporary surcharge and vertical drains in areas susceptible to a high degree of consolidation / settlement.
  - *Following breakwater construction*: Dredge surplus sand from berm in front of breakwater and re-use for beach nourishment: 3 months.
  - *Following quay wall construction*: Dredge harbour basin with csd (extend to 500 m wide) : 8 months.
  - *Note:* For all of the above dredging activities unsuitable material will be transported to a marine disposal area by tshd.

- The methodology described above is illustrated in sketches on the following pages:

Section 9 - Construction methodology and planning

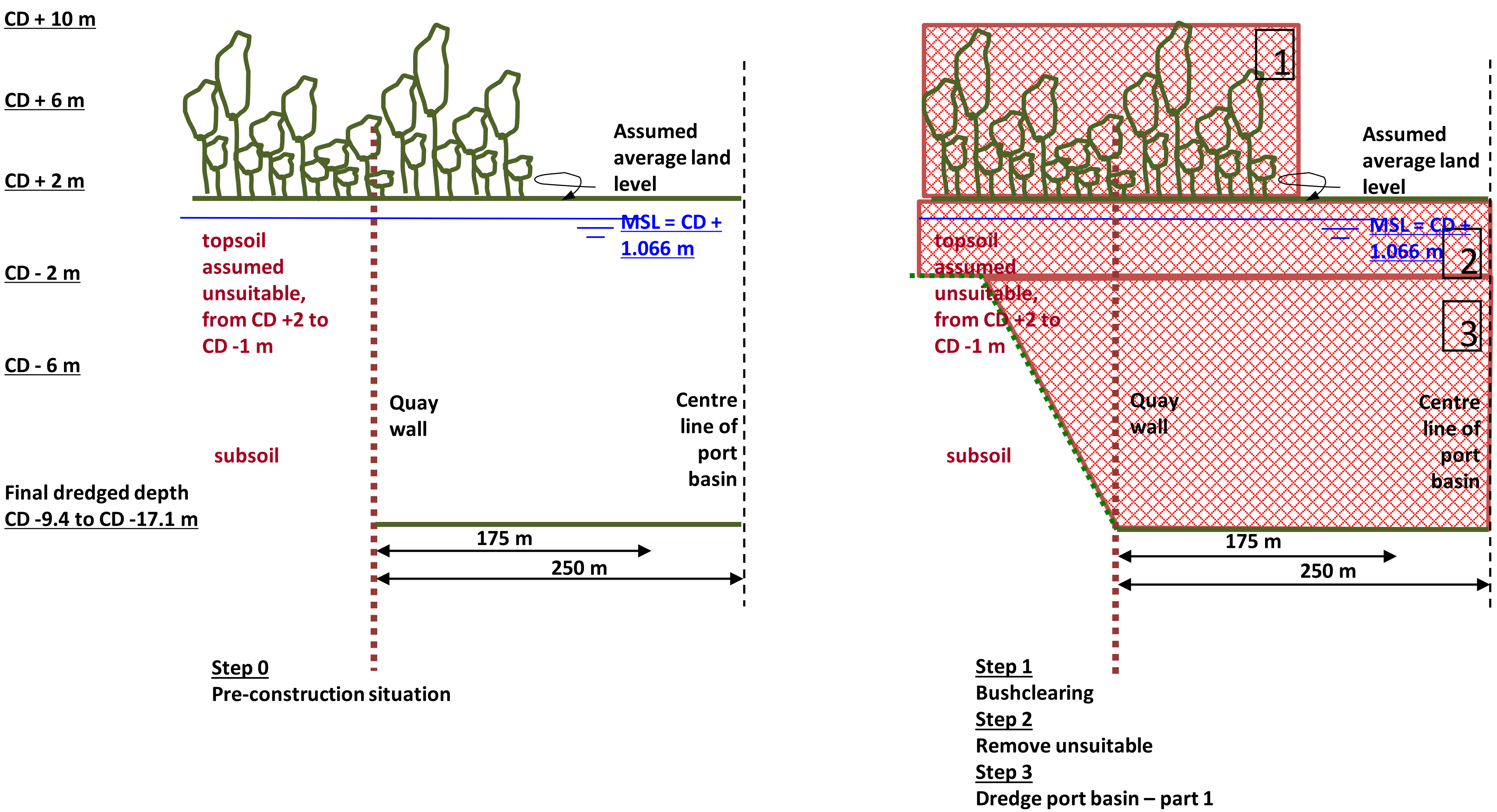
Assumptions for dredging and reclamation works

The following assumptions apply to the dredging and reclamation works:

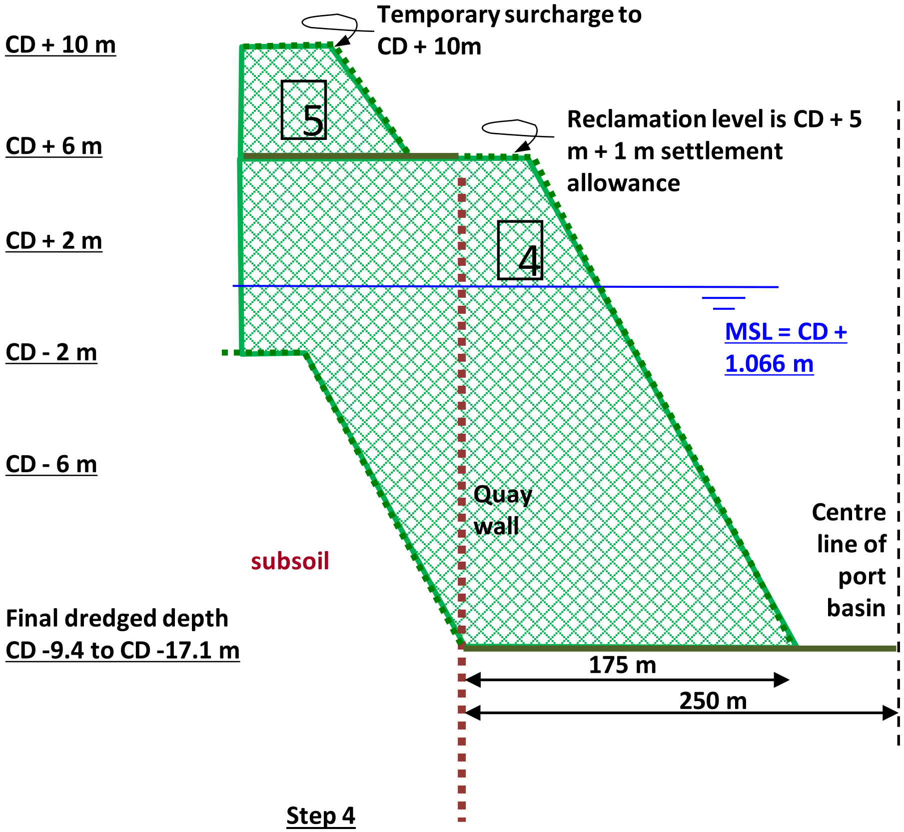
- Access channel dredging volumes are based on the recent bathymetric survey .
- No contamination in any soil will be encountered.
- Remove unsuitable toplayer in port area (Phase 1, development near coast: CD+2 m to CD -1m; 2035, inland development: CD+3 m to CD + 1 m).
- Reclaim terminal area to CD +5 m plus 1 m settlement allowance.
- Include a provision for surcharging and vertical drains in the terminal areas.
- Assume 40% suitable / 60% unsuitable material out of harbour basin and access channel dredging volumes.
- Dispose unsuitable material at 10 km distance at a marine disposal / spoil area.
- Suitable material is re-used for reclamation of terminal areas, breakwater base and beach nourishment.
- Deploy a combination of mid-size csd and tshd to execute all dredging and reclamation works
- No sand borrowing fee or material disposal fee applicable.
- Execution to international standards applying good practice.
- No environmental constraints as to marine works.

The sequence of dredging, reclamation and construction activities is illustrated in the following slides.

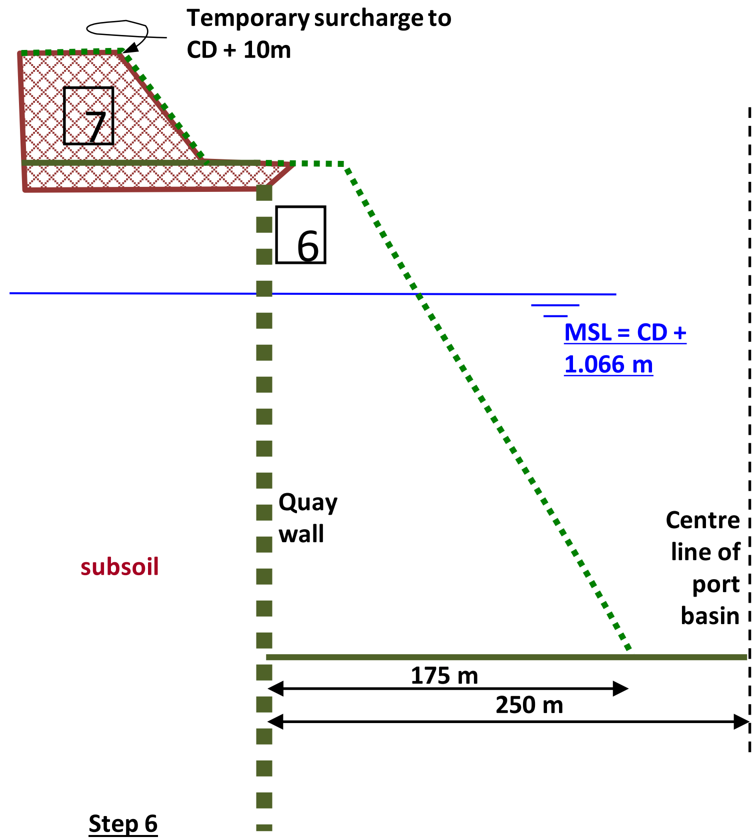
Dredging and reclamation activities (2)



Dredging and reclamation activities (2)



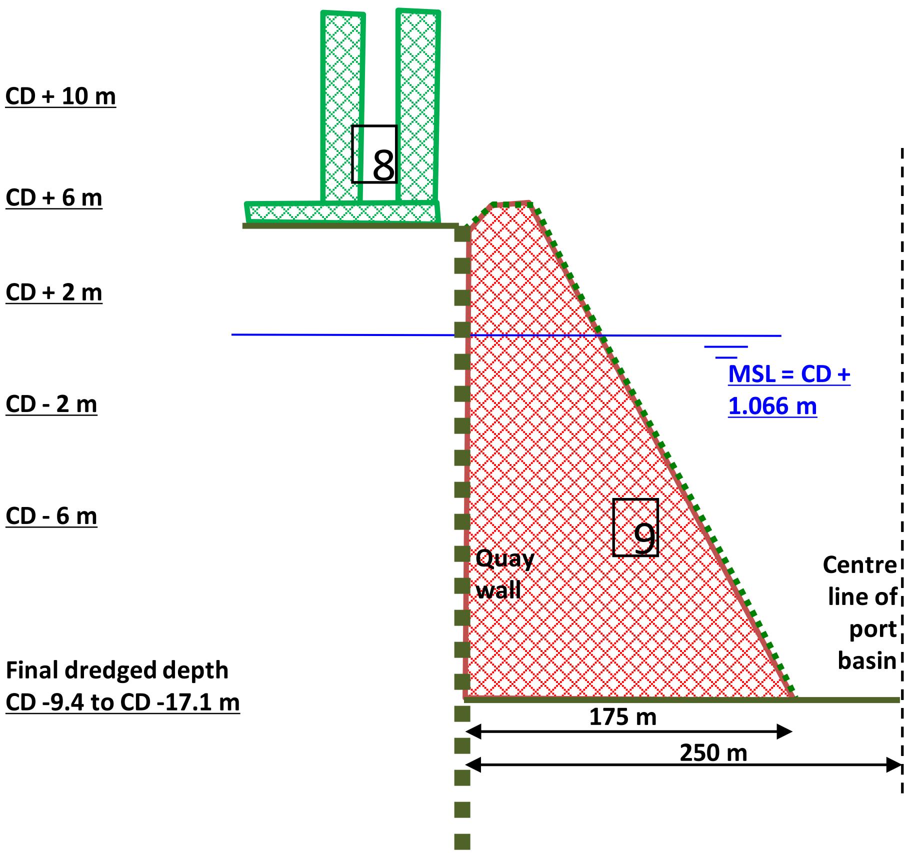
Step 4
Reclaim to CD + 5 m
+ 1 m settlement allowance
Step 5
Apply temporary surcharge to CD + 10 m

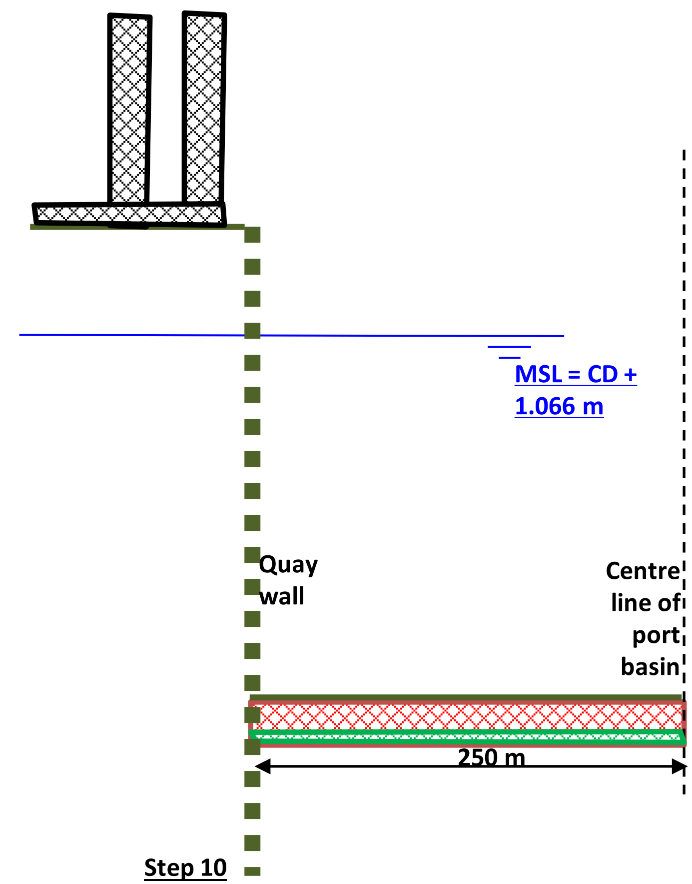


Step 6
Build quaywall

Step 7
Shift / remove surcharge

Dredging and reclamation activities (2)





Step 8
Build terminal infrastructure

Step 9
Dredge port basin Phase 1a part 2 in front of quay (to max CD-14.3 m)

Step 10
Dredge (Phase 1b)

Step 11
Apply bottom protection to bottom level CD -16.5 m

Time schedule of port and terminal construction

- In 4 years construction time Phase 1 of IDSP can be operational (including oil terminal).
- A fast track schedule with one single contractor for all marine and construction works is needed to achieve this.
- Financial close, environmental clearance, and all permits from state or federal governments, are assumed to be completed at contract award date in order to meet the schedule.
- The critical path of construction planning (next page) is with marine and reclamation works at first; after 1.5 years it shifts towards terminal construction and equipment commissioning.
- Construction of land infrastructure is a significant task but not considered to be part of the critical path towards the Phase 1 completion; the time schedule for cpmpletion of land infrstructure works is shown in Table 9.1:

Task	quantity	unit	rate/wk	duration (wk)	duration (month)	remark
Access Road outside fence	20000	m1	300	66.7	15.5	bushclearing + gravel foundation
Bridges/ramps/fly-over/connections					18	
Access Road 2*2 outside fence	20000	m1	500	40.0	9.3	road construction
Access Road 2*1 in port area	10000	m1	400	25.0	5.8	road construction incl base layer
Utilities					6	
Port Buildings, control tower, service port, navigational aids					15	
Tug & pilot boats					3	commisioning
FTZ bushclearing	100	ha	7	14.3	3.3	
FTZ reclamation					4	
FTZ road system	4000	m1	400	10.0	2.3	

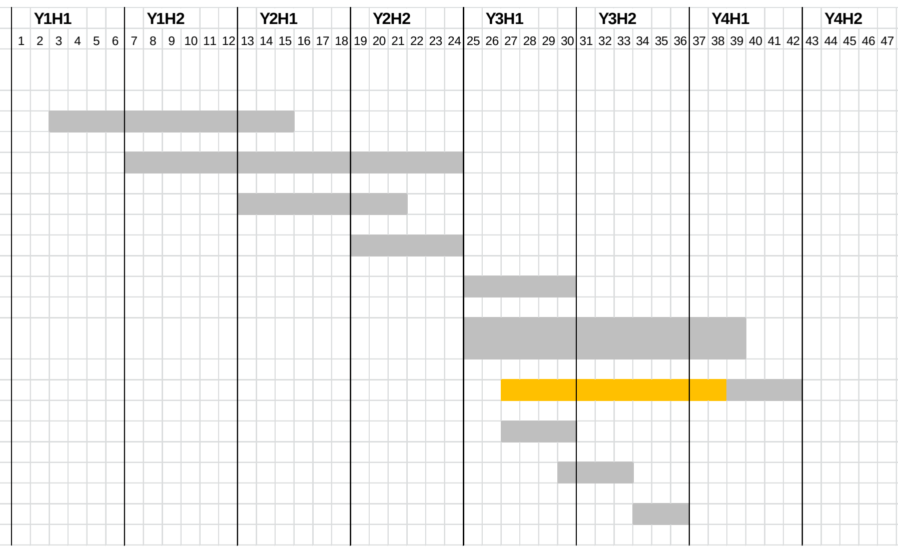


Table 9.1 – Time schedule for land infrastructure (in months; yellow parts indicate procurement or mobilization periods)

Time schedule of marine works, with critical path

Task	quantity	unit	rate/wk	duration (wk)	duration (month)	remark
Award of Contract: in month 0						
Mobilization dredge equipment					2	
Dredge access channel (part 1) + reclaim sand berm for breakwater	10,000,000	m3	500,000	20.0	4.7	rate for 1 tshd dump + 1 tshd reclaim
Breakwater + Sea defence	2460	m	20	123.0	28.6	total time incl mob of equipment
Bushclearing and fencing	550	ha	7	78.6	18.3	reclamation area + infra corridor
Topsoil removal	2,200,000	m3	100,000	22.0	5.1	
Dredging harbour basin (part 1), reclaiming terminal areas	7,000,000	m3	200,000	35.0	8.1	200 m wide channel
Geotechnical measures					15	
Quaywall construction (incl rear crane)	1700	m1	20	85.0	19.8	rate for 2 construction sets
Terminal Infrastructure & utilities					18	following quay construction
Terminal Equipment					10	installation+commisioning, following infrastructure
Jetty + trestle construction					15	
Oil tank terminal with piping					30	
Dredge access channel (part 2)	33,000,000	m3	325,000	101.5	23.6	rate for 1 tshd dump unsuitable
Dredging harbour basin (part 2)	9,000,000	m3	250,000	36.0	8.4	to 450 m wide channel, including berth areas
Slope and bottom protection (harbour basin)					6	

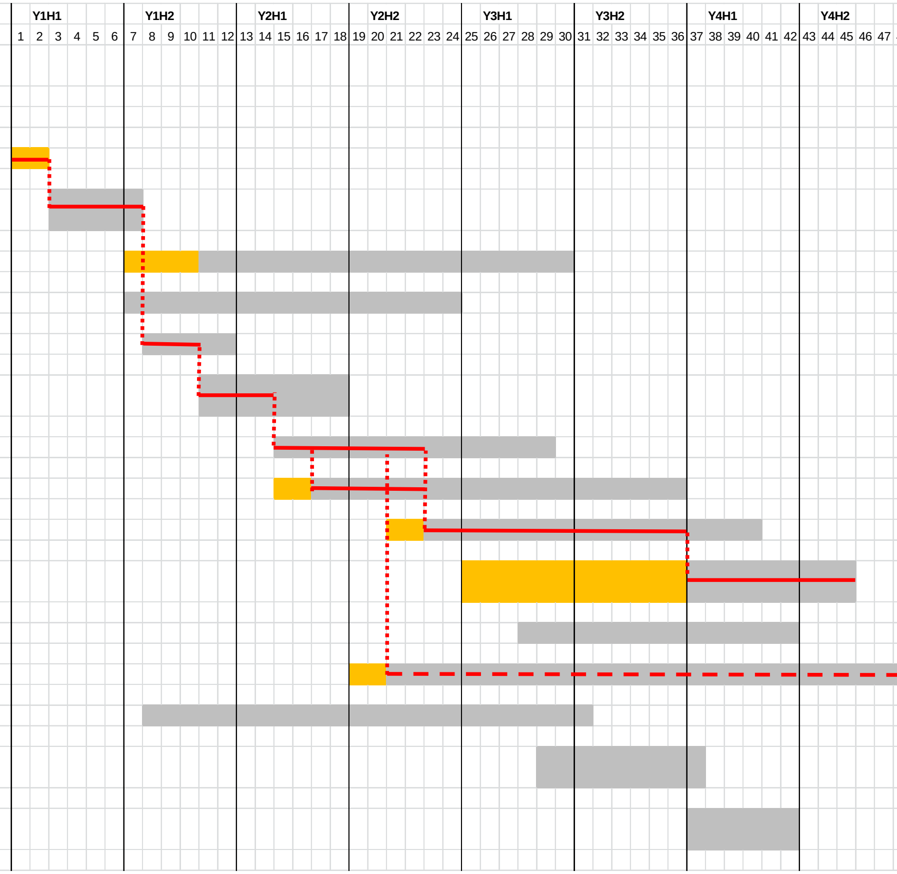


Table 9.2 – Time schedule for marine works (in months; yellow parts indicate procurement or mobilization periods)

Contents

CAPEX for Phase 1 and 2035 – methodology and assumptions (1)

- CAPEX investments are estimated as Q*P: Quantity * Price.
- Quantity is the Scope of Work as defined by the port Master Plan, broken down into a list of scope items.; all terminal infrastructure and equipment quantities are based on the capacity to handle the adopted cargo forecast
- The Price is the direct unit rate
- Q*P represents the Direct Costs for construction of the works at the project location.
- The methodology to arrive the final Project Price is as follows

- In order to determine the Project Costs, the Direct Costs must therefore be increased with:
    - Contractor's Markup
    - Employers Markup
    - Risk & Uncertainty Markup

CAPEX for Phase 1 and 2035 – methodology and assumptions (2)

- The Contractor's Markup covers for the following costs:
  - Indirect costs: e.g. site staff, surveys, mobilization, security & housing, other site facilities
  - Financing costs: e.g. escalation and currency hedge, insurance costs, other contract financing costs
  - Contractor's overhead: headoffice costs, profit & risk
- Based on international construction expertise, western standards of construction, and the remote project site in Nigeria, the following percentages for contractor's non-direct costs are recommended:
  - Dredging and breakwater construction: 45%
  - Port constructions: 39%
  - Land & terminal infrastructure: 38%
  - Terminal Equipment: 10%
- The breakdown / specification of these percentages is presented in App. TF-7.
- The combination of the Direct Costs and the Contractors' Markup yields the Contractor's Selling Price.

CAPEX for Phase 1 and 2035 – methodology and assumptions (3)

- The Contractor's Selling Price must be increased with the Employer Markup to cover the following:
  - Site investigation
  - Contract preparation and tendering costs
  - Detailed Design
  - Land acquisition & compensation
  - Contract and site management (staff costs)
  - Boats, cars, fuel, supplies
  - Environmental Impact Study & monitoring
  - Security, base camp, housing
  - Communication and marketing

- The Employers' Markup at startup and in 2035 is depicted in the table below; a breakdown / specification of these percentages is given in Appendix TF-7.

	Phase 1 Start-up	Phase 2 2035
Marine & Civil Works	14.0%	10.0%
Terminal Works	10.0%	7.0%

Table 10.1 – Employers' Markup

CAPEX for Phase 1 and 2035 – methodology and assumptions (4)

- The Risk & Unforeseen Markup is an allowance that covers for :
  - for all contingencies in scope detailing, however excluding scope variation.
  - for uncertainty in design and pricing because of assumptions

- For the present state of the project (OBC), the following percentages are recommended to adopt:
  - Marine and construction works: 30%
  - Infrastructural works: 25%
  - Terminal infra and equipment: 20%

- In these values a provision is included to cover for the fact that Ibom Deep Sea Port is in fact a multi-project. This reduces the risk allowance to some extent, as it is not likely that all partial projects will suffer negative effects.

- The above % can be interpreted as 1.00 – 1.64 Sigma (standard deviation); hence the cost estimate figure (= the value resulting from the above) has a 5-15% probability of exceedance . I.e. the probability that the actual project costs are larger that this value is 5-15%.

- This is a value recommended to adopt for budgetting purposes..

STANDARD DEVIATION OF THE MEAN

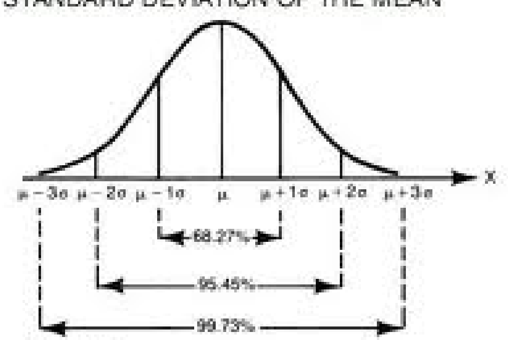


Figure 2

Percent	99.73%	99%	95.45%	95%	90%	80%	68.27%
No. of ± σ's	3.00	2.58	2.00	1.96	1.645	1.28	1.00

Section 10 - Cost estimates: CAPEX and OPEX

CAPEX for Phase 1 and 2035 – Results

- The Price level of cost estimates is January 2013; all costs are in USD.
- Phase 1 Definition:
  - Deep Channel ; CD – 18.6 m (includes 0.6 m dredging tolerance)
  - Dry Bulk Terminal: No
- No VAT or Import Duties or other dues as these are assumed not applicable under the FTZ tax regime.
- A more detailed description and backgrounds of cost estimates are given in Appendix TF-7

Item	Phase 1 [M USD]	Expansion to Full Master Plan [M USD]	Total Master Plan 2035 [M USD]
Dredging and Reclamation	568	506	1,074
Breakwater	198	0	198
Quay wall and Jetties	185	465	668
SUBTOTAL 1	**951**	**971**	**1,939**
Infrastructure and FTZ	349	1,107	1,445
Port Operations and Management	29	53	82
SUBTOTAL 2	**378**	**1,160**	**1,527**
Terminal Infra	93	544	637
Terminal Equipment	85	456	541
Other Terminal Facilities	253	691	944
SUBTOTAL 3	**431**	**1,690**	**2,122**
GRAND TOTAL (SUB 1+2+3)	**1,760**	**3,822**	**5,588**

Table 10.2 CAPEX Estimate Ibom DSP

Scope used as input for CAPEX

Dredging volumes		Phase 1a	Phase 1b
Access Channel	m3	51,519,898	20,839,058
Harbour Basin	m3	15,970,000	2,289,000
Unsuitable from reclamation area	m3	3,222,000	
Reclamation	m3	13,220,000	
Re-used volume	m3	-16,675,000	
TOTAL dredging volume	**m3**	**67,256,898**	**23,128,058**

Other quantities		Phase 1a	Phase 1b
bushclearing	m2	3,000,000	
temporary surcharge	m2	730,000	
vertical drains	m2	730,000	
Breakwater & Shore protection	m	2,510	
Quay Walls	m	1,300	
Jetty	unit	1	
Access Road	m	20,000	
Secondary Road	m	8,000	
Bridges	unit	prov. item	
200 MW Power Plant	unit	0	
Desalination	unit	1	
Wastewater Treatment Plant	unit	0	
Port perimeter fence	m	10,000	
Electricity, Water, sewerage, data	m	8,000	
FTZ site preparation	m2	1,000,000	
Roads FTZ	m	4,000	
Tugs	unit	3	
Pilot boats	unit	2	
Port Building & Control Tower	unit	1	
Fairway Buoys	unit	16	
Aids to Navigation	unit	1	
Total terminal area	m2	1,050,000	
Liquid Bulk Tank Storage	m3	540,000	540,000

Dredging volumes		expansion to 2035
Access Channel	m3	26,475,000
Harbour Basin	m3	20,100,000
Unsuitable from reclamation area	m3	8,120,000
Reclamation	m3	17,300,000
Re-used volume	m3	-17,300,000
TOTAL dredging volume	**m3**	**54,695,000**

Other quantities		expansion to 2035
bushclearing	m2	4,500,000
temporary surcharge	m2	2,030,000
vertical drains	m2	2,030,000
Breakwater & Shore protection	m	0
Quay Walls	m	4,600
Jetty	unit	1
Access Road	m	0
Secondary Road	m	4,000
Bridges	unit	prov. item
200 MW Power Plant	unit	1
Desalination	unit	1
Wastewater Treatment Plant	unit	1
Port perimeter fence	m	4,000
Electricity, Water, sewerage, data	m	4,000
FTZ site preparation	m2	9,000,000
Roads FTZ	m	20,000
Tugs	unit	7
Pilot boats	unit	3
Port Building & Control Tower	unit	1
Fairway Buoys	unit	6
Aids to Navigation	unit	1
Total terminal area	m2	0
Liquid Bulk Tank Storage	m3	1,080,000

Scope used as input for Capex

Container Terminal	
Phase 1 175,000 m2	**Phase 2035 700,000 m2**
Pavement (100% paved) including security & terminal operations facilities, pre-parking and empty depot area	Pavement (100% paved) including security & terminal operations facilities, pre-parking and empty depot area
3 Ship to Shore cranes, supporting quay equipment	12 Ship to Shore cranes, supporting quay equipment
Container X-ray machine	2nd Container X-ray machine
Reefer racks	Reefer racks
Private generation of utilities	Connection to Port main utilities

Table 10.3 Scope Container Terminals

Breakbulk & Roro	
Phase 1 125,000 m2	**Phase 2035 750,000 m2**
Pavement (100% paved, will become Container Terminal later) including security & terminal operations facilities, pre-parking area	Pavement (75% paved) including security & terminal operations facilities, pre-parking area
5,000 m2 warehousing and stores	25,000 m2 warehousing and stores
2 Mobile Harbor Cranes and supporting quay equipment	10 Mobile Harbor Cranes and supporting quay equipment
Private generation of utilities	Connection to Port main utilities

Table 10.4 Breakbulk & Roro Terminals

Scope used as input for Capex

Tank Storage Terminal	
Phase 1 150,000 m2	**Phase 2035 500,000 m2**
Pavement (15% paved) including security & terminal operations facilities	Pavement (15% paved) including security & terminal operations facilities
270,000 m3 Storage (API 650)	2,420,000 m3 Storage (API 650)
Jetty top side equipment and pipe corridor to terminal	Jetty top side equipment and pipe corridor to terminal
Fire fighting and emergency response	Fire fighting and emergency response
8 Truck loading stations	24 Truck loading stations
Private generation of utilities	Connection to Port main utilities

Table 10.5 Tank Storage Terminals

Dry Bulk Terminal	
Phase 1 nil	**Phase 2035 900,000 m2**
	Pavement (20% paved) including security & terminal operations facilities per commodity
	4 pneumatic unloaders for **grains/sugar**, including belt conveyors, 4 flat stores, stackers/reclaimers and truck loading facilities
	4 pneumatic unloaders for **fertilizers**, including belt conveyors, 4 flat stores, stackers/reclaimers and truck loading facilities
	4 pneumatic unloaders for **cement**, including 82,500 m3 storage silos, and truck loading facilities
	Connection to Port main utilities

Table 10.6 Dry Bulk Terminals

Scope used as input for Capex

Offshore Supply Base	
Phase 1 **320,000 m2**	**Phase 2035** **960,000 m2**
Pavement (35% paved) including security & terminal operations facilities	Pavement (35% paved) including security & terminal operations facilities
5,000 m2 of office warehouses, workshops, stores (for Terminal Operating Company only)	15,000 m2 of office warehouses, workshops, stores (for Terminal Operating Company only)
1 Mobile Harbor Crane	14Mobile Harbor Crane
Fuel/Bunkering station	Doubling of Fuel/Bunkering station
Private generation of utilities	Connection to Port main utilities

Table 10.7 Toffshore Supply Base Terminals

OPEX for Phase 1 and 2035

Methodology and assumptions for OPEX figures

- Annual maintenance costs of port and terminal structures is estimated as a percentage of the CAPEX (via expert judgement).
- For maintenance of access channel and harbour basin a first-order morphologic and sediment flow analysis has been performed, resulting in annual maintenance volumes.
- Labour/staffing of the port management authority and of the various terminals is based on Consultant's experience in both port administration and terminal operation, and related to the size/growth of the terminals:

Item	Phase 1		Total Master Plan 2035	
	Expat	Local	Expat	Local
Port Management	10	86	10	156
Nautical Services	3	70	12	180
Offshore Supply Base	10	50	10	400
Dry Bulk Terminal	0	0	18	420
Container Terminal	16	380	24	1,520
General Cargo/RoRo Terminal	21	160	21	960
Petroleum Products terminal	7	30	7	180
FTZ Management	10	40	10	40
Toll Road Management	10	190	10	190
TOTAL	**87**	**1,006**	**122**	**4,046**

Table 10.8 FTE Jobnumbers

OPEX: maintenance costs (percentages) and fuel+electricity

Capex item			maintenance (percentage of CAPEX)
			%/CAPEX/annum
Breakwaters and sea defence			0.5%
Dredging - Access Channel			3.5%
Dredging Port Entrance & turning circle			3.5%
Dredging Port Inner Basin			2.0%
Reclamation Port areas			0.5%
Aids to Navigation			2.0%
Navy base (jetty)			1.5%
Nautical base			1.5%
Nautical fleet			5.0%
Road connection (outside port boundary)			2.0%
Port inner roads and PDMC buildings			2.0%
Rail connection (inside port boundary)			1.5%
Pipeline connection (inside and outside port boundary)			1.5%
Port Commercial Centre			0.5%
Port Utilities			1.5%
FTZ site preparation and road system			0.5%
OSB	quaywall		1.5%
OSB	terminal infra & other facilities		1.5%
OSB	terminal equipment		3.0%
Dry Bulk	quaywall		1.5%
Dry Bulk	terminal infra		1.5%
Dry Bulk	terminal equipment		3.0%
Container	quaywall		1.5%
Container	terminal infra & other facilities		1.5%
Container	terminal equipment		3.0%
GC incl RoRo	quaywall		1.5%
GC incl RoRo	terminal infra & other facilities		1.5%
GC incl RoRo	terminal equipment		3.0%
Liquid Bulk	jetty	2)	1.5%
Liquid Bulk	terminal infra & other facilities		1.5%
Liquid Bulk	tank farm & related		1.5%

Capex Item	Unit rate	Unit
Port management	50000	USD/annum
Nautical Services	1000	USD/call
Petroleum Products Terminal	0.20	USD/MT
OSB	2.00	USD/MT
Container Terminal	5.00	USD/MT
GC (RoRo and Breakbulk)	1.50	USD/MT
Dry Bulk Terminal	0.50	USD/MT
Free Trade Zone	0.20	USD/m2

Values based on Electricity 0.10 USD/kWh and Fuel 1.00 USD/liter

Contents

Section 11 - Recommendations

Recommendations for next phase of project preparation

- Based on the executed pre-feasibility study, according to the presented Master Plan and phasing at the seaside location, **the development of Ibom DSP is deemed technically feasible**;

- For the successful development of IDSP it is essential to pay due attention to the **timely development of good quality hinterland connections** to the destination markets: primarily road, soon followed by railway and pipeline, and possibly including other logistic concepts such ass dry ports.

- It is recommended to focus efforts on obtaining additional data and information necessary for dsetailed design in FBC Phase through:
  - extensive geotechnical and geophysical surveys, both on- and offshore
  - metocean data measurements over a certain period of time (wind, waves, currents, etc.)
  - sediment sampling of the seabed in the surf zone

- The obtained data can be used for further verification and optimization of the port design through:
  - hydrodynamic and wave modelling, to predict hydraulic conditions in and around the port
  - morphological modelling of sedimentation and erosion patterns to be expected
  - full mission nautical simulations, real time
  - flume testing of breakwater designs

A more detailed description of recommended surveys and studies is given on the following pages and in App. TF-8

Appendix – Recommendations for additional surveys and studies

Additional surveys

More detailed information with respect to the local circumstances is necessary to elaborate the feasibility design into a detailed design. Following surveys are required for the next design stage:

- Geotechnical survey (on- and offshore):
  - Cone Penetration Tests (CPT's).
  - Bore holes with Vane tests, Standard Penetration Tests (SPT's) and soil sampling.
  - Extensive laboratory test programme, which amongst others holds the following tests:
    - Classification tests: unit weight, water content, angularity, carbonate content, specific gravity. permeability test, particle size distribution, unconsolidated undrained tests, Atterberg limits
    - Consolidation tests on undisturbed samples: Oedometer tests.
    - Strength/stiffness tests on undisturbed samples: CU Triaxial tests, CD Triaxial tests, Min/max density tests.
- Hydrographical survey (detailed, in access channel and port entrance with surrounding areas):
  - Full bathymetrical survey.
  - Side scan sonar and magnetrometer survey.
  - Shallow seismic reflection survey (geophysical survey in connection with geotechnical survey).
- Topographical survey of the area (port and FTZ perimeter):
  - Land elevation
  - Identification of objects (XYZ)

Appendix – Recommendations for additional surveys and studies

Additional surveys

- Prepare a GIS drawing combining all bathymetric and topographic data as well as existing oil infrastructure and nautical facilities as the basis for further mapping of the master plan and the associated land and marine infrastructure. For the purpose of the project a local grid can be developed with transformation to longitude/latitude and UTM 32N coordinate systems.
- Metocean survey, to collect following data:
  - Meteorology
  - Oceanography
  - Winds
  - Waves
  - Visibility
  - Tides
  - Currents

- Measuring period of a Metocean survey is at least 6 months, or by collecting data:
  - Water levels: 4 staff gauges (minimum 1 year of historical data).
  - Waves: divers at various locations (minimum 1 year of historical data).
  - Flow velocities: ADCP, literature and public domain (minimum 1 year of historical data).
  - Grain size: sea bed samples at various locations.

Appendix – Recommendations for additional surveys and studies

Additional studies

Following detailed studies are required to determine detailed port design and its impact and performance:

- Geotechnical (3D interpretative model) with:
  - Classification of soils to be dredged and reclaimed.
  - Consolidation, stability and settlement of subsoil in reclamation areas and breakwater location.
  - Suitability and unsuitability of dredge volumes.
  - Geotechnical design parameters for quay wall structures.

- Detailed wave modelling (based on metocean data):
  - Offshore operational and extreme wind climate.
  - Breakwater layout optimalisation.
  - Extreme value analysis of both waves and waterlevels.
  - Design evaluation based on extreme wave conditions.

- Morphological study:
  - Tidal currents and wind induced currents near the port area.
  - Morphological impact on environmental stability.
  - Morphological behaviour of approach channel, port entrance and port area.

- Detailed verification of the location and size of the Marine Disposal Area, based on detailed hydrodynamic model studies, geotechnical data, environmental effect studies and confirmation of access channel alignment and dredging quantities.

Appendix – Recommendations for additional surveys and studies

Additional studies

- Wave agitation study
    - Wave agitation study to find optimal breakwater layout;
    - Downtime analysis;

- Scale model tests of breakwater design (based on survey data and final design)
    - 2D flume tests: testing of optimal breakwater cross section with regard to wave overtopping and armour stability;
    - 3D basin tests to verify stability of breakwater roundhead with regard to armour stability and wave penetration.

- Nautical studies
    - Navigation simulations (fast-time and real-time).
    - Berthing- and mooring simulations.
    - Breakwater layout verification with regard to nautical aspects: port entrance width, access channel layout, port basin.
    - Access channel alignment with respect to deep sea route, oil & gas industry assets
    - Capacity of anchorage area
    - Vessel traffic simulations

Appendix – Recommendations for additional surveys and studies

Additional studies

- Port Logistics masterplan:
  - Estimates for dwell times and modal split, per commodity and terminal.
  - Study hinterland connections, source/destination for various commodities, call sizes road and rail.
  - Use of inland terminals, inland storages for liquids, dry ports concept.
  - Phasing and development plan for roads, rail, pipelines connections.
  - Customs and other inspection procedures per commodity, incl. type & number Inspections, percentages, X-ray policies, etc. (logistics on terminal level).

- Port Utilities masterplan:
  - Define consumptions for power, water, main network, redundancy.
  - Location and capacity study for water treatment plant (desalination plant) and power plant.
  - Collective sewage collection network, location of waste water treatment plant.
  - Data and telecom network / receiving station.
  - Firefighting policy per terminal, HSSE requirements.
  - Terms of References to terminal concessionaires.

Project Initiators:

Transaction Advisors:

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

SOCIAL & ENVIRONMENTAL PRE-FEASIBILITY STUDY

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Akwa Ibom

Transaction Advisors:

Felak Concept Limited

mtbs maritime & transport business solutions

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case
	Social & Environmental Pre-Feasibility Study
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

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Contents of Full Report – OBC Supporting Documents 1/3

This OBC report contains an outline of the Social & Environmental Pre-Feasibility Study. The full Social & Environmental Scoping Study (SESS) report is included as Supporting Document to this OBC. This section describes the contents of the full report.

Contents of Full Report – OBC Supporting Documents 2/3

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Contents of Full Report – OBC Supporting Documents 3/3

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Contents

Introduction

Infrastructure projects often have significant social and environmental impacts arising from their construction and operation, which can be both positive and negative. Environmental impacts on the project location and in associated areas (for example downstream, ground water or ambient air) include effects on natural resources, biodiversity, and sustainability due to alterations and/or pollutants. Social impacts on communities affected by the project may include, for example, resettlements of communities at the project site and the associated impact on quality of life and livelihoods, and impacts related to environmental alteration (for example on health and livelihoods). Given the importance of recognizing and mitigating these impacts, social and environmental impact assessments are often a mandatory regulatory requirement of an infrastructure project's development process.

The scope of social and environmental studies covers the following:

- Quantifiable social and environmental costs and benefits;
- Non quantifiable social and environmental costs and benefits;
- Options for mitigating adverse impacts and the cost of mitigation;
- Types of permits and licenses required;
- Health and safety standards;
- Any secondary effects should also be included;
- Public consultations as part of the process to ensure that the secondary effects are adequately captured.
- Any additional environmental studies / analyses that will be required before the project is ready for procurement (often detailed studies are required for the major issues).

The proposed Ibom Deep Sea Port (IDSP) in Ibeno LGA, Akwa Ibom State, Nigeria is a Greenfield port development of considerable size that is bound to have a social and environmental impact on the proposed project area.

This report, further referred to as Scoping Report, presents the results of the Social and Environmental Scoping Study (SESS), as a first step in the process of Environmental Impact Assessment (EIA).

The full Scoping Report is included as Supporting Document ito the OBC. This section is aimed at providing an abstract of this Scoping Report.

Introduction – **Project Scope**

The proposed Ibom Deep Sea Port (IDSP) consists of the following components:

- **Access Channel** for deep sea vessels
- **Anchorage Area** for vessels waiting for free berth or use of access channel
- **Port Basin** for ship manoeuvring and (un)mooring
- **Breakwaters** to provide shelter from open sea and waves
- **Berths and Terminal Area** for containers, general cargo, dry bulk, liquid bulk, Ro-Ro and LNG
- **Terminal Superstructure, Equipment and Facilities** for all expected cargo types
- **Ship Repair** Yard for vessels
- **Supply Base** for oil and gas industry
- **Berths, Area Facilities** for maritime service providers and naval security forces
- **Self supporting utilities** (200MW Gas-Fired Power Plant, water, sewerage)
- **Connections to existing roads** (20-25km to East-West Road) and utility networks
- **Free Trade Zone** for logistical and added value activities (individual projects within the Zone will conduct their own EIAs, using the baseline data of this ESIA, which will be updated every five years, as required by the FMENV guidelines.

The land take for the proposed IDSP, besides the link proposed 20-25km link road to East-West Road and the access channel, is about 2225 hectares. The ESIA will cover the port facilities planned for this land as listed above, except the proposed 200MW Gas-Fired Power Plant and link road mentioned above. However, these could be accommodated in the current ESIA if their technical details are available, to ensure proper assessment and mitigation of their potential impacts; and include them in the ESMP. This will entail expanded FMENV's technical review panel for the ESIA.

Introduction – ESIA Process

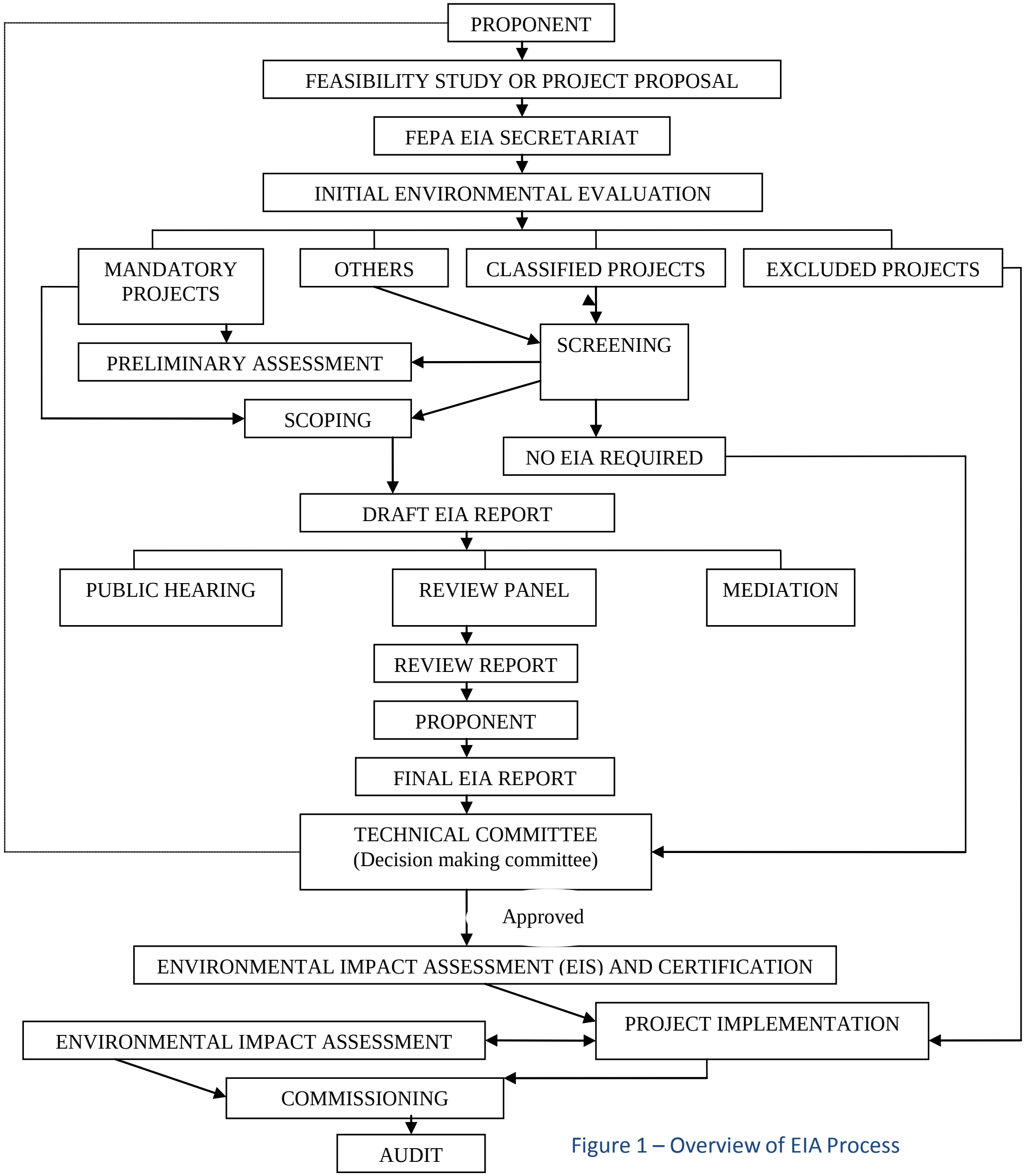

Figure 1 – Overview of EIA Process

Introduction – ESIA Process – **Summary**

Table 1 – Summary of EIA Process

Step	Description
Screening	In the Nigerian EIA screening is required to determine if the project requires a summary EIA or a detailed EIA.
Scoping	Scoping identifies the key issues to be addressed in the ESIA. Scoping, as presented in this report, will ensure that the process is focused on the potentially significant environmental and social impacts which may arise from the project. It will take into account the results of consultations undertaken to date on the project. Ultimately scoping defines the scope of work of the ESIA, including Stakeholder engagement.
Baseline Studies	For the key issues identified in scoping, available information on the existing environmental and social conditions (also referred to as baseline conditions) will be gathered. This will be supplemented by field studies and surveys where necessary. The future development of the baseline conditions in the absence of the project will also be considered.
Impact assessment and mitigation measures	This stage is focused on predicting environmental and social changes from the baseline as a result of the project's activities (considering the entire lifecycle of the project). Each impact will then be evaluated to determine its significance for the environment and society. Where necessary measures will be proposed to mitigate significant impacts.
Environmental and social management plans	The various mitigation measures will be presented in an Environmental and Social Management Plan (ESMP), describing how measures will be implemented throughout the different project phases. The ESMP will detail the resources and responsibilities for implementation, the timing and monitoring and audit plans to ensure all the mitigation commitments are met. It will also identify any requirements for training and other capacity building. The ESMP will include a Livelihood Restoration Plan and a Resettlement Action Plan detailing how land acquisition and easement will be managed in accordance with IDSP policy and international good practice.
Stakeholder Engagement and Consultation	During the ESIA studies the team will seek the views of interested parties so that these can be taken into account in the assessment and reflected in the proposals for mitigation. Once complete, the ESIA Report will be subject to public disclosure and consultation. Comments will be taken into account in revising the final ESIA Report and ESMP.

Contents

Regulations & Guidelines – **Statutory Framework** 1/2

The Nigerian legislation refers to EIA and not ESIA. If references are made to the Nigerian procedure the acronym EIA will be used. If references are made to IDSP's broader approach the acronym ESIA will be used.

The statutory (legal and administrative) frameworks within which the ESIA study on the proposed project shall be executed are provided by the following regulations, guidelines and standards:

- The regulations, guidelines and standards of the Federal Ministry of Environment (FMEnv) concerning infrastructural development activities in Nigeria.
- The regulations, guidelines and standards of the Federal Ministry of Transport in Nigeria.
- The environmental regulations, guidelines and standards of the Nigeria's Infrastructure Concession Regulatory Commission (ICRC), notably the PPP Manual for Nigeria (21 September 2012)
- The regulations, guidelines and standards of the Akwa Ibom State Ministry of Environment and Mineral Resources.
- All International Conventions on Environmental Protection to which Nigeria is a party.

Specifically, some of these statutes include:

- The Environmental Impact Assessment Act No 86 of 1992.
- FEPA EIA Procedural Guidelines, 1995.
- FEPA EIA Sect oral Guidelines for Infrastructure Projects, 1995.
- Infrastructure Concession Regulatory Commission(ICRC) Act 2005
- Nigerian Maritime Administration and Safety Agency Act, 2007
- Coastal and Inland Shipping (Cabotage) Act, 2003
- Merchant Shipping Act 2007
- National Inland Water Ways Authority (NIWA) Act No. 13 of 1997
- Wild Animals Preservation Act, 1916.
- Nigerian Urban and Regional Planning Act No. 88, 1992
- Endangered Species (Control of International Trade and Traffic) Act, 1985.

Regulations & Guidelines – **Statutory Framework** 2/2

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REGULATIONS	*ADOPTED*
World Bank Environmental Assessment Source Books	1998
UN Convention on Biological Diversity	1994
UN Framework Convention on Climate Change	1992
International Convention on Oil Pollution preparedness, Response and Cooperation.	1990
Convention on the Control of trans-boundary Movements of Hazardous Waste and their Disposal of 1989 (Basal Convention)	1989
Protocol on Substances that Deplete the Ozone Layer. Note: The Protocol was amended for the first time on 29 September 1990 in London. A second set of amendments was adopted in Copenhagen in November 1992; these entered into force on 1994.	1987
Convention for the Protection of the Ozone Layer	1985
UN Convention on the Law of the Sea.	1982
Convention for Co-operation in the protection and Development of the marine and Coastal Environmental of the West and Central African Region (Abidjan Convention).	1981
Protocol Concerning Cooperation in Combating Pollution in Cases of Emergency in the west and Central African region.	1981
International Convention on Standards of training Certification and Watch-keeping for Seafarer (STCW).	1978
The Solid Waste Management Act of 1976 (Resource Conservation and Recovery Act, RCRA)	1976
Protocol relating to the International Convention for the Safety of life at Sea (SOLAS PROT).	1978
International Convention for the Safety of Life at Sea (SOLAS)	1974
Convention on the International Regulations for Preventing Collisions at Sea (COLREG).	1972
Convention Concerning the protection of the World Cultural and National Heritage (World Heritage Convention)	1972
Convention of the Prevention of Marine Pollution by Dumping of Wastes and other Matters. London Dumping Convention. Note: The Convention was amended in 1992.	1972
International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (IOPC FUND).	1971
International Convention on Civil Liability for Oil pollution Damage (CLC).	1969
African Convention on the Conservation of nature and Natural Resources	1968
Convention on facilitation of International Maritime Traffic	1965
Convention of the High Seas.	1958
Convention on the Territory Sea and Contiguous Zone	1958
Convention on the Continental Shelf (CSC)	1958
International Convention for the Prevention of pollution of the Sea by Oil (OILPOL), Note: Superseded on 2 October 1983 by the MARPOL treaty 1973/78 to which Nigeria is a party	

Regulations & Guidelines – **World Bank Safeguard Policies**

The World Bank has operational safeguard policies, which apply to various development projects which the bank is either implementing or funding. The objective of these policies is to prevent or at least minimize social and environmental risks while increasing socio-economic benefits of approved projects. The effectiveness and positive impact on development of projects and programmes supported by the Bank has substantially increased as a result of these policies. The Bank's safeguards policies include:

- OP 4.01 Environmental Assessment
- OP 4.04 Natural Habitats
- OP 11.03 Cultural Properties
- OP 4.12 Involuntary Resettlement
- OD 4.20 Indigenous Peoples
- OP 4.36 Forests
- OP 7.50 Projects in International Waterways
- OP 7.60 Projects in Disputed Areas

The World Bank shares responsibility with local communities and state governments for ensuring that safeguards are not violated. Applicable World Bank's operational policies that are triggered by the proposed project are summarized in the following table:

OPERATIONAL POLICY	*BRIEF DESCRIPTION*
Environmental assessment (EA)	World Bank financed projects must be environmentally sound and sustainable. The type and detail of the EA is dependent on the nature, scale and potential environmental risks. The safeguard instrument used here is the ESIA.
Involuntary resettlement	People who have to be removed or who lose their livelihood as a result of the project must be resettled, compensated for all of their losses and they must be provided with a situation that is at least as good as the one from which they came. The safeguard instrument applicable here is the RPF.

Regulations & Guidelines – **EBRD ESIA Performance Requirements**

IDSP has adopted EBRD Performance Requirements (PRs) as the international reference standard for their social and environmental strategies. The IDSP project should be classified as Category A according to EBRD criteria, and as such a special formalized participatory assessment process is required according to EBRD Standards. The process should include: A comprehensive Environmental and Social Impact Assessment incompliance with PR 1 Environmental and Social Appraisal Management and PR 10 Information Disclosure and Stakeholder Engagement; an examination of the technically and financially feasible alternatives and the rationale for the alternative selection.

Also addressing PRs 2 and 4 the ESIA should identify the issues related to potential risks related to community health, safety and security, as well as labour and working conditions; an assessment of involuntary resettlement issues according to PR 5 Land Acquisition, Involuntary Resettlement and Economic Displacement. The sustainable use of natural resources and the protection of biodiversity will have to be considered as instructed by PR 6; an assessment of impacts on cultural heritage according to PR 8 Cultural Heritage.

Also the following PRs can be mentioned at this stage:

PR1 - EBRD's definition of Stakeholder: Individuals or groups who

1. are affected or likely to be affected (directly or indirectly) by the project ("affected parties"), or
2. may have an interest in the project ("other interested parties")

PR2 - Labour and Working Conditions: This PR applies more to organizational and operational issues; however in so far as some aspects are an integral part of an ESIA, they will be addressed in all relevant sections of the ESIA, and in particular in the ESMP. PR3 - Pollution Prevention and Abatement: This PR has and is permeating IDSP engineering design, and thus, will be feeding all the ESIA process. With respect to the Nigerian requirements for the ESIA, the application of EBRD standards requires the following additional processes:

Scoping: This is a process by which stakeholders are consulted to contribute to the identification of key issues to be investigated as part of the ESIA. This *Scoping Document* is prepared in application of this requirement.

Stakeholder Engagement Plan: a comprehensive approach to the communication and consultation with the identified stakeholders throughout the whole project lifecycle. *Focus on Social Issues*: whereas the Nigerian legislation mainly refers to environmental impacts (which includes socioeconomic issues), the EBRD approach also focuses on the identification of impacts on the impacted communities and subsequent definition of necessary mitigation measures.

Contents

Base Line Conditions – **Communities & Population** 1/3

The approved EIA of the proposed Ibom Industrial City (IIC) Project describes the environmental baseline conditions of the wider Ibaka area. The IIC area includes the alternative locations for the IDSP as presented in Chapter 3. An overview of the most relevant baseline conditions is given in the following paragraphs, most of which are excerpts from the IIC EIA.

COMMUNITIES & POPULATION

There are 19 gazetted villages in Mbo and 5 in Ibeno that are within the project area. Some are shown in the table below.

The population of the communities was projected from the 1991 census figures (which are the officially accepted record to date) at five yearly intervals, using a growth rate of 2.8% per annum. The linear and exponential projection methods were used and the results presented in Tables 5.1 and 5.2. The population figures give us an indication of the number of people that will be impacted by the proposed project in the area.

Table 2 – Overview of Communities around Ibom DSP

Community	1991	1996	2001	2006	2011
Ibaka	1246	1420	1595	1769	1944
Ibuot Utan	810	923	1037	1150	1264
Mbendoro	1245	1419	1594	1768	1942
Obio Iyata	1874	2136	2399	2661	2923
Unyenge	2561	2920	3278	3637	3995
Asiak Obufa	894	1019	1144	1269	1395
Utan Brama	2585	2947	3309	3671	4033
*Okposo	1134	1293	1452	1610	1769
Itak Idim Ekpe	514	586	658	730	802

**During the survey the community had been deserted because of a conflict*

Source: National Population Commission

Base Line Conditions – **Communities & Population** 2/2

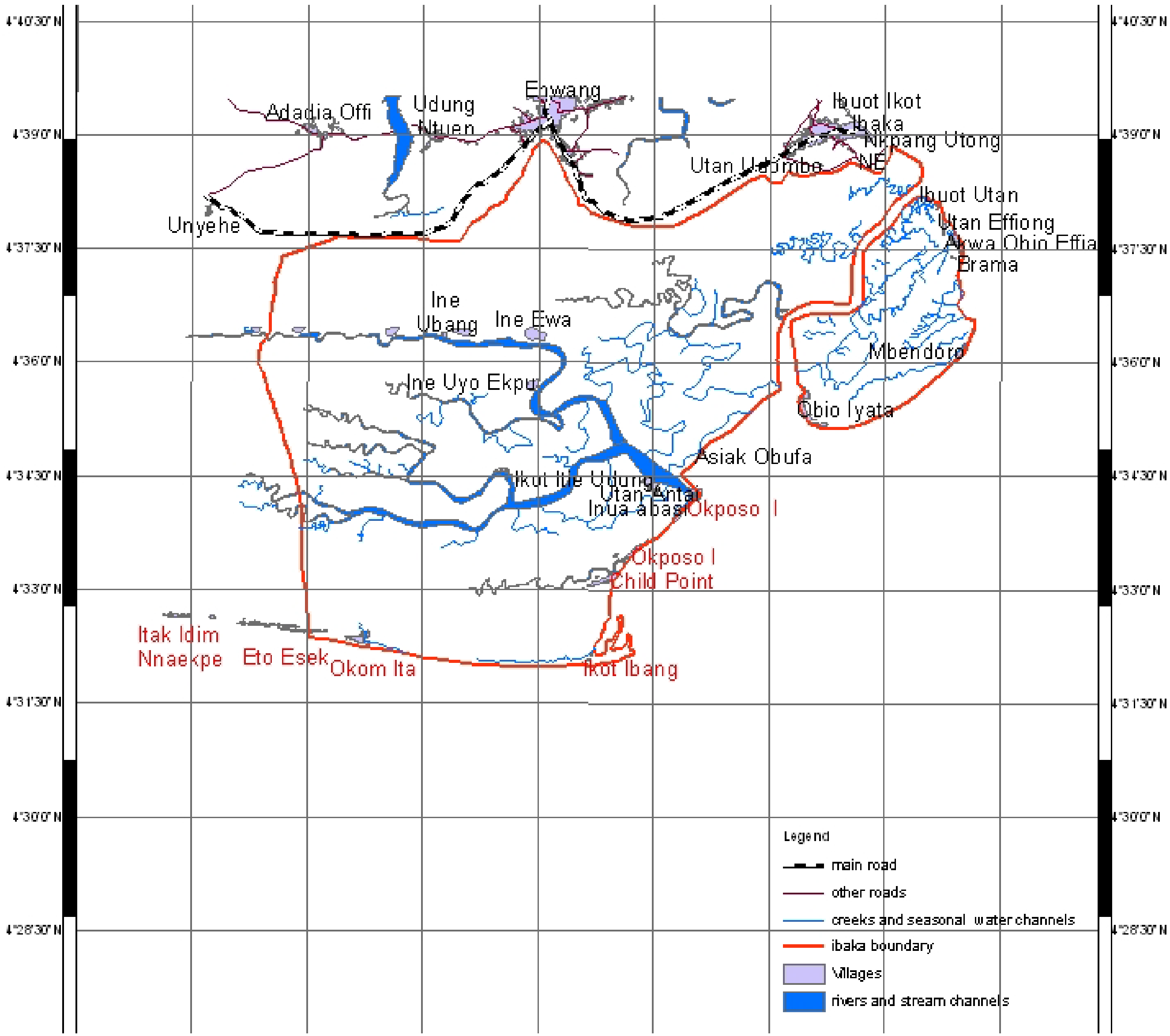

Figure 2 – Overview of Communities around Ibom DSP

Base Line Conditions – **Communities & Population** 3/3

The economy of the community was highly private sector driven. There is a high level of dependence on natural resources for livelihood sustenance. The natural water bodies are inhabited by fishes, shrimps crabs, oysters and periwinkles, etc. In essence capture fisheries remain the most important source of economic livelihood. Fishing is a male dominated enterprise while women essentially dominate the gathering of periwinkles and crabs etc. from the shallow swamps. The women also exploit the mangrove forest for firewood and other non-timber forest produce (mushroom, wild fruits and vegetables etc.). They also process fish (drying or smoking), engage in a little compound farming and also market palm wine and illicit gin (locally brewed ethanol). The major female activity is however marketing of products.

Apart from fishing, the male are involved in timber logging, marine transportation, artisanal dredging, and sale of fishing equipment and accessories. With reference to employment opportunities in oil service companies it was alleged that indigenes are entitled to quarterly (3 months) employment slots and that various deceptive and disingenuous strategies are utilized to deny them of these slots which are than “sold” to people (mainly non – indigenes) who can afford to offer money for these slots.

Palm plantations are viable in this area. There is a moribund 100 hectare (ha) oil palm plot located in Mbendoro settlement. There is an opportunity of locating a small scale industry with processing equipment for palm produce. The people also plant cassava and other crops on available land.

Base Line Conditions – **Climate, Vegetation**

CLIMATIC CONDITIONS

Akwa Ibom State is in the humid tropics with characteristic distinct wet and dry seasons, and determined by the movement of the natural winds. The south-west wind is responsible for the warm humid maritime tropical air mass while the north-east wind is associated with the dry continental tropical air mass usually dry and hot. The study area is constantly influenced by the Maritime Tropical Air mass giving rise to wet season starting from about March and ending October or November a span of 8-9 months of rain.

VEGETATION

The proposed project area is located within the Niger Delta, Nigeria. The Niger Delta is the most extensive and lowland forest/aquatic ecosystem in West Africa and is of regional and global importance (IUCN 1992). Vegetation in the proposed area consists predominantly of degraded lowland swamp forests and dry-land rainforest (drier areas of the fresh water swamp forests), farmlands and fallow lands at various stages of regeneration. The complex structure (physiognomy) and species richness of the natural vegetation in the lowland rainforest has been largely converted. Distinct canopy stratification expected of mature rainforests was not discernible except for a tree, shrub and herb layers. Trees of timber size were scanty. The exotic nypa palm (*Nypafruticans*) dominated the shoreline in most locations, indicating areas of mangrove (predominantly *Rhizophoraracemosa*) degradation.

Cultivation of some economic crops is evident in the form of a few home-based gardens. The major economic crops included Carica papaya (pawpaw), Musa sp. (plantain, banana), fruit trees (*Atrocarpuscommunis, Mangifera indica*) and palms *(Elaeisguineensis, Cocosnucifera, Raphiahookeri*). Tree species, which offer non-timber forest products (barks, fruits, roots etc) that play roles in traditional medicine and nutrition, abound in the area.

Base Line Conditions – **Hydrobiology** 1/2

The zooplanktonic fauna of project area are categorised into Copepoda, Ostracoda, Rotifers and others (eggs and larval forms). Zooplankton numbers varied between 141 organisms/l and 265 organisms/l at during the dry season and from 86 organisms/l and 135 organisms/l during the wet season. The numbers of organisms and species in the study area were higher during the dry season than the wet season.

During the dry season, seventeen species of zooplankton and 3 larvae/eggs were recorded. During wet season a total of 15 species, 3 egg/larvae were recorded.

The Order Copepoda dominated the zooplankton with 1098 individuals per litre (54.9%) and was represented by 7 species during the dry season. This was followed by the Ostracoda with 334 individuals per litre (16.7%) made up of 3 species, Rotifera with 313 individuals per litre (15.7%) also made up of 3 species, Gastropoda with 214 individuals per litre (10.7%) made up of 2 species, and others with 41 individuals (2.1%). This same trend was recorded during the wet season with Copepoda dominating with 585 individuals (46.5%), followed by Rotifers with 273 individuals (21.7%), Ostracoda and 245 individuals (19.5%) and others with 154 individuals (12.7%).

The Copepoda in the study area is represented by three sub-orders, they include Calanoida, Cycloipoida and Harpacticoida and the organisms were mainly monogeneric. The low number of zooplankters could be ascribed to (a) the patchy nature of distribution, (b) vertical migration phenomenon which most species exhibit so that during the day time; they descend to the bottom of the sea. The others that were not identified as zooplankton were represented by fish eggs, fish larvae, pelecoid larvae and cuprid larvae. The zooplankters were less abundant and less frequent and showed a paucity of species compared with the phytoplankton as would be expected. The higher numbers of zooplankter recorded during the dry season correlates with higher phytoplankton abundance during this time. This is expected because they depend largely on phytoplankton for food so the co-variation is expected.

The results of abundance, distribution and occurrence of organisms surveyed in this investigation would be critical future bench markers for monitoring the ecosystem relative to compliance conditions and for assessment of her integrity and health status.

HYDROBIOLOGY - BENTHOS

During the dry season 128 organisms were encountered and these belong to 4 major taxonomic groupings. These groupings and their contribution to the total macro-benthic collection during dry season are Annelida (53.9%), Mollucsa (18.8%), Arthropoda (17.2%) and Echinodermata (10.1). During the wet season the contribution of the various groups to the total benthic fauna were Annelida (55.6%), Mollusca (18.0%), Arthropoda (13.9%) and Echinodermata (12.5%). During the wet season a total of 72 organisms were recorded, a decrease of 44% over the dry season abundance. The increase recorded during the dry season may suggest a more favourable condition growth condition during this period than during the wet season.

All the benthic organisms identified in the study area during the survey are monogeneric and therefore stands the risk of extinction if changes in environment especially pollution affects any species or group of organisms adversely.

The benthic fauna live mainly on remains of plants and animals in the sediment. They are most affected during pollution because of their inability to move away from pollutant and the benthic fauna largely bio-accumulate pollutants within their body biomass. Their abundance, distributions and tissue bioassay m

Base Line Conditions – **Hydrobiology** 2/2

HYDROBIOLOGY – FISH FAUNA

The inshore fish resources of the Nigerian waters (0-50 m) includes demersal, pelagic and shellfish resources. The potential yield from inshore waters is estimated at 201,000 metric tonnes per annum. Small-scale fisheries contribute between 50 - 70% of total domestic production. Tobor, (1965 and 1968) recorded about 157 species of fish belonging to 71 families in the Nigerian inshore waters. Demersal species are grouped according to their area of occurrence either above or below the thermocline at 30 - 40 m depth. The pelagic fish resources are mainly the Clupeid family and the most exploited are; Ethmalosa fimbriata, Sardinella maderensis, Sardinella aurita and Illisha africana. Others such as anchovy and the scombrids are not the major targets of the small-scale fishery. Shellfish harvested by the artisanals include white shrimps (Nematoplaemon hastatus, Palaemon hastatus), brackish prawn (Macrobrachium macrobrachion), river prawn (Macrobrachium vollenhovenii), and juvenile pink shrimp Penaeus notialis and Penaeus duorarum. The industrial shellfish fisheries targets the adult pink shrimp Penaeus notialis and Penaeus duroarum taking considerable quantities of the guinea shrimp Parapenaeopsis atlantica in the process (Adetayo and Ajayi. 1982). Shrimp resources are abundant around river mouths and lagoon entrances as in Effiat (Tom Shot). Important species occurring in Nigerian waters are the pink shrimp Penaeus notialis, dominant in 10 to 50 metres of water, the tiger shrimp Penaeuskerathurus, and the near shore shallow coastal shrimp Parapenaeopsis atlanticat.

The principal fishes of the area show the occurrence of a minimum of 29 species. These recordings were made from landings during the survey; there are therefore more species in the area than the number recorded as stated above. The fish fauna comprises of 20 families and 26 genera. In this survey there are 1.1 species per genus and 1.5 species per family. The genera Liza and Pseudotolithus are most diverse consisting of 3 species each. Carnanx comprises 2 species and the others are mono-specific. The most diverse families are Carangidae, Clopeidae, Ephippididae, Mugillidae and Sciaenidae (3 each). There are 14 (70%) mono-specific and 6 (30%) poly-specific families. The dominance of mono-specific taxa is of major conservation concern because a disastrous environmental perturbation can result in the disappearance of the entire genera and family.ay also give an indication of the environmental pollution status.

HYDROBIOLOGY - GONADOSOMATIC INDEX (GSI) AND FECUNDITY

The investment in reproduction of the most dominant species of fish in the study area was expressed by the GSI – (the Gonadosomatic Index). For the prevalent fish species, this index was generally low except for *Ethmalosafimbrata* (bonga) and *Liza grandisquamis* which had 3.0 each. *Pseudotolithuis* and *Alectusalexis* had the lowest values (0.56 and 0.48) respectively. Most of the bonga and mullets caught were in their pre-spawning stage with full matured eggs, giving rise to the high GSI values observed in this fish.

Base Line Conditions – **Farming & Fisheries**

LAND USE AND FARMING ACTIVITIES

Local land use is predominantly a forest reservation and agricultural, with some areas cultivated. There are many small farmlands scattered around the inhabitant residents. Presently, less than 15% of the project area is used for settlements and agriculture. Agriculture is practiced as a secondary occupation among the inhabitants, albeit the inhabitants combined it with commodity trade and fishing, though hunting is still minimally practiced. The natives cultivate yam, plantain, oil palm, raphia palms, cassava, yam, etc. at the subsistence level under mixed cropping system. The conventional farming operations involve clearing, burning and manual tilling to make mounds and ridges for the cultivation of crops such as cassava, maize, plantain and yam, etc. Soil nutrients are maintained via litter fall accumulation, secondary forest re-growth and addition of farmyard manures as replenishment for fertility lost. Nutrient build-up occurs through mineralization and nutrient recycling during the fallow period. This practice, however, often results in impaired soil structure but enhanced fertility status.

FISHERIES

A total of eight (8) major fishing settlements were surveyed. All the settlements were permanent (resident throughout the year). The presence of the Ghanaian (Wasa) fishermen with the large purse siene net was a common feature in Ibaka, Okposo (now abandoned) and Brama. The gill net (drift and set) are widely used in the area. The two types of gillnets are used interchangeably by varying the floats and the weights. The drift gill can be used in different water depths by varying the length of the suspending lines (near surface) for the Clupeidae (*Ethmalosa fimbriata* and *Sardinella madarensis*) near-bottom for mainly Scianidae (*Pseudotolithus*), Carangidae and other near bottom dwellers.

Also widely employed are the seine nets, the purse net, cast as well as hook and line, Anchor nets for catching crayfish and shrimps (*Pengeusnotalis*and*Namatopalaemonhastatos*). The large fishing communities are Ibaka, Ine Enwang, Utan Iyata, Esuk Effiat, Utan Antai, Utan Brama, Ibout Utan, Mbendoro and Okposo. Each boat carries a minimum of crew of 2 while the larger boats carry up to 7 crews. The Ghanaian boat (Wasa type) carries up to 12 crews. Estimates of catch-per-unit effort are 20kg/boat/day at Ine Enwang, 35kg/boat/day at Esuk Effiat, 100kg/boat/day at Utan Iyata and Utan Antai. Utan Brama, Ibaka and Okposo are 110,140 and 150kg/boat/day respectively. The fishers located within the proposed project area supply most of the crayfish and shrimp consumed in Nigeria. The fishery products are ferried into the hinterland part of the country everyday in lorries and buses.

Contents

Main Permanent & Temporary Impacts – **Environment**

The main permanent impacts are related to facilities supporting port and terminal operations. These will have significant landscape impacts and will typically generate air emissions, light and noise, together with increased road traffic and reduced safety.

The operation of the power station will generate air emissions and noise and will have an impact on the landscape. The magnitude and significance of these impacts is comparable to those of small co-generation gas power plants. Best practice and mitigation measures will be adopted to minimize operational impacts. Landscape impacts will be managed through the restoration of the original landscape in the area through vegetation screening of the permanent structures where required.

Construction impacts include temporary noise and air emissions from construction machinery, impacts on land use, loss/disturbance of natural habitats (flora and fauna), landscape and temporary impacts to water quality and aquatic habitats during near shore marine works. The magnitude and significance of construction impacts will depend on the local conditions. Typically construction impacts can be managed and mitigated efficiently.

Main Permanent & Temporary Impacts – **Social**

Social impacts will include the physical displacement, necessitating the involuntary resettlement of some communities. They may be physically displaced **or** lose their source of livelihood (fisheries, agricultural land, employment, business outlets, and so on) as a result of land acquisition. The key principles of the Resettlement Action Plan for the proposed IDSP are listed below:

Ensure that the affected population can achieve an equivalent or improved standard of living within a reasonable time. The affected population would be given access to land, natural resources, housing and infrastructure of a level at least equivalent to that which they previously enjoyed, allowing them to recover or improve their income levels within a reasonable period. They would be provided with an acceptable level of services, over time, including potable water, drainage, and sanitation and community infrastructure, regardless of their previous conditions.

Fully compensate all transitional losses. These will include all legal costs, transport costs and loss of income resulting from displacement during the project.

Minimize the disruption of social networks and economic opportunities. As far as possible the affected population would be encouraged to maintain their social networks. This can be achieved through close consultation, by resettling the affected population as a group, as near as possible to their original location, and by timing the move to coincide with the most appropriate times in the school year and/or agricultural cycle.

The proposed IDSP would provide opportunities for development

Wherever possible, the affected population would be the first to benefit from the opportunities provided by the project. This can be achieved by giving them preference in employment, and if necessary training, and by offering opportunities for self-employment. Examples would include service contracts for local labor, or the provision of parking and basic facilities for roadside vendors affected by the proposed projects.

Vulnerable Groups

It is particularly important to ensure that vulnerable groups are adequately protected. They include poor ethnic minorities, such as indigenous people, landless rural poor, and small farmers or squatters who lack full legal title to the land they use or occupy. The project regulators will only support resettlement of traditional land-based **indigenous people** if it can be shown that resettlement will result in direct benefits to them. The project requires that their customary rights must be recognized and fully compensated, they must be offered a suitable land-for-land option, and they must give their informed consent to the resettlement proposals. Special attention would be given to those sectors of the population that are at risk of impoverishment or that may have special difficulty adjusting to the disruption caused by displacement. They include the elderly, the physically handicapped and female heads of household. In addition, the compensation and rehabilitation measures would ensure that the rights of partners living in common-law unions and their children are protected if the couple separate or if one of the partners dies.

Contents

ESIA Action Plan – **Onshore** 1/12

ONSHORE			
Resource	Approach	Parameters	Period
Surface and Ground Water	Desk: • Bibliographical/desk based literature review • Remote sensing interpretation using aerial photographs or satellite imagery. Field study: (i) Sampling and analysis of selected main crossings of permanent rivers, streams, creeks, channels. (ii) Collect groundwater samples from selected existing wells within 500 m from the selected site Output: • Characterisation of baseline water quality at survey locations ``	(i) Surface Water: The following data will be collected: River morphology and channel descriptions Water Quality – physico-chemical parameters Sediment Quality (for potentially contaminated rivers only). - physico-chemical and biological parameters (ii) For groundwater: physico-chemical parameters	Timing of field surveys: August – mid September
Vegetation & Flora	Desk: • Bibliographical search; and • Remote sensing analysis: Field study: A team of ecologists and flora experts will conduct a survey of the terrestrial environment to describe the existing habitat type and identify flora species of interest. Surveys will be performed only for areas of ecological and conservational interest. Specific field surveys will also have to be conducted for the Appropriate Assessment on Natura 2000. Output: • Flora species list and distribution • Vegetation map• Characterisation of vegetation and flora at survey locations	Vegetation and flora surveys will focus on species of conservation interest and priority habitats • Endangered and other endemic/important species	Timing of field surveys: late August – early October

ESIA Action Plan – **Onshore** 2/12

ONSHORE			
Resource	Approach	Parameters	Period
Fauna & Habitats	Desk: • Bibliographical search; and • Remote sensing analysis: Field study: A team of ecologists and fauna experts will conduct a survey of the terrestrial environment to describe the existing habitat type and identify fauna species of interest. Surveys will be performed only for areas of ecological and conservational interest. Aspects to be identified: • Habitat types • Fauna species list and distribution • Sensitive habitats Specific field surveys will also have to be conducted for the detailed assessment of protected areas. Output: • Fauna species list and distribution • Habitat Map • Characterisation of fauna and habitats at survey locations	Vertebrates, particularly focusing on species of interest, including: • Priority fauna species (Bear, wolf, Otter) • Nesting Birds • Fish • Amphibians, reptiles, small mammal Macroinvertebrates	Timing of field surveys: middle August – Late September • Priority fauna species: Mid August, and August-October • Nesting Birds: August- September • Fish: August and September • Amphibians, reptiles, small mammals: Mid August and Aug-September • Macroinvertebrates: August – early September

ESIA Action Plan – **Onshore** 3/12

ONSHORE			
Resource	Approach	Parameters	Period
Air	Desk: • Bibliographical and desk based literature review Field Study: • Air quality data will be recorded only for the • A specialist will conduct a study to determine the status of local air quality using existing monitoring data or by conducting measurements. Measurements will be conducted using an air quality monitoring station. • Air quality sampling, using diffusion tubes, at villages near proposed locations over a minimum of four weeks. Output: • Mapping of air quality sensitive receivers • Characterisation of baseline air quality at proposed site • Modeling of emission dispersion from port facility operation only.	Parameters to be measured will include: • Oxides of nitrogen (NOx) • Sulphur dioxide (SO2) • Hydrocarbons (VOCs). • Carbon Monoxide (CO)	Timing of field surveys: August – end of September • Timing of Modeling: September
Noise & Vibration	Desk: • Bibliographical and desk based literature review. Field Study: • A specialist will conduct a study of ambient noise levels. The study will identify locations of sensitive receptors. Both short term and long term measurements are to be collected. Measurements are to be taken continuously during the day and the night time (24 hours) at villages near proposed locations. • Moreover, hourly measurements at villages close to the selected pipeline route other project features (accesses, pipe yards, etc.) that may be impacted temporarily by construction activities Output: • Mapping of noise sensitive receivers • Characterisation of baseline noise levels at proposed site • Modeling of noise emissions at sensitive receivers close to.	• Acoustical measurements using a Type I or Type II integrating sound level meter monitoring the slow response, A-weighted, equivalent sound pressure level (Leq) at selected location	• Timing of field surveys: August – end of September • Timing of Modeling: September

ESIA Action Plan – **Onshore** 4/12

ONSHORE			
Resource	Approach	Parameters	Period
Light Pollution	Identify sources of light emissions, potential sensitive receptors and view points	Light emissions and potential sensitive receivers	N/A
Soil	Desk: • Bibliographical/desk based literature review, including project information • Remote sensing interpretation using Soil maps (1:50,000 or similar) and aerial photographs or satellite imagery. Desk: • Bibliographical/desk based literature review, including project information • Remote sensing interpretation using aerial photographs or satellite imagery. Field study; • The soil specialist will undertake study of: - soil physico-chemical characteristics; - existing soil contamination; - Economic value of soil types Investigation will include analysis of soil samples of upper layers of soil at locations with agricultural land use and areas of potential soil contamination. The soil specialist will also conduct visual assessment of soils for fertility parameters. Output • Geological/hydro geological cartography to 1: 50,000 scale along the selected corridor and other project features (accesses, materials yards etc.). `		Timing of field surveys: August – mid September

ESIA Action Plan – **Onshore** 5/12

ONSHORE			
Resource	Approach	Parameters	Period
Landscape	Desk: • GIS desk top analysis to assess landscape quality width. Special attention will be given to: - Port facility locations - Areas of high landscape value (hill areas, forested areas, etc.) • 3D simulations on the site to include: - View sheds analyses - 3D simulation Field Visual assessment during corridor survey Output. • Mapping of landscape quality • Characterisation of landscape within areas of high landscape value • 3D Model of	• Location of visual sensitive receivers • Characterisation of landscape where permanent structures will be located	Timing of field surveys: August – end of September • Timing of Modelling: September

ESIA Action Plan – **Onshore** 6/12

ONSHORE			
Resource	Approach	Parameters	Period
Cultural Heritage Resources	Desk: • Bibliographic search • Identification/mapping of areas of high archaeological potential Field : • Initial field reconnaissance • Detailed Field survey • Fieldwork will not cover all areas of the project area with equal attention but will focus on area shown by the predictive model and density of know sites to have the highest archaeological potential. Output. Characterisation of CH elements	• Monuments, buildings and above ground structures of cultural interest • Intangible Cultural Heritage (ICH) • Archaeological sites	Timing of field surveys: August – September

ESIA Action Plan – **Onshore** 7/12

ONSHORE			
Resource	Approach	Parameters	Period
Traffic and Transport	Desk: • Desk based review of existing information on regional transport network, including rural roads • Description of the current status of vehicle traffic on the roads affected by the project and assessment of the integrity of Project transportation routes. Field: • The social experts deployed in the field will identify major junctions and key areas where project traffic could become an issue related to the following: - community health and safety - congestion and flow - impacts to cultural heritage • The field study will be based on both interviews and observations (including traffic counts) Output. • Municipal and Village profiles • Findings report on traffic flow on roads and at major junctions.	Traffic characterisation: current usage patterns and volumes • Structural properties (load limits, traffic volume limits) • Functionality (condition of road surface) • Transportation practices • Access routes	Timing of field surveys: August – September
Demographics and Population	Desk: • Bibliographical and desk based literature review. • GIS / Cartography desk top analysis to assess settlement size and distribution, • Review of data gaps and updating information as appropriate. Field : • A team of social specialists will conduct a survey to determine the general socioeconomic characteristics of the study area including demographics and population trends. • As part of the survey, IDSP will undertake a Household Survey to collect qualitative data including data on population and demographics. Output. • Commune and Village profiles • Sample quantitative assessment of key population characteristics	Settlement patterns and mapping • Population size of settlements within 2 km corridor and area around installations. • population trends • in and out migration • Gender and age structure • Religious and ethnic diversity, including minorities • Vulnerable Groups (i.e. women, elderly, etc) • Education and literacy levels	Timing of field surveys: August – September

ESIA Action Plan – **Onshore** 8/12

ONSHORE			
Resource	Approach	Parameters	Period
Land Use and Development	Desk: • Bibliographic search • GIS desk top analysis of land use (Land Sat images) Field: • The teams of social specialists deployed in the field will ground truth GIS based information on land uses. • The teams will assess community dependency on natural resources, including water and land, through results of focus groups and interviews with key informants, including heads of municipalities and villages. • If a household survey is undertaken it will include questions on land ownership patterns and tenure structure and availability of alternative land. Output: • Conduct a qualitative and quantitative survey of the land tenure system and land use patterns in the 2 km survey corridor through household surveys • Mapping of land use scale of cartography outputs will range between 1: 5,000 and 1:50,000	• Land use • Land ownership and tenure • Traditional land titles • Spatial planning and development • Use and dependency on natural resources, including land for agriculture and pasture.	Timing of field surveys: August – September

ESIA Action Plan – **Onshore** 9/12

ONSHORE			
Resource	Approach	Parameters	Period
Socio-Cultural Institutions and Government Administration	Desk: • Review of existing desk based (secondary) information on the structure of socio-cultural institutions and administrations Field: As part of the overall socioeconomic survey and stakeholder engagement activities the field teams will assess the presence and structure of social institutions through interviews and focus groups. Output: Profile of administrative and community institutions	Government structures • Presence and role of other institutions (NGOs/CBOs) • Social organisations and institutions • Social networks, power hierarchies and support structures • Role of women • Leadership patterns • Safety, security, law and order	Timing of field surveys: August – September

ESIA Action Plan – **Onshore** 10/12

ONSHORE			
Resource	Approach	Parameters	Period
Livelihoods and Micro-Economy	Desk: • Review of existing desk based information on the local economy and livelihoods including unemployment and employment structures Field: • The social teams deployed in the field will assess the means of livelihood and income for all communities within the 2 km corridor and areas around installations. The assessment will be done through qualitative methodologies (focus groups and interviews with key informants). • Quantitative data will be collected if a household survey is undertaken. • Information on alternative livelihood options due to economic resettlement will be investigated. Output: • Municipal and Village profiles • Qualitative assessment of household livelihoods and income • Qualitative assessment of employment structure • Qualitative assessment of alternative Livelihoods	• livelihood and economic profile • Economic importance of key sectors: tourism, logging, agriculture etc • Income distribution • Occupation and employment structure including proponent's employment plan • Vulnerability and subsistence economy • Opportunities for alternative livelihood activities	Timing of field surveys: August – September

ESIA Action Plan – **Onshore** 11/12

ONSHORE			
Resource	Approach	Parameters	Period
Social Infrastructure	Desk: • Review of existing desk based information on infrastructures Field: • The field survey teams will visit all settlements within the 2 km corridor and the areas around installations to assess the situation vis a vis social infrastructure and to collect relevant data to develop the municipal and village profiles. • The teams will use a combination of observation techniques and interviews with key informants to locate infrastructures and areas of interest. Output: • Municipal and Village profiles • List of sites of cultural and religious significance (see Cultural heritage survey) • Mapping of sites. Scale of cartography outputs will range between 1: 5,000 and 1:50,000	Settlements • Key man made features • Economic, culture and historical sites • Recreational facilities (nature and location) • Cultural and religious facilities/ sites (nature and location) • Cultural traditions • Sites of cultural and religious significance • Education and health resources (nature and location) • Utilities (i.e. water, electricity, telecommunications, etc)	Timing of field surveys: August – September

ESIA Action Plan – **Onshore** 12/12

ONSHORE			
Resource	Approach	Parameters	Period
Community Health	Desk: • Review of existing desk based information on the health status and resources of local communities Field: • The social teams deployed in the field will assess the health status and health resources available to communities located within the 2 km corridor and areas around installations. • The assessment will be done through a combination of qualitative methodologies (focus groups and interviews with key informants like doctors and nurses) and quantitative methods (if a household survey is undertaken). Output: • Health Profile of the Villages and Municipality • Review of health care resources • High level health capacity review	Community health status • Health determinants • Community health needs and concerns of host communities • Health Care resources	Timing of field surveys: August – September

ESIA Action Plan – **Offshore** 1/4

OFFSHORE			
Resource	Approach	Parameters	Period
Wind, Waves, Currents and Tides	Desk: • Desk based, bibliographic search. Output: • Characterization of marine habitat within the area of influence.	Meteocean parameters	NA
Sediments and Water Quality	Desk: • Desk based, bibliographic search Field: • Water and sediment sampling for physico-chemical and biological parameters. Output: • Characterization of water quality and seabed sediments within area of influence • Modelling of sediments dispersion during dredging and backfilling of the nearshore section to determine impacts to water quality and habitats	Water Quality physico-chemical and biological parameters • Sediment Quality physico-chemical and biological parameters	Timing of field surveys: • August – mid September for water quality and sediments • August – early September for macrobenthos Timing for modeling: September
Habitats	Desk: • Desk based, bibliographic search Field: • Benthos through sediments sampling – see above • Seagrasses and other habitats of interest will be surveyed by means of Remotely Operated Vehicle (ROV) during the marine surveys Output: • Characterization of marine habitat within the area of influence.	Benthic macrofauna • Seagrasses (e.g. P. oceanica, C. nodosa, etc.) • Habitats and species of conservation interest: • Presence of sensitive habitats	Timing of field surveys: August – mid September

ESIA Action Plan – **Offshore** 2/4

OFFSHORE			
Resource	Approach	Parameters	Period
Marine Mammals, marine Turtles and Marine Birds	Desk: • Desk based bibliographic research study of the presence of marine mammals, turtles and birds in the area of influence of the project, including migration patterns and presence of endangered species. • Determine exposure of species present to disturbance during marine construction works Output: • Characterization of marine habitat within the area of influence.	List and distribution of marine mammal, turtle and marine birds species present or potentially present in the study area. • Breeding, feeding, nursing or nesting grounds of species of conservation interest	
Fish and other Commercially Interesting Species	Desk: • Desk based bibliographic research to determine the species, reproductive seasons and location, migration patterns etc (see below for the socio economic side of fisheries) • Determine exposure of species present to disturbance during marine construction works Output: • Characterisation of fisheries resources within the area of influence. • Potential for a stock assessment based on normal off takes if the area is found to be a breeding area for fish	List and distribution of fish species of conservational interest or commercial interest • Spawning, rearing grounds of species of conservation and/or commercial value	

ESIA Action Plan – **Offshore** 3/4

OFFSHORE			
Resource	Approach	Parameters	Period
Marine Cultural Heritage	Desk: • Bibliographic search on existing data on marine archaeological finds in and around the study area Field : • Side Scan Sonar (SSS) • Video/ROV survey • Multibeam echosounder survey • Magnetometric survey Output: • Determine presence or potential presence of archaeological sites/findings within the area of influence	Archaeological sites/findings • Intangible Cultural Heritage (ICH)	Timing of field surveys: August – September

ESIA Action Plan – **Offshore** 4/4

OFFSHORE			
Resource	Approach	Parameters	Period
Socio Economics	Desk: • The study will include both desktop research, including remote sensing analysis, and primary data collection (interviews, observation, focus groups, household survey). • GIS desk top analysis of costal area Field: - Fisheries: Interviews with fisheries authorities and fishermen organisations to gather updated data on fleet and fisheries organisation, fishing methods, areas, seasons, captures, revenues, etc. The specialist will also visit all landing sites within the area of influence of the project. - Tourism: Interviews with tourism authorities and organisations to gather updated data on tourism development plans, etc. - Shipping and navigation, other uses of the sea& infrastructures: Interviews with relevant authorities and organisations to gather updated data Output: • Characterisation of fisheries, shipping and tourism resources within the area of influence.	• livelihood and economic profile of coastal communities • Economic importance of fisheries and tourism sector • Income distribution • Occupation and employment structure including proponent's employment plan • Opportunities for alternative livelihood activities • Dependency on fisheries and tourism livelihood • Coastal land use	

Full Environmental Scoping Report

Further reference is made to the Full Environmental Scoping Report which is included in the Supporting Documents File to the OBC

Contents

Corporate Social Responsibility

In line with international best practice in port development, corporate social responsibility is regarded as a very important parameter in the project's development.

Port development can have a significant impact on local communities:

- Displacement of local communities
- Changes in the surroundings and environment of local communities
- Changes in the economic position of local communities
- Etc.

During the project's bidding phase, bidders receive points for their contributions towards local communities.

The following components in the project's Corporate Social Responsibility (CSR) program shall be rewarded with points in the bidding phase:

- Education for local communities (e.g. development of schools)
- Healthcare for local communities
- Local Employment in the port and in the Free Trade Zone
- Local Entrepreneurship linked to activities in the port and in the Free Trade Zone
- Utilities (e.g. local communities benefitting from project desalination plant and power plant)
- Safety (e.g. local communities benefitting from the safety provided by the Ibom DSP's naval base)
- General support to local communities (e.g. a fishery port at Ibaka (not in IDSP/IIC), to support the local fishery industries)

The CSR program strives to minimize the negative impact on the local communities. By doing so, the port's project developer also benefits from the CSR program:

- It helps to build better relations with local communities
- Having good community relations reduces the risk of project delays and/or port closure

Project Initiators:

Transaction Advisors:

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

LEGAL REVIEW

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs maritime & transport business solutions

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Legal Review
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Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Preface

Source: ICRC PPP Manual for Nigeria

A comprehensive Legal Review must be done to ensure that all the foreseeable legal requirements are met for the development of the project. Although it may be costly to undertake a comprehensive review of all legislative and regulatory aspects of the project in this early phase, it is essential as a minimum to carry out a legal screening. Common legal issues pertain to land use rights, regulatory matters, governing legislation, tax laws, and other related matters.

Structure of the Legal Assessment - Legal Framework

1. Legal Framework description

The objective is to undertake a general review of the Legal Framework for undertaking the project that will satisfy the requirement of the OBC.

Content:

- Structure of Port Ownership in Nigeria
- Nigerian Ports Authority Act, Cap N 126, LFN 2004
- Infrastructure Concession Regulatory Commission Act
- Public Procurement Act, 2007
- Public Enterprises (Privatization and Commercialization) Act, Cap P 38, LFN 2004
- Fiscal Responsibility Act, 2007
- Nigeria Export Processing Zones Act, Cap N104, LFN 2004
- Nigerian Investment Promotion Commission Act, Cap N 117, LFN 2004
- Coastal and Inland Shipping (Cabotage) Act, 2003
- Land Use Act Cap, Cap L5, LFN 2004
- Environmental Impact Assessment Act, Cap E 12, LFN 2004

2. Key Legal Items

The objective is to identify key characteristic issues that may interfere with the implementation of the proposed PPP Structure and whether any legal barrier exists in the proposed PPP model and the likelihood of a successful resolution of the barrier.

Content:

- Jurisdiction and Authority of a public entity to enter into private sector contract
- NPA as the legally authorized and sole Grantor to the Concession
- Term of the Master Concession
- Ownership and control of (port) infrastructure
- The PDMC as a legal entity
- The PDMC's right to grant Sub-concession contracts
- Tariffs and revenues
- Conflicts of interest in the PDMC structure
- Tax implications, incentives and Free Trade Zone (FTZ)
- Declaration of Ibom as Port Area
- Financial commitment and Sovereign Guarantee
- Conclusion

Structure of Port Ownership in Nigeria

Structure of Port Ownership in Nigeria

The National Assembly by virtue of *Section 6 of the 1999 Constitution of the Federal Republic of Nigeria* has exclusive powers to legislate on Ports, their powers, constitution including navigation as provided under *Item 35 Exclusive Legislative List*. In line with the above powers, the National Assembly enacted the *Nigerian Ports Authority Act Cap. N 126, Laws of the Federation of Nigeria, 2004* which regulates the development, operation and management of ports in Nigeria. It is the only law for port regulation in Nigeria. Under the current Ports Act, it is only the Nigerian Ports Authority that has powers to develop, own and manage ports on behalf of the Federal Government.

With the adoption of the Landlord model by the Federal Government for port development in Nigeria under its National Transport Policy, the private sector was allowed the participation in port development and management while reserving the right of ownership of the land and port infrastructure on the Federal Government through the Nigerian Ports Authority. It therefore follows that the reversionary interest in all ports rest in the Federal Government through the Nigerian Ports Authority.

The power to ensure security of Nigerian ports and enforcing all laws in the territorial waters up to the limit of its exclusive economic zone is vested on the Nigerian Navy. *See Section 3, 4(a) & (b) of the Armed Forces Act*. This includes the power for the production of nautical charts and publications for the country in conjunction with the Nigerian Ports Authority.

Nigerian Ports Authority Act, Cap. N126, LFN, 2004

The Nigerian Ports Authority (NPA) was established by *Section 1 the Nigerian Ports Authority Act, Cap. N126, Laws of the Federation of Nigeria, 2004 (the "Ports Act")*. It operated a full service port model with powers under *Section 7 of the Ports Act* to render services to both ships and cargo. It has responsibilities to provide and operate facilities in ports, provide marine (navigational) services and manage Nigerian ports. The NPA also has powers under *Section 8 (a)* to construct, execute, carry out, equip, improve, work and develop ports, docks, harbours, piers, wharves, canals, water courses, embankments and jetties.

Section 30 (2)(a) and (b) further vest all ocean beaches within 100 meters of the high water level; the waterways, creeks and swamp land below the highest astronomical tide level and all beacons moles, piers, jetties, slipways, quays and other works, extending beyond the natural line of the high-water level on NPA. This effectively places all foreshore lands in Nigeria under the control and management of the NPA.

The Ports Act empowers NPA under *Sections 9* to perform or exercise any of its functions under the Act through an agent or any other person authorized by it in that behalf. This includes the power to enter into agreement with any person for the operation or the provision of any of the port facilities which may be operated or provided by NPA under *Section 8(l).* Consequently, the NPA may, form, establish or incorporate subsidiaries or affiliate companies whether wholly or jointly, with other persons for purposes of carrying any of its functions (except the power to make regulations) under *the Ports Act*.

In granting a Concession for the development of Ibom port on land acquired for the NPA comprised in the project site, the concessionaire would require a term of years necessary for it to recoup the cost of his investment. The NPA by *Section 8(r) of the Ports Act* is empowered to grant lease, purchase or otherwise acquire, hold or manage real property of any description. However, the NPA is restricted from alienating its property (immovable) for a period exceeding 5 years. To grant a concession that would involve leasing the land for a period beyond 5 years would require Presidential Approval. *See Section 25(1) and (2) of the Ports Act.*

For purposes of designating the Project as a point of entry for ships, NPA has power under *section 30 of the Ports Act* to declare any place in Nigeria and any navigable channel leading to that place as a port within the meaning of the Act.

Infrastructure Concession Regulatory Commission Act, (the "ICRC Act") 2005

The powers of the NPA and other Ministries, Departments, Agencies (MDAs) to enter into agreement with the private sector (as Public Private Partnerships) in respect of infrastructure projects was further enhanced with the passage of the *Infrastructure Concession Regulatory Commission Act, (the "ICRC Act") 2005.The ICRC Act, Section 1* empowers any Federal Government agency, corporation or body involved in the financing, construction, operation or maintenance of infrastructure, by whatever name called, to enter into a contract or grant a concession in respect of same in accordance with its provisions.

Upon establishing the viability of the project in line with *Section 2(1) of the ICRC Act*, the relevant MDA, or corporation is required to obtain the approval of the Federal Executive Council under *Section 2(2)* before putting the project up for open competitive bidding in line with Guidelines made by the Infrastructure Concession Regulatory Commission ("the Commission") pursuant to *Section 34 of the ICRC Act.*

Public Procurement Act, 2007

The *Public Procurement Act, 2007 ("the Procurement Act")* established the Bureau for Public Procurement ("BPP") to harmonize government policies and practices, among other matters, in respect of public procurement with a view to ensuring fair, competitive, transparent, value for money practices and accountability in public procurement.

Section 15 (1) (a) & (b) of the Procurement Act provide the scope of its application as covering the procurement of goods, works and services carried out by the Federal Government and all procurement entities or entities outside the Federal Government or its other entities outside that category which derive at least 35% of the funds appropriated for that purpose of the project being procured from the *Federal Share* of the Consolidated Revenue Fund.

The Procurement Act identified the basic components under its scope of application as "goods", "works" and "services"; defined as follows:

"Goods" means objects of every kind and description including raw materials, products and equipment and objects in solid, liquid or gaseous form and electricity as well as services incidental to the supply of goods;

"Works" means all works associated with the construction, reconstruction, demolition, repair or renovation of a building, structure or works, such as site preparation, excavation, erection, building, installation of equipment or material, decoration and finishing as well as services incidental to construction such as drilling, mapping, satellite photography, seismic investigation and similar services provided pursuant to the procurement of contract where the value of those services does not exceed that of the construction itself.

"Services" means the rendering by contractor or supplier of his time and effort and includes any object of procurement other than goods, works or construction.

Public Procurement Act, 2007 (continued)

A Public- Private Partnership (PPP) is a legal arrangement between the government or its agencies with private sector entities by which the private sector entities provide public goods and services which ought to have been provided by the government or its agencies for a term. The responsibility for financing the project is therefore transferred to the private sector.

Where Government acquires shares in the private entity (Special Purpose Vehicle) as is contemplated in the Ibom Project, it would only be investing in the shares of the SPV which has a personality different from the shareholders. It is the SPV that would raise debt for financing the Project and undertake construction of the Project. From the foregoing, it is clear that the *Procurement Act* does not apply because there is no direct procurement of any goods, works or services by the Government as contemplated under its provisions (particularly, section 15).

In the event that public funds are to be utilized for direct procurement of the construction contract for the port amounting to 35% or more of the total cost by the NPA on behalf of the Federal Government, then the Procurement Act becomes applicable under *section 15(1)(b) of the Act*. Where the PPP model utilizes private sector funds through Project Finance, by that logic, the funds are not the Federal Share of revenue contemplated under *the Procurement Act,* its provisions will not apply.

The role of the NPA in the Ibom Project is limited to granting the concession and investing in equity of the Project Company by virtue of the powers granted to it under *Sections 9 and 19 of the Ports Act*. The sections empower NPA to form companies whether wholly or in partnership with other persons and invest its funds as may be approved by the Minister of Transport.

Public Enterprises (Privatization and Commercialization) Act

Public Enterprises (Privatization and Commercialization) Act, Cap. P38, LFN, 2004

The Public Enterprises (Privatization and Commercialization) Act ("the Privatization and Commercialization Act") established the National Council on Privatization ("the NCP) as a policy organ for the privatization and commercialization of existing government enterprises listed in the Schedules thereto. The Act also established the Bureau of Public Enterprises ("the BPE") under *section 12* as the implementing agency for privatization and commercialization of public enterprises. The functions of the BPE in respect of privatization and commercialization of government owned companies (and enterprises) are contained in *sections 13 and14* respectively.

A combined reading of *sections 13 and 14 of the Privatization and Commercialization Act* shows that the BPE is responsible for divesting the shares held by the Federal Government in public companies listed in *Parts I and II of the First Schedule* through partial or full privatization respectively as provided under *section 1 of the Act*. The second category of enterprises listed in *Parts I and II of the Second Schedule to the Privatization and Commercialization Act* provided under *section 6(1) and (2)* are to be partially or fully commercialized respectively.

On the applicability of *the Privatization and Commercialization Act* to the grant of concession for the Ibom Project, it is observed that its provisions deal with the reorganization of existing government enterprises specifically listed in the First and Second Schedules to the Act, in order to make them operate as commercial ventures.

Based on the foregoing, the Privatization and Commercialization Act does not apply to Public Private Partnership contracts for the development and management of public infrastructure even by the commercialized enterprises which the Act regulates, of which the NPA is one.

Fiscal Responsibility Act, 2007

The Fiscal Responsibility Act, 2007 provides for the establishment of the Fiscal Responsibility Commission under *section 1* with the aim of enhancing efficiency in the allocation and management of public expenditure, revenue collection, debt control and transparency in fiscal matters by government and its agencies.

Section 22 (1) of the Fiscal Responsibility Act requires government corporations to establish a general reserve fund to which it shall allocate 20% of its operating surplus for the operating year. The 80% balance of the operating surplus for each operating year is to be paid to the **Consolidated Revenue Fund** of the Federal Government. The Act provides that where a corporation's result is a deficit, the deficit shall be classified under *section 23(2)* as the corporation's loss for the fiscal year.

There is no provision requiring the Federal Government to make any grant to corporations to cover the deficit of any fiscal year in order to ensure their financial stability/ability to continue discharging their functions and financial obligations effectively.

The NPA is required to fund its equity participation in the Ibom Project from its internally generated revenues. In the unlikely event that the results of the NPA ends in a deficit for any fiscal year, and without any grant from the Federal Government, there is the tendency that it might not be able to fulfill its financial obligations to the Ibom Project. This is most especially so as the issue of the continued solvency of the NPA is necessary for it to continue to fulfill its financial obligations to the Ibom Project which is essential to its success.

This aspect of the Fiscal Responsibility Act needs to be reconsidered to ensure that corporations which pay up 80% of their surpluses are supported in the event that their results end in a deficit for any fiscal year and which has the capacity to hamper their operations in order to enable them continue to discharge their financial obligations.

It is however noted that the NPA, with the approval of the Minister, has powers to borrow money by way of loan or overdraft from the Government or any other person, provided the loan is repayable within one year after the date of borrowing. *See Section 18 of the Ports Act.* In other words, the NPA cannot embark on long term borrowing.

Nigeria Export Processing Zones Act

Nigeria Export Processing Zones Act,Cap. N104, LFN, 2004

The Nigeria Export Processing Zones Act (the NEPZA Act") was enacted for purposes of stimulating economic activities in manufacturing, warehousing, import of goods for special services, duty free transshipment of goods etc through granting tax and custom duties incentives/exemptions for activities specified in the *Third Schedule* pursuant to *sections 8 and 12(1) of the NEPZA Act.*

Tax incentives granted for operations in the Zones in line with *section 9* are only for approved activities contained in the *Third Schedule of the NEPZA Act*. However, goods passing through the customs zone would be liable to pay taxes and custom duties like import or exports from other countries as provided under section 17. Payment of goods and services within the Zones in line with *section 11* shall be in foreign currency.

Authorized activities that relate to port operations are warehousing, freight forwarding, handling of duty free goods (transshipment, sorting, bagging) and import of goods for special services listed as *items 2, 3 and 5 of the Third Schedule to the NEPZA Act.* The incentives granted under the NEPZA Act are in respect of customs duties/taxes and do not derogate from the powers of the NPA or its agents to charge for port services rendered by it to ships/cargo within the Zone in line with its function under the Ports Act.

Considering the fact that debt financing for the Ibom Project is going to be in foreign exchange, the operation of the NEPZA Act which allows payments for services in the Zone in foreign exchange is an incentive because it reduces the exchange rate risks of the Project.

Nigerian Investment Promotion Commission Act

Nigerian Investment Promotion Commission Act, Cap N.117, LFN 2004

The Nigerian Investment Promotion Commission Act established the Nigerian Investment Promotion Commission (NIPC) to encourage, promote, and coordinate investment promotion activities in Nigeria. *section 4 of the NIPC Act*.

It is interesting to note that the investment incentive packages provided by the Nigerian Investment Promotion Commission (NIPC) are negotiable. *section 22 of the NIPC Act.* However, this negotiation is done in consultation with appropriate Government agencies for the promotion of investments.

Incentives provided by NIPC include grant of pioneer status, reduced income tax rate, capital allowance, investment in infrastructure, etc.

Coastal and Inland Shipping (Cabotage) Act, 2003

The Coastal and Inland (Cabotage) Act (“the Cabotage Act) deals with the registration, regulation, operation/navigation of ships involved in coastal and inland trade in Nigeria. It prohibits participation by foreign ships in domestic coastal carriage of cargo and passengers in inland waters, territorial waters up to the limits of the Exclusive Economic Zone of Nigeria.

The scope of application of the Cabotage Act has no direct bearing on the Ibom Project. At the completion of the project, any ship involved in coastal and inland carriage of passengers and cargo that calls at the port would be liable to pay the applicable port dues and rates in line with the Ports Act, being the law governing port operations.

Land Use Act

Land Use Act Cap. L 5, LFN, 2004

The Land Use Act vests all lands in the territory of each state in the Federation in the Governor of the State to be held in trust for the common benefit of all Nigerians in accordance with the provisions of the Act. The Governor has the power under *section 5(1)(a)* to grant statutory right of occupancy to any person for all purposes.

*Section 36 (1) and (2)*recognize the rights of occupiers of land under customary law or otherwise howsoever held, prior to the commencement of the Act used for agricultural purposes, as deemed holders of customary rights of occupancy in respect of same. Such lands and other developed lands can be compulsorily acquired under *section 28(2) (b)* subject to the payment of compensation as required under *section 29(2) and (3).* This is in line with *section 44 of the Constitution of the Federal Republic of Nigeria, 1999* which allows compulsory acquisition of land for public purposes prescribed under any given law subject to payment of compensation.

Additionally, *the Ports Act* provides for the compulsory acquisition of land for purposes of port development under *section 24 thereof*. The Authority has power thereupon to deal with the land for the performance of its function under the Act.

The land on which the Ibom Project is to be constructed has already been acquired and a Certificate of Occupancy issued to the NPA in respect of it by the Governor of Akwa Ibom State in the exercise of his power under *section 5 of the Land Use Act* after complying with the law regarding payment of compensation to occupiers and holders of rights of occupancy in respect of same.

Environmental Impact Assessment Act

Environmental Impact Assessment Act, Cap. E 12, LFN, 2004

The Environmental Impact Assessment Act ("the EIA Act") prohibits the public or private sector of the Nigerian economy from undertaking or embarking on any projects or activities without prior consideration of its environmental effects at an early stage.

The EIA Act in *section 4,* prescribed the minimum matters that have to be taken into account in conducting an environmental impact assessment, among which are: a description of the effect, potential affected environment, specific information necessary to identify and assess the effect, measures to mitigate the adverse effects etc.

Section 12 made provision for "mandatory study activities" in the Schedule to the Act in respect of which the law requires environmental impact assessment. *Item 10 in the Schedule* is in respect of construction of ports and port expansion involving an increase of 50% or more in handling capacity per annum. Undertaking an EIA in respect of the Ibom Project is therefore mandatory.

In the event that the Ibom project requires debt financing from international finance institutions and Development Finance Institutions (DFIs), there is the additional requirement of a social impact assessment in line with the *equator principles* developed by the World Bank. Consequently, an Environmental and Social Impact Assessment (ESIA) on the project based on the requirements of the World Bank has to be undertaken in order to satisfy lenders and DFIs. This would also be necessary if the Ibom Project is to get political risk insurance coverage from the Multilateral Investment Guarantee Agency (MIGA) of the World Bank.

Procedure to be adopted in respect of the models suggested

Port Management Model

- Prioritizing of project by the Port Authority (which may involve including it on the mid -term development plan of the Authority in line with requirement of the National Planning Commission).
- Preparation of OBC and FBC.
- Obtaining Federal Executive Council (FEC) approval.
- Competitive bidding for the appointment of the Concessionaire under ICRC Act.

Where the NPA on behalf of the Federal Government is required to contribute funds for the construction works (which is above 35% of the Project cost) to directly co-fund the construction of the port whether in conjunction with Akwa Ibom State or the Concessionaire before concessioning it, then, the following procedure will apply to the bidding process for the Engineering, Procurement and Construction (EPC) contract:

- Making budgetary provision for the Project by NPA.
- Obtaining approval for the budget from the National Assembly.
- Preparation of tender documents.
- Competitive bidding under Procurement Act in accordance with section 15(1)(b) of the Procurement Act.
- Obtaining Ministerial Tenders Board and Federal Executive Council (FEC) approvals for the award of the construction contract to the preferred bidder.
- Award of contract/Construction works.
- Handing over of project and commencement of term of the Concession.

Structure of the Legal Assessment - Legal Framework

1. Legal Framework description

The objective is to undertake a general review of the Legal Framework for undertaking the project that will satisfy the requirement of the OBC.

Content:

- Structure of Port Ownership in Nigeria
- Nigerian Ports Authority Act
- Infrastructure Concession Regulatory Commission Act
- Public Procurement Act, 2007
- Public Enterprises (Privatization and Commercialization) Act
- Fiscal Responsibility Act, 2007
- Nigeria Export Processing Zones Act
- Nigerian Investment Promotion Commission Act
- Coastal and Inland Shipping (Cabotage) Act, 2003
- Land Use Act Cap
- Environmental Impact Assessment Act

2. Key Legal Items

The objective is to identify key characteristic issues that may interfere with the implementation of the proposed PPP Structure and whether any legal barrier exists in the proposed PPP model and the likelihood of a successful resolution of the barrier

Content:

- Jurisdiction and Authority of a public entity to enter into private sector contract
- NPA as the legally authorized and sole Grantor to the Concession
- Term of the Master Concession
- Ownership and control of infrastructure
- The PDMC as a legal entity
- The PDMC's right to grant Sub-concessions
- Tariffs and revenues
- Conflicts of interest in the PDMC structure
- Tax implications, incentives and Free Trade Zone (FTZ)
- Declaration of Ibom as Port Area
- Financial commitment and Sovereign Guarantee
- Conclusion

Key Legal Items: PDMC

Jurisdiction and Authority of a public entity to enter into private sector contract

The public entity (Nigerian Ports Authority - NPA) must have the legal capacity to enter into the concession with the PDMC. Any act that is *ultra vires,* that is, beyond the power of the party performing the act, may become unenforceable and subsequently rescinded or invalidated. In other words, if the public entity does not have the right to enter into a contract and sign the agreement, the PDMC shall be unable to enforce the contract or carry out its obligations.

Sections 8 (k) and (l) of the Ports Act expressly gives the NPA powers to enter into a contract with a private entity for the supply, construction, manufacture, maintenance, repairs or operation of any port facilities. The NPA also has the right or power to take part in the management, supervision or control of such private entity by reason of shareholding or otherwise. *See Section 7 (f) NPA Act.*

The power of the NPA to grant concessions is further enhanced under *Sections 1, 2 and 3 of the ICRC Act,* which empowers government agencies involved in the provision or management of any government infrastructure to granting concession in respect of same, ensuring that the “project proponent” possesses the financial capacity, expertise and experience in undertaking the required infrastructure development and/or maintenance.

Key Legal Items: PDMC

NPA as the legally authorized and sole Grantor to the Concession

Ownership of the land vests on the NPA in accordance with the provisions of the enabling laws – *Land Use Act and Ports Act.* The activities to be concessioned fall within the statutory powers of the NPA under *sections 7, 8 and 9 of the Ports Act.*

Note that all foreshore lands by virtue of the Ports Act vest in the NPA. NPA is therefore the sole grantor of the Master Concession.

Term of the Master Concession

The tenure of the MC depends on the recovery period of the loan as disclosed from the financial model. The MC can provide for expansion of the project area during the term of the MC if it becomes necessary due to increased demand for port capacity or becomes necessary for the commercial viability of the Project. The MC can also grant options to renew upon the expiration of the initial term of the MC whether on negotiated terms without public bidding or subject to competitive bidding process with the Concessionaire having the right of first refusal. The renewal could be on like terms (except for the option clause itself, rent, royalty and development plans) which are renegotiated.

Ownership and control of infrastructure

The land comprised in the project site would be covered by a different Certificate of Occupancy (C of O) granted directly to NPA and would ordinarily be for a period of 99 years. The current certificate is 45 years. The legal ownership of the land and port infrastructure (and reversion in the Project) remains with the NPA including common user facilities such as the channels and roads.

For the port to be viable, there is the need for hinterland connection by road. The responsibility for hinterland connection is that for the governmental authority responsible for the particular road. The major road leading to the port is under the jurisdiction of Akwa Ibom State Government. There is therefor the need to obtain assurances for its construction from the Akwa Ibom State Government or an arrangement could be reached whereby the Federal Government would take over construction of the road. Alternatively, the PDMC is granted the right to construct and toll it.

Based on the model to be adopted, the Concessionaire will have the right of economic exploitation of the project and ownership of the equipment which may be acquired by the NPA upon expiration of the term at fair market value. The responsibility of maintenance during the term also rests with the Concessionaire.

Key Legal Items: PDMC

The PDMC as a legal entity

The Promoters of the Project that is, NPA and Akwa Ibom State will form a Special Purpose Vehicle (SPV) by incorporating the PDMC to develop and implement the Ibom Project. To become a legal entity, the PDMC will be registered as a Private Limited Liability Company under the provisions of *the Companies and Allied Matters Act*. It will be an entity with a personality different from NPA and Akwa Ibom State.

The Promoters will Request for Proposals (RfP) from the public for the grant of a concession to undertake the Project with the private party taking up equity participation of 60% in the PDMC. It should be persons with financial capacity and expertise in port management. A Shareholders Agreement will be executed between the Parties based on the terms of the Master Concession.

Alternatively, NPA and Akwa Ibom could request for proposals from private sector entities (whether an individual company or a consortium) for the award of a concession with the condition that it would form/incorporate a Special Purpose Vehicle (SPV) in which shares would be allotted to NPA and Akwa Ibom State in percentages that are predetermined on commercial terms.

The NPA and Akwa Ibom State are legally allowed to hold separate minority shares on commercial terms at start up. The minority shareholding presence of the Federal and State Government in the PDMC still allows the PDMC to act as a fully private entity subject only to the terms and conditions of the Master Concession. No Government control can be forced upon the PDMC other than through its normal shareholding rights.

Key Legal Items: PDMC

The PDMC's right to grant sub-concessions

Although *the Ports Act* gave the NPA powers to carry out its functions through an authorized agent, however, certain activities cannot be sub concessioned such as the power to make regulation, environmental protection, responsible for provision of marine services, security, nautical/admiralty chart production, pilotage/licensing of pilots and provision of aids to navigation. Generally, services to vessels are not concessioned. Although NPA is also responsible for maintenance dredging during the term of the concession, it is advocated that the responsibility should be concessioned to the Special Purpose Vehicle in order to ensure seamless operation of the port. This would remove any possible mismatch in the procurement of dredging services that could have negative impact on port performance.

It is good practice for the Master Concession to indicate the right of the PDMC to grant sub concession. The sub concession will mirror the terms of the master concession and must not go outside it. Nigeria operates common law which allows freedom of contract provided the activity is not illegal or prohibited by law.

A sub concessionaire may own shares in the PDMC (sometimes as the technical partner) as a precondition for being appointed operator. The PDMC reserves the right to select sub concessionaires under its terms and conditions provided it is not contrary to law or the Master Concession.

On whether the sub concession ends upon termination of the Master Concession would depend on the terms of the Master Concession. To address the issue, the Master Concession can provide that where termination is due to default under financing documents by the Concessionaire without the default or privity of the sub concessionaire, the banks would step in and take the place of Concessionaire and allow the sub concessionaires to continue to operate. In this regards, the Master Concession would provide that sub concessionaires should enter into a Direct Agreement with NPA (Grantor) as co-signor at the time of their appointment by the Concessionaire granting them security of tenure if they are not responsible for the events of default resulting in the termination of the Master Concession. Where default of the Concessionaire is triggered by default of sub concessionaire, termination may affect them both.

Key Legal Items: PDMC

Tariffs and revenues

The NPA sets tariffs by law subject to approval by the Ministry of Transport. *(Sections 56 – 79 of the Ports Act)*
It sets the maximum limit subject to adjustment annually based on Consumer Price Index Unit (CPIU) published by CBN annually. The CPIU is circulated to Concessionaires who may adjust tariff within those limits if they wish.

Port revenues go to an Escrow Account and priority in ranking in disbursement is usually set out by the terms of lending under the financing contracts with banks.

Conflicts of interest in the PDMC structure

In the recommended model, conflicts of interests are foreseen. The Government (NPA) is the grantor and shareholder at the same time. Misaligned incentives may arise as the Government is playing different roles at different sides of the transaction. The obligations of the Shareholder grantor and shareholder investor/contractor should be well specified in the Shareholders Agreement.

On the other hand, there may be a possibility for a shareholder of the PDMC becoming a sub concessionaire. Sometimes an operator may be required to have share qualification as a precondition for the grant of a sub concession. Having shares in the PDMC as an operator may be an incentive for performance because there is a sense of ownership both ways and the sub concessionaire would be interested in how the PDMC is operated. It is only when the regulatory agency like NPA has shares in the sub concessionaire that the conflict of interest would be real in view of the role of NPA to check excesses of the private sector.

Key Legal Items: PDMC

Tax implications, incentives and Free Trade Zone (FTZ)

All approved enterprise operating within an approved export processing zone shall be exempted from all Federal, State and Government taxes, levies and rates. See *section 8 of the NEPZA Act.* The activities to be undertaken in the free trade zone are manufacturing, warehousing, sorting of goods for export, facilities for berthing are the subject of licensing/tax incentives. Port operations whether or not in the Free Trade Zone are licensed by the NPA.

Approved enterprises within the FTZ shall be entitled to incentives pertaining to taxes, duties foreign exchange, repatriation of foreign capital investment, remittance of profits and dividends earned, no import or export licenses, sale of up to 25% of production within the zone, rent free land at construction stage, up to 100% foreign ownership of business allowable, employment of foreign managers and qualified personnel (*section 18 of the NEPZA Act).*

For the purposes of promoting identified strategic or major investments, the Nigerian Investment Promotion Commission (NIPC) shall, in consultation with appropriate Government agencies, negotiate specific incentive packages for the promotion of investments. *Section 22 of the NIPC Act*

The PDMC, being a company incorporated under CAMA is liable for its tax obligations under Companies Income Tax Act, Cap C21, LFN, 2004. The PDMC may apply to NIPC for incentives under the applicable laws if it can meet the conditions under that law.

Key Legal Items: PDMC

Declaration of Ibom as port area

The right to declare any place or a navigational channel in Nigeria lies with the Minister of Transport. Once the Minister declares an area or navigational channel, a port, this information is published in an official gazette. No approval of the National Assembly or process is required before this publication. This is because the right of the Minister to make this declaration is statutorily provided for in *section 30 (1) of the Ports Act.*

Financial commitment and sovereign guarantee

No Ministry, Agency, Corporation or body shall give any guarantee, letter of comfort or undertaking in respect of any Concession Agreement except with the approval of the Federal Executive Council. *Section 3 of the ICRC Act*

If the Federal Government is to issue a guarantee for Akwa Ibom State, it would have to issue a counter guarantee to the Federal Government whether by way of Irrevocable Payment Order (IPO) or Irrevocable Standing Payment Orders (ISPO) by which the Federal Government would be authorized by Akwa Ibom State through a written instrument to withhold its share of the revenues coming from the Federal Government (Federation Account) to fund its obligations to the PDMC. The guarantee would be limited to the monies due and payable to Akwa Ibom State.

A Guarantee in respect of the financial obligations or liabilities of the NPA will be undertaken by the Federal Ministry of Finance. The Federal Government may have a Counter Guarantee in the form of a Sinking Fund where port revenues and other revenues of NPA from other sources are contributed towards meeting any default warranting a call on the Sovereign Guarantee.

Section 25 (1) of the NIPC Act guarantees that no enterprise shall be nationalized or expropriated by the Government of the Federal Republic of Nigeria except for national interest or for a public purpose. A fair and adequate compensation shall be paid without undue delay and repatriation in convertible currency shall, where applicable be issued.

For purposes of obtaining political risk insurance against expropriation recognised under section 25(1) of the NIPC Act, a framework for the issuance of a guarantee to the project may be necessary.

Key Legal Items: PDMC - Conclusions

Conclusion

Nigeria has created a suitable legal environment that encourages the recommended PPP model (PDMC) and permits a procurement process consistent with best practices. With the enactment of the ICRC Act and other enabling legislation, sufficient legal framework has been provided for PPP Projects in Nigeria. The Ports Act allows NPA to invest in businesses and also form companies. *Section 9 of the Act*

Since the land is going to be held by NPA and there is provision under *section 25* for granting leases in respect of it for periods beyond 5 (five) years, NPA shall seek the requisite approval under section *25(1)* for alienation of the property beyond five years.

Consequently, there is sufficient legal environment for the actualization of the Ibom Project and also, no significant legal barrier that may impede the implementation of the project model.

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs

maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

FINANCIAL DUE DILIGENCE

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Financial Due Diligence
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Contents

Project Initiators:

Transaction Advisors:

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

FINANCIAL FEASIBILITY

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

Project Initiators:

Transaction Advisors:

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Document Title	Outline Business Case
	Financial Feasibility
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Preface

Source: ICRC PPP Manual for Nigeria

It is essential to establish the financial viability of the project through a Financial (Pre) Feasibility Study with respect to the costs involved and the revenue potential, especially if the project will be developed as a PPP, as return on investment is the private sector's main motive for doing the project.

The first step is obviously to estimate the project's cost. Secondly, project revenues need to be estimated. Project revenues represent the income that is generated from the provision of services to the users. These could be in the form of user charges levied, fare or toll revenue, revenue from ancillary sources like sale of carbon credits, provision of advertising rights etc. Project revenues may also include direct payments from the government authority in the form of Government Funding Support.

The revenue sources for various sectors could vary from one sector to another and are often dependent on tariffs that are regulated. A key component to estimating revenues is to understand the price that can be charged, and the willingness to pay for the service. Therefore, a detailed analysis of the tariff setting process is required. Furthermore, demand analysis and, in many cases, a willingness to pay assessment is required following surveys of potential users. For many transport projects a traffic model will need to be made incorporating the results of comprehensive traffic surveys of journeys, alternative routes and modes, and price elasticity.

In compliance with ICRC's PPP Manual for Nigeria, this Financial Feasibility Report describes the methodology, key-assumptions and outcomes of the Financial Modelling exercise. Thereby, the financial feasibility of the Ibom DSP Project is demonstrated. For a detailed overview of the Financial Model's structure, inputs and assumptions reference is made to the Financial Modelling Report of this Financial Due Diligence. Risk analyses, sensitivities and the need for Government Funding Support are covered in subsequent parts of this Financial Due Diligence.

An extensive description of the inputs and assumptions used in the model is provided in section D-2 Financial Modelling. The same applies for the sensitivity analysis: this is covered in section D-3 Financial Sensitivity. The Affordability and Value-for-Money analysis is covered in section D4 concise introduction in the model's structure is presented in this document, along with the financial feasibility's methodology. The outcome of the financial analyses is the main content of this report.

Summary 1/7: Feasibility Individual Activities

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The Net Present Value of the Concessionaire is the cumulative NPV of all underlying entities, including the terminals, the FTZ, the road and the port management (PDMC). The nautical services are excluded as these functions are not ceded to the PDMC.

4	**IBOM DSP PROJECT**	**1,255M**	**viable with substantial returns**
5	CONCESSIONAIRE – PDMC	1,042	viable with substantial returns
1A	CONTAINER TERMINAL	817M	viable with substantial returns
1B	BREAKBULK/RORO TERMINAL	17M	viable with modest returns
1C	PETROLEUM PRODUCTS TERMINAL	625M	viable with substantial returns
1D	OFFSHORE SUPPLY BASE	74M	viable with modest returns
1E	DRY BULK TERMINAL	0.5M	viability depending on committed volumes and rail link
1F	FTZ MANAGEMENT	155M	viable with substantial returns
1G	TOLL ROAD MANAGEMENT	0M	viable without excess returns
2	PORT MANAGEMENT	-649M	not viable with only port dues
6	CONCESSION GRANTOR – NPA		
3	NAUTICAL SERVICES	213M	viable with substantial returns

Summary 2/7: Project Viability

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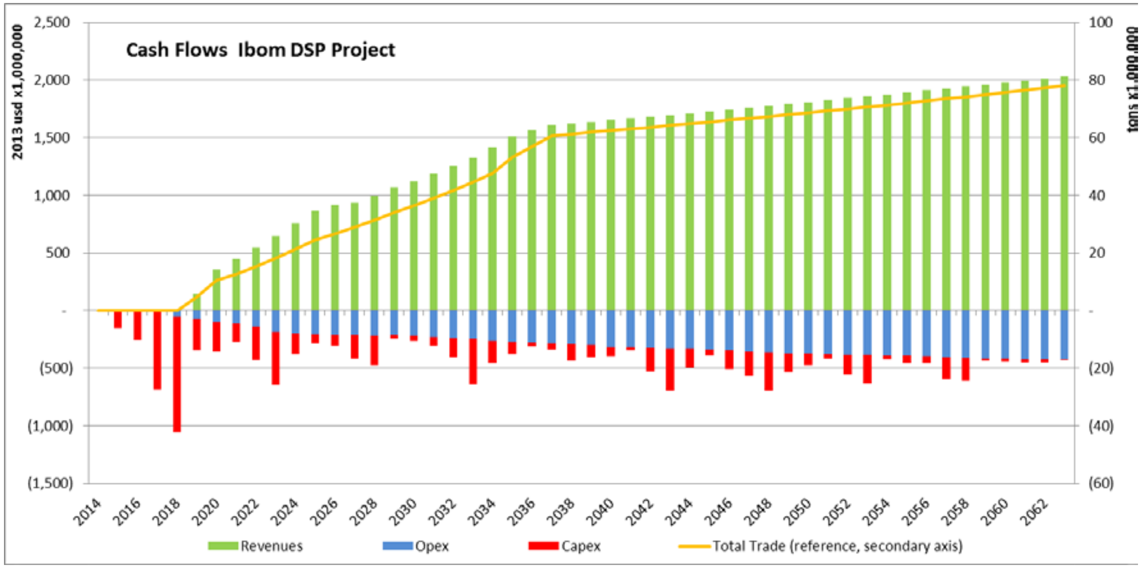
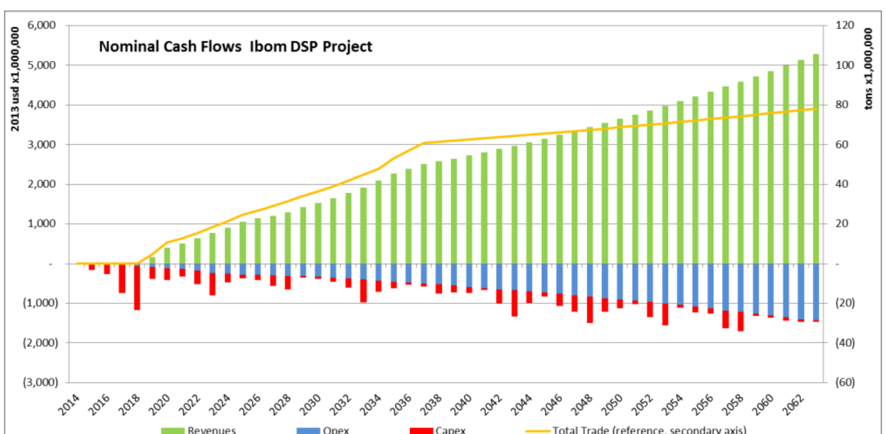
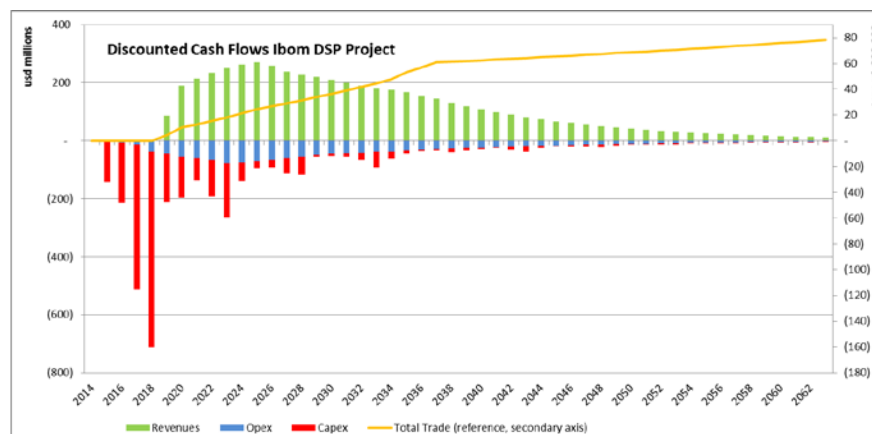
The Ibom DSP Project, covering all public and private activities, is viable, having an Internal Rate of Return of 16.9% and a Net Present Value in excess of 1.2B USD (using blended Weighted Average Cost of Capital of 13.02%.



Investments - Ibom DSP Project - USD 2013		
Phase1 Capex Operators	652,451,040	USD
Phase1 Capex NPA	18,026,250	USD
Phase 1 Capex PDMC Common Infra	1,089,876,749	USD
Total Phase 1 Capex	**1,760,354,039**	**USD**
Additional first 10y Capex Operators	1,379,178,705	USD
Additional first 10y Capex NPA	18,026,250	USD
Additional first 10y Capex PDMC Common Infra	887,273,612	USD
Additional first 10y Capex	**2,284,478,567**	**USD**

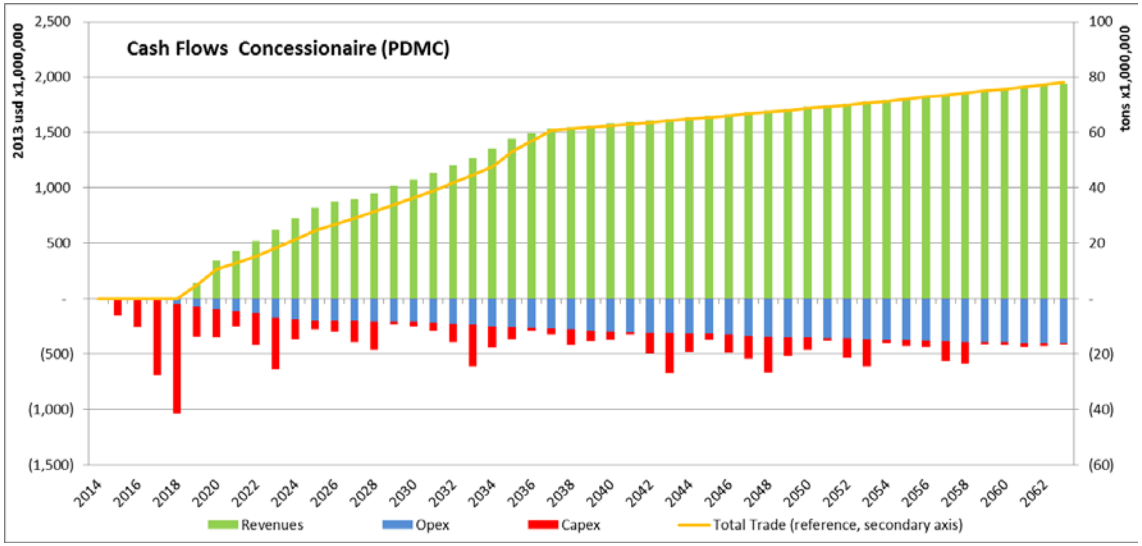
Business Case - Ibom DSP Project - Feasibility PDMC		
Project IRR	**16.89%**	**%**
Project NPV	**1,255,274,639**	**USD**
WACC	**13.02%**	**%**
Payback Period	**13.9**	**years**





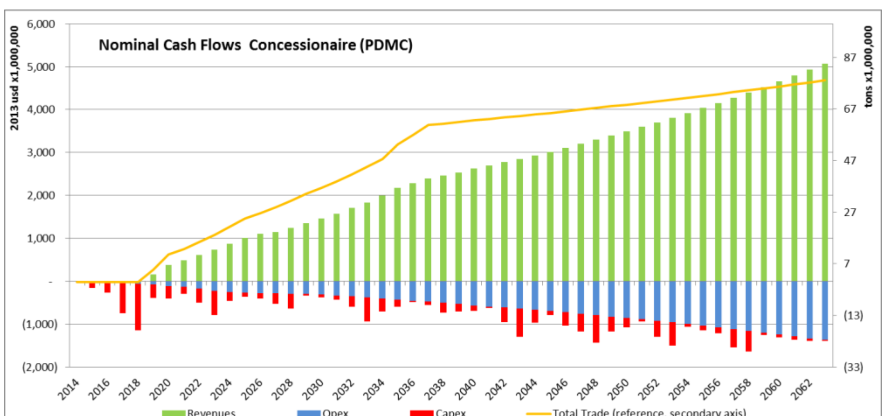
Summary 3/7: Concessionaire Viability

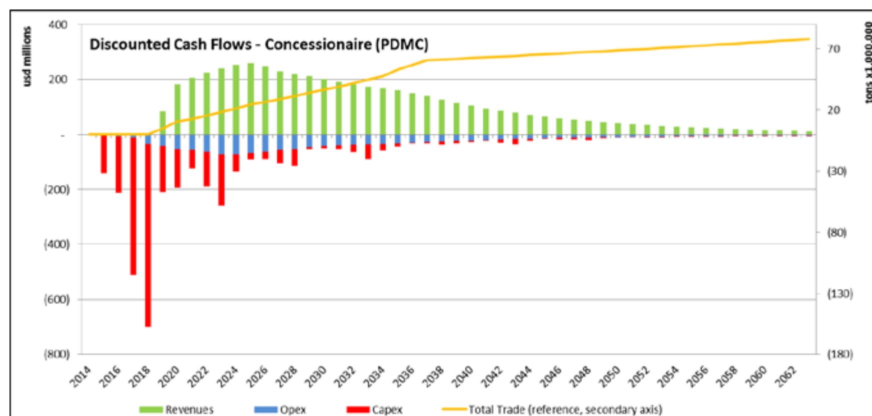
The Concessionaire (PDMC), covering all public activities, is viable, having an Internal Rate of Return of 18.4% and a Net Present Value in excess of 1.0B USD (using blended Weighted Average Cost of Capital of 13.20%. Considering the overall feasibility of the Concessionaire, concession payments may be established between the Concessionaire and the Concession Grantor (NPA).



Investments - Concessionaire - USD 2013		
Phase1 Capex Operators	652,451,040	USD
Phase 1 Capex PDMC Common Infra	1,089,876,749	**USD**
Total Phase 1 Capex	**1,742,327,789**	**USD**
Additional first 10y Capex Operators	1,379,178,705	USD
Additional first 10y Capex PDMC Common Infra	887,273,612	**USD**
Additional first 10y Capex	**2,266,452,317**	**USD**

Business Case - Concessionaire - Feasibility PDMC		
Project IRR	**18.36%**	**%**
Project NPV	**1,042,113,219**	**USD**
WACC	**13.20%**	**%**
Payback Period	**13.1**	**years**





Summary 4/7: Government Funding Support for the Ibom DSP Project

The project's viability from a commercial perspective is proven in the financial analysis. However, from a lender's perspective, the project needs to be "bankable", implying: a focus on Phase 1 and a conservative approach towards tariffs. Project viability can be further strengthened through Government Funding Support (GFS) by the public sector, positively impacting the project's bankability.

Government Funding Support

Government Funding Support (GFS) is a means for the Government to improve critical project characteristics to ensure private involvement in the project and therewith enable the Public-Private Partnership (PPP). In case of the Ibom DSP Project, it is expected that GFS is required to ensure project bankability for the PDMC. Besides, GFS is considered a means to enable the committed 20/20/60 (federal/state/private) project funding structure.

Government Funding Support can be provided in various structures and by various public entities.

Available structures include non-refundable grants, re-fundable grants, (soft) loans and regular loans. For the Ibom DSP Project, it is assumed that GFS shall be in the form of a soft loan. Reasons for this is that a regular loan from the government (on regular commercial terms) would not materially improve bankability from banker's perspective and that (non-refundable or refundable) grant funding is not required due to the positive medium to long term outlook for the project. A soft loan would provide necessary 'seed-funding' for the PDMC and the soft terms are justified by the economic value which is generated by the project.

In the Ibom DSP Project, it is assumed that GFS shall be provided by the Federal Ministry of Finance of Nigeria. As the primary public entities in the project, the NPA (Concession Grantor) and the Akwa Ibom State Government (Concession Co-Signatory) are expected to inject 20% equity in the project.

Other public bodies may be involved in the provision of the GFS. This includes the Petroleum Trust Fund (and its successors) or the National Sovereign Investment Agency (NSIA; possibly in combination with the IFC/WorldBank).

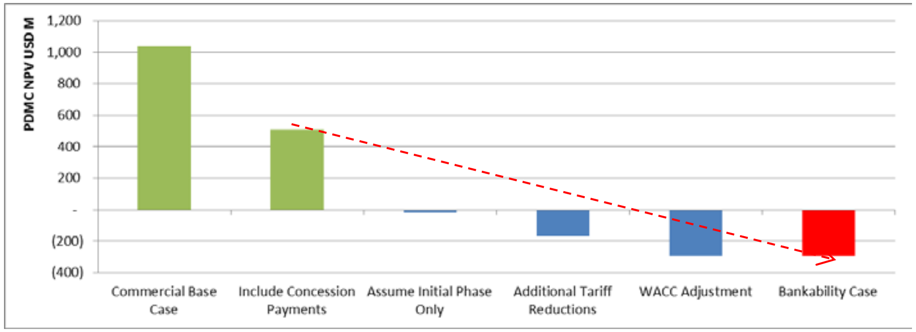
Summary 5/7: Government Funding Support for the Ibom DSP Project

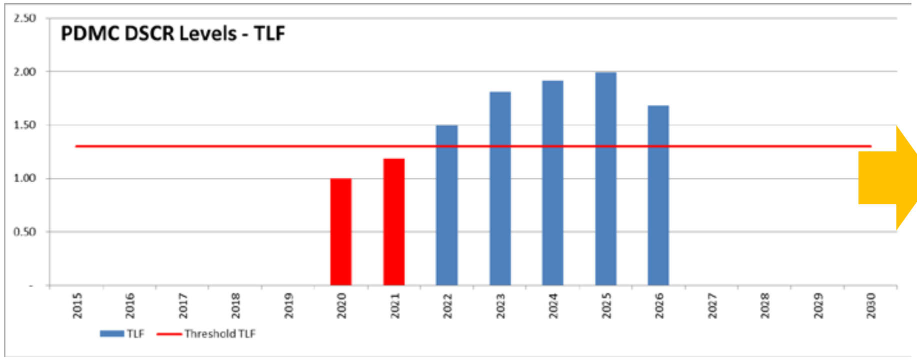
The need for Government Funding Support is justified by assessing the effects on the PDMCs Net Present Value (NPV), Debt Service Cover Ratio (DSCR) and its expected Return on Equity (RoE)

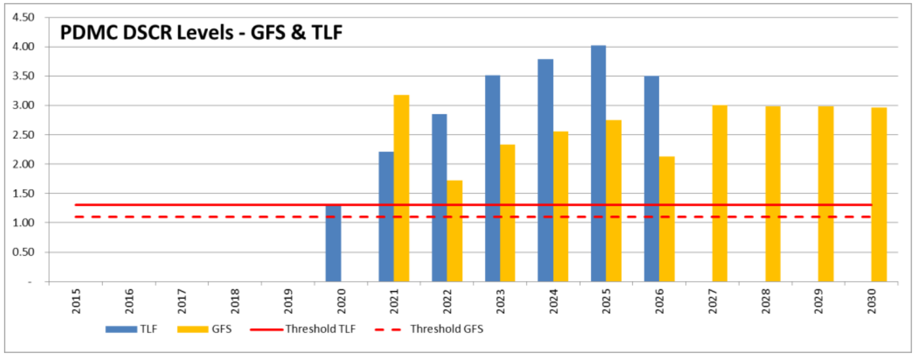
The picture on the right depicts the deterioration of PDMC NPV when considering the project from lenders' perspective. It shows the need for GFS.

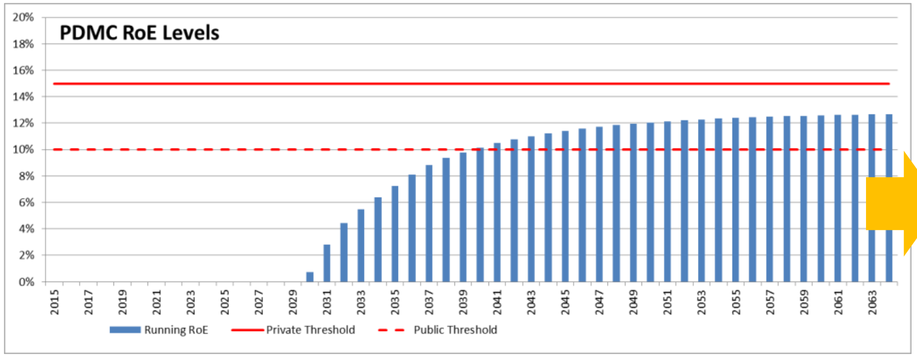
The graphs below show the positive effects of GFS on critical funding drivers: DSCR (lenders) and RoE (investors)

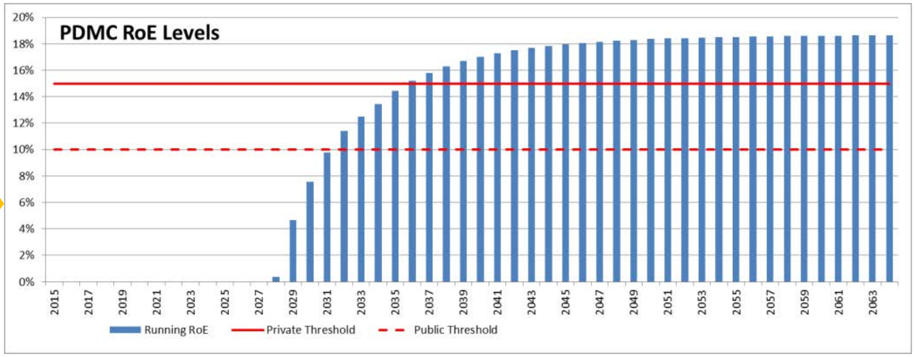
Government Funding Support (GFS) is further assessed in the Outline Business Case, section D1: Financial Feasibility









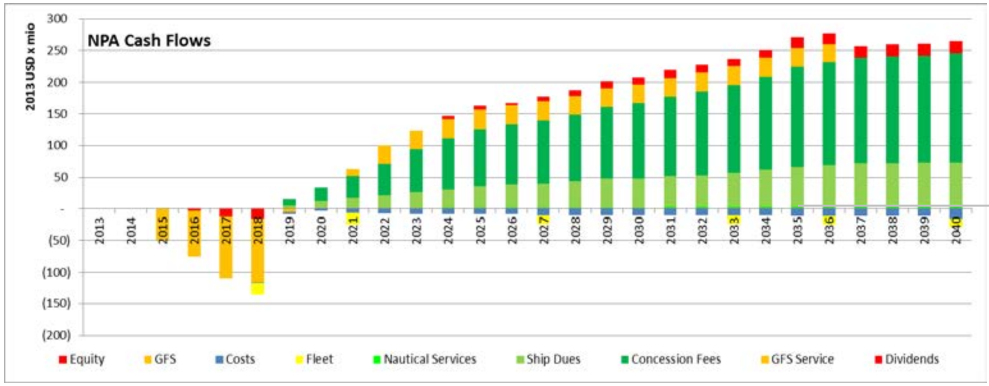


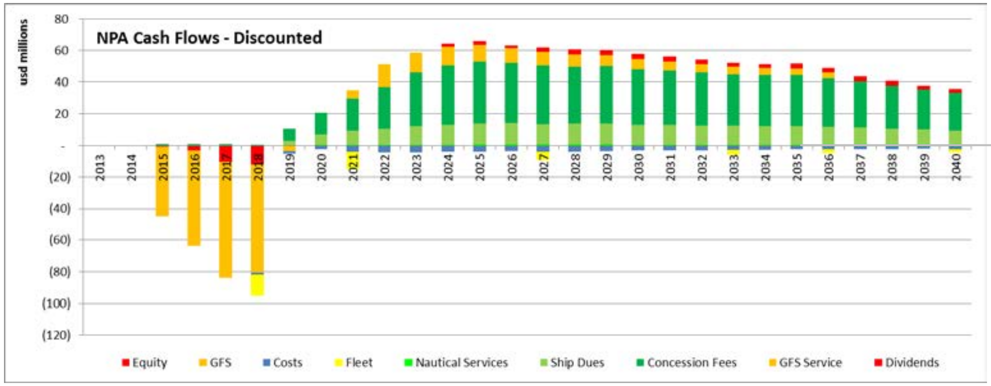
Summary 6/7: Concession Grantor Viability

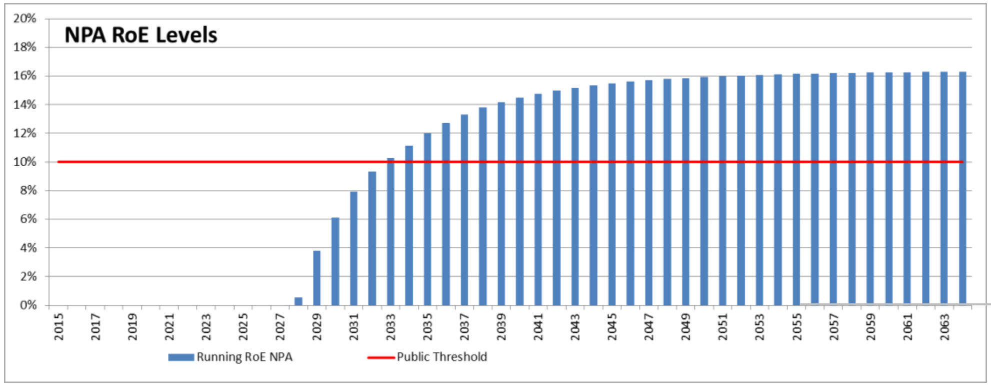
The NPA, covering its limited responsibilities as stipulated in the Concession Agreement, is financially feasible.

Business Case - NPA - Total NPA Cash Flows			
	Including GFS	Excluding GFS	
Project IRR	**12.65%**	**15.97%**	**%**
Project NPV	**1,082,664,911**	**1,210,315,656**	**USD**
WACC	**10.00%**	**10.00%**	**%**
	NPA	Private Investor	
Equity IRR	**16.29%**	**18.78%**	**%**

1. **Equity Injections + Dividends**: Both NPA and the State shall inject equity in the PDMC (20% each; parallel to the 60% of the private investor) and each shall receive their share of the dividends, once available.
2. **GFS Injections + GFS Service**: The Federal Ministry of Finance of Nigeria shall provide Government Funding Support (GFS) to the PDMC to ensure bankability. It is assumed that GFS for this project is structured as a soft loan, so GFS Service shall constitute of repayments and interest.
3. **Fleet Investments**: NPA shall not cede the responsibilities for nautical services and shall therefore invest in the fleet. Over time, the fleet shall be expanded and replaced by the NPA
4. **Operational Costs**: NPA incurs costs for provision of nautical services, including the Harbour Master tasks
5. **Ship Dues**: NPA receives ship dues for towage and mooring (fixed component of the ship dues) and for pilotage and the Harbour Master tasks (share of the variable component of the ship dues (other share for PDMC for channel development/maintenance and waste management) .
6. **Concession Fees**: As Concession Grantor, the NPA shall receive Concession Payments, which are structured as fixed landlease payments and royalty payments (revenue share)







Summary 7/7: Akwa Ibom State Government Viability

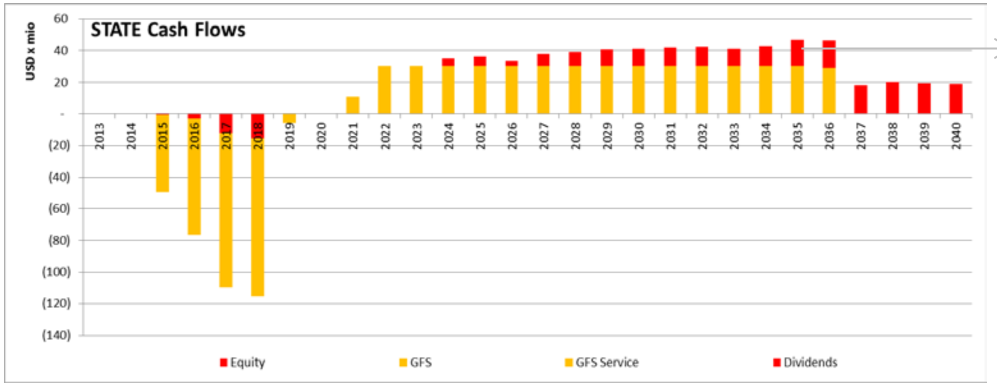
The NPA, covering its limited responsibilities as stipulated in the Concession Agreement, is financially feasible.

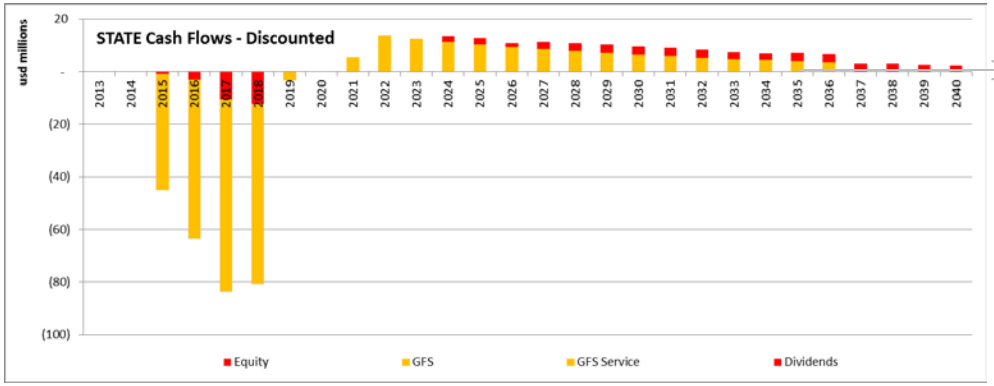
Business Case - STATE - Total STATE Cash Flows			
	Including GFS	Excluding GFS	
Project IRR	**9.45%**	**11.78%**	**%**
Project NPV	**(77,573,458)**	**50,077,287**	**USD**
WACC	**10.00%**	**10.00%**	**%**
	STATE	Private Investor	
Equity IRR	**16.29%**	**18.78%**	**%**

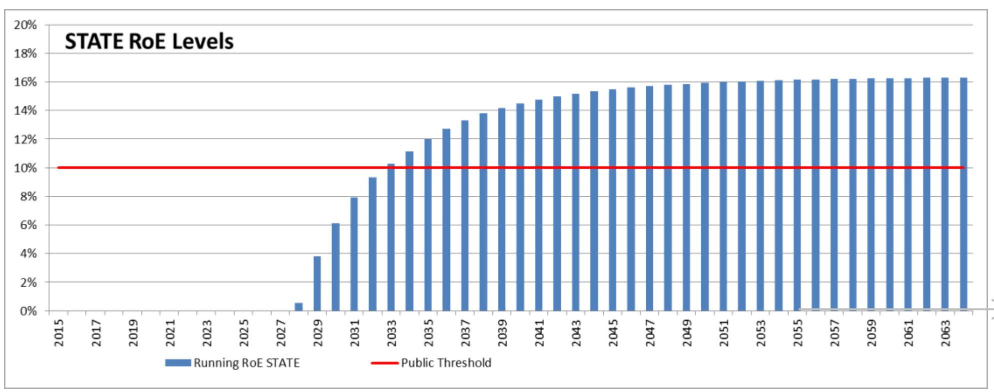
1. **Equity Injections + Dividends**: Both NPA and the State shall inject equity in the PDMC (20% each; parallel to the 60% of the private investor) and each shall receive their share of the dividends, once available.
2. **GFS Injections + GFS Service**: The Federal Ministry of Finance shall provide part of the Government Funding Support (GFS) to the PDMC to ensure bankability. It is assumed that GFS for this project is structured as a soft loan, so GFS Service shall constitute of repayments and interest.

Positive or negative NPV levels depend on the state's equity contribution. A Concession sharing system with the NPA may be considered to close any NPV gaps.

The NPA and State can expect a 18.7% equity return on their 20% participation in the PDMC. This level is in excess to the assumed public threshold of 10%. It is slightly lower than the private returns since some dilution is expected from additional private equity injections to fund early expansions (no additional public capital needed after initial phase).







Contents

Contents

Introduction – Structure – **Analysis**

Project viability is explored on various levels: Business Unit-level; Total Project-level, Concessionaire-level, and Concession Grantor-level

The business case model for Ibom DSP is structured in 6levels:

1. The various **Private Operational Business Units** within the PDMC. These individual operational business units cover the individual operational responsibilities which are ceded to the PDMC as stipulated in the Concession Agreement. This includes the port terminals; the FTZ management organisation and the toll road management organisation. These private operational business units operate under the mandate of the PDMC and as such, they may be structured as sub-concessions under the PDMC. This level of analysis shows the viability and performance of individual operational activities.

2. The **Port Management Business Unit** within the PDMC. This covers the non-operational responsibilities of the PDMC and relates to the development of the common-user infrastructure; the management of the project and the port dues which accrue to the PDMC to cover these responsibilities.

3. The **Public Operational Business Unit**. This covers the operational responsibilities which are retained by the NPA as stipulated in the Concession Agreement. This relates to the Nautical Services and the Ship Dues which (partly) relate to these activities.

4. The **Ibom DSP Project**, covering all business units of the project, including the Private Operational Business Units, the Port Management Business Unit, and the Public Operational Business Unit. This level shows the overall viability of the Ibom DSP Project, but it does not cover the concession payments between the Concessionaire (PDMC) and the Concession Grantor (NPA)

5. The **Concessionaire (PDMC)**, covering all project responsibilities which are ceded to the PDMC as stipulated in the Concession Agreement. This level shows the overall viability of the Concessionaire. On this level the possibilities for establishing concession payments to the Concession Grantor (NPA) can be explored. At a later stage in this Financial Feasibility Report, this level is also used to test PDMC bankability and to explore the need for Government Funding Support for the PDMC.

6. The **Concession Grantor (NPA)**, covering all public project responsibilities including the Public Operational Business Unit and any concession payments from the Concessionaire (PDMC) to the Concession Grantor (NPA).

Introduction – Structure – **Analysis**

Figure 1.1 – Structure of the Business Case Analysis

Each underlying business unit is separately investigated since each business unit has an individual impact on the overall project feasibility and, where it concerns responsibilities ceded to the Concessionaire (PDMC), on the feasibility of the PDMC. Following this rationale, each individual business unit provides (or absorbs) a certain part of the value (NPV) of the Project, of the Concessionaire and/or of the Concession Grantor.

Variations in value (NPV) amongst business units are caused by variations in cash flows due to differences in operational drivers amongst business units (traffic, investments, tariffs and operational expenses) and by variations in discount factors (WACCs) due to differences in risk profiles.

Introduction – Structure – **Business Case Model**

The components of the financial model are:

- Model inputs:
  - Assumptions: CAPEX, OPEX, NPA Tariffs, concession payments, indexation, exchange rates, taxation, etc.
  - Traffic forecasts: for cargo handling, cargo storage, vessel calls, FTZ land use, OSB land use, Road use, etc.

- Calculation blocks:
  - CAPEX: establishing the required investments over time based on traffic forecasts and unit prices
  - OPEX: establishing the expected operational expenses over time based on traffic forecasts, investments, wages and OPEX percentages for maintenance and insurance
  - Revenues: calculating the expected revenues based on traffic forecasts and applicable tariffs and tariff policy

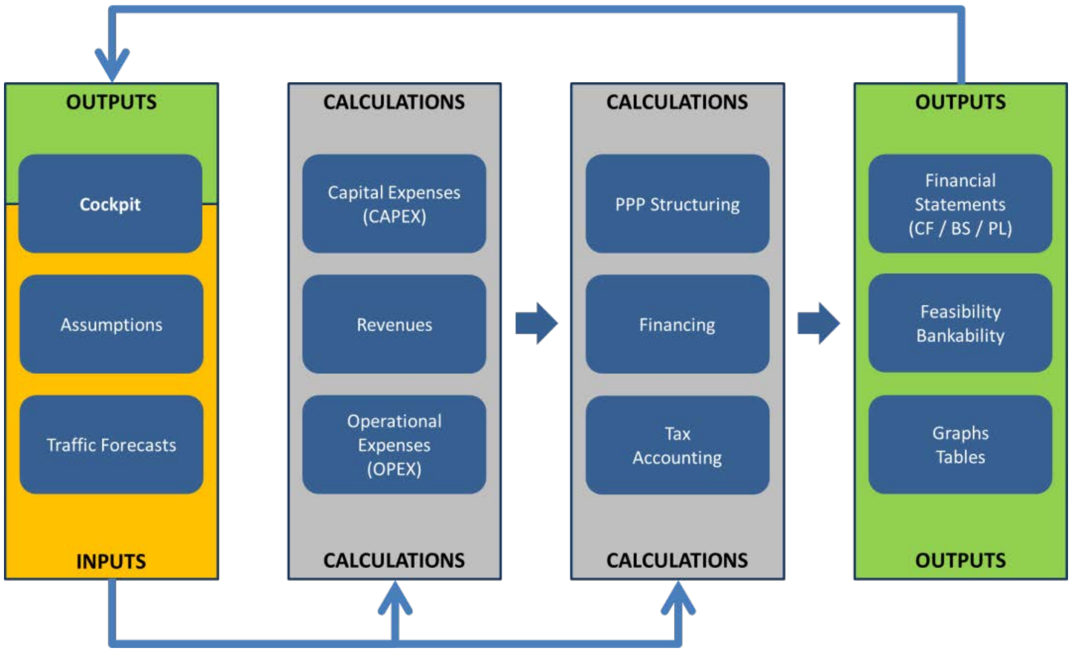


Figure 1.2 – Structure of the Business Case Model

- Model outputs:
  - Financial Statements:
    - Cash Flow Statements for Operational Business Units, Project, PDMC and NPA;
    - Balance Sheets and Profit & Loss for PDMC
  - Feasibility: assessing the project's primary financial output
  - Bankability: assessing the PDMC's secondary financial output
  - Graphs & Tables: present the model's outcomes in a structured and clear manner
  - Benchmarking: provide financial & operational outputs for reference and monitoring
  - Cockpits that use a customer-friendly for non-expert modellers to work with access to primary inputs and outputs.

Introduction – Methodology – **Indicators for Financial Feasibility**

Net Present Value, Internal Rate of Return & Payback Period

The objective of this report is to assess the financial viability of the Ibom DSP Project through a Financial Feasibility Study with respect to the expected cash flows for the operational business units, for the entire project; and for the PDMC itself.

The key figures that represent the project's financial viability are:

- Net Present Value

  The Net Present Value (NPV) of the various components of the Ibom DSP Project is considered as the main indicator that stipulates the financial feasiblity of the project: this value should be positive to label the project as being 'financially feasible'. The NPV consists of the sum of the present values of all the cash flows in the project. These present values are based on a discount rate that corrects the cash flows for the time period that the project is analysed: the Weighted Average Cost of Capital (WACC). In case the NPV is negative, measures could be taken to improve the value of the investment, e.g. through phasing of investments, improvement of revenue generation or through external financial support in the investments (i.e. Government Funding Support). NPV is calculated per 2015 as Financial Close for the project is expected in this period.

- Internal Rate of Return

  The Internal Rate of Return (IRR) is the rate at which the net present value of costs or negative cash-flows is equal to the net present value of positive cash-flows or benefits; the higher the IRR, the more desirable it is to undertake the project. The internal rate of return is a rate quantity which indicates the efficiency, quality or yield of an investment. This is contrary to the NPV, which is an indicator of the value or magnitude of an investment.

- Payback Period

  The payback period for the terminal operators and the PDMC provides insight in the time that is required to recover the cost of an investment. It is an important determinant for investors on their investment decision: longer pay-back periods are less desirable for investors.

These key figures are established in the financial model based on the free cash flow calculations that follow from business cases of the individual operational business un, the entire project; and the PDMC. .

Introduction – Methodology – **Other Indicators**

Financial indicators per unit of cargo, free cash flows in first years of operation & initial CAPEX estimates

Besides the three major financial indicators, secondary indicators are used to assess the project's financial feasibility and to enable comparisons to international port benchmark figures.

- Initial CAPEX estimates

The initial CAPEX estimates for the project provide insight in the required funding for the initial phase of the project until operations start.

- Free cash flows in the first years of operation

The free cash flows in the first years of a terminal's operation provide insight in the terminal's ability to recover from the (generally) high investments that are made prior to its operations.

- Revenue and OPEX per unit of cargo

Revenues and OPEX' per unit of cargo are calculated for the terminal operators for benchmarking purposes.

Introduction – Methodology – **Financial Modelling**

Business case modelling based on primary project cash flows in order to calculate free cash flows

The business case model that is used to determine the financial feasibility of the project is based on the following elements:

- CAPEX, or capital expenses that are investments in assets in the project.
- OPEX, or operational expenses that are costs for running the project.
- Revenues that are the incomes received from the business activities in the project.
- Concession Payment as established between Concessionaire (PDMC) and Concession Grantor (NPA)

These elements form the foundation of the financial feasibility of the Ibom Deep Sea Port and Free Trade Zone. Following financial feasibility, bankability of the project is explored on the same basis. The financial model that is constructed is based on these elements renders project cash flows, internal rates of return, net present values and payback periods for the following components of the project:

- Business Units:
  - Containers
  - RoRo & Breakbulk
  - Petroleum Products
  - Dry Bulk
  - Offshore Supply Base
  - FTZ Land Management
  - Toll Road Management
  - Port Management
  - Nautical Services (NPA)
- Ibom Deep Sea Port Project
- Concessionaire (PDMC)
- Concession Grantor (NPA)

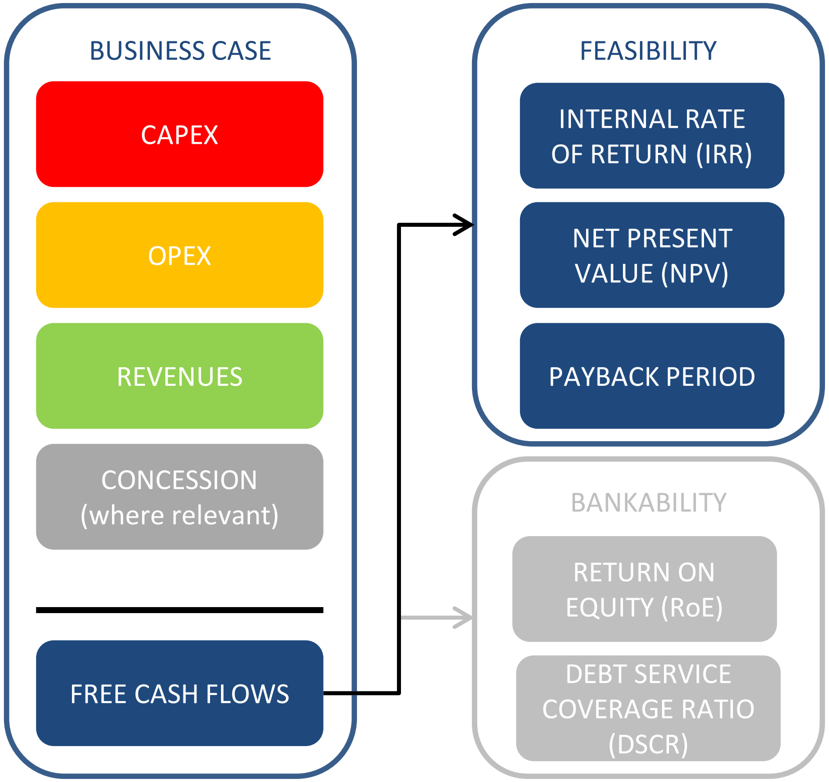


Figure 1.3 – Modelling: Inputs to Outputs

Introduction – **General Assumptions**

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Assumptions used in the financial model for: investment allocation, WACC & revenues

The assumptions used in the financial model are described in detail in the Financial Modelling report (D2). The most important assumptions for the financial model are described in this section of the Financial Feasibility Report.

The following assumptions are described on the next pages:

- Investment Allocation: describing the total initial investments for the first phase of the port's development and the allocation of these investments amongst PPP partners.
- Traffic Forecasts: elaborating on the expected trade in the port
- Revenue Allocation: describing the assumptions for the project revenues
- Weighted Average Cost of Capital: the assumptions for the calculated WACCs for the various project entities are described
- General Assumptions on Inflation, ramp-ups, pricing and tariff erosion.

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Introduction – General Assumptions – **Investments**

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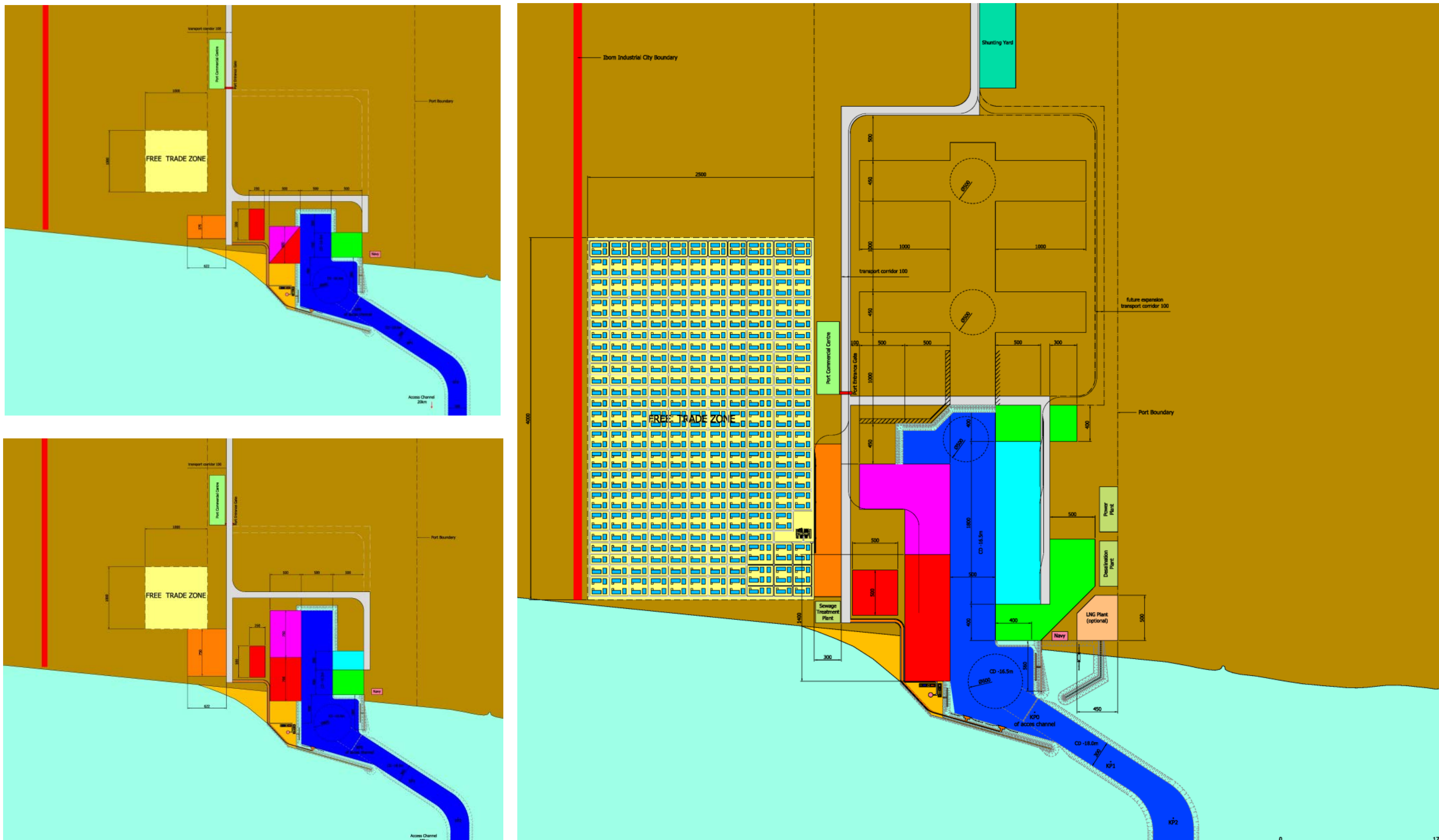
The Ibom DSP Project Covers the phased development of a Deep Sea Port and adjacent Free Trade Zone in Akwa Ibom State, Nigeria.

Reference designs for Minimal First Phase Development (top left); Maximum First Phase (bottom left); and Master Plan 2035 (right)



Introduction – General Assumptions – **Capex & Allocation**

Total capex requirements for the initial phase of the Ibom DSP project is between 1.76 and 2.64 bn USD, depending on the size of the scope of the initial phase. Between 2.60 and 1,09 bn USD needs to be financed by the PDMC, depending on the scope of the initial phase and the PDMCs ability to sub-concession the terminals.

The basis for the Ibom DSP project and financial structuring of the PDMC is the total capex requirements for Phase 1. The total investments required for Ibom Phase 1 are presented in the table below (described in more detail in Section C1 of the OBC):

Item	Amount (Phase 1 Mini)	Amount (Phase 1 Max)	
Land	0 M USD	0 M USD	
Port Infrastructure	766 M USD	945 M USD	Dredging, breakwater, land reclamation
Port Superstructure	139 M USD	139 M USD	Utilities, aids to navigation, offices, nautical base
Terminal Infrastructure	185 M USD	370 M USD	Quay walls, jetties
Terminal Superstructure	127 M USD	282 M USD	Paving, roads, fences, offices, warehouses, IT
Terminal Equipment	304 M USD	647 M USD	Cranes, trucks, forklifts, tanks
Free Trade Zone	46 M USD	46 M USD	Land development, internal roads, utility connections
Road connection	175 M USD	175 M USD	20km dual-carriage way
Total Capex PDMC	**1,742 M USD**	**2,604 M USD**	
Nautical Fleet (NPA)	18 M USD	36 M USD	Tug boats, pilot boats, mooring craft
Total Capex Project	**1,760 M USD**	**2,640 M USD**	

As the PDMC is likely to sub-concession the terminal operations to private terminal operators, part of the investments (terminal superstructure, terminal equipment) will be transferred to sub-concessionaires. The envisaged investment allocation between the PDMC and sub-concessionaires is summarized in the table below:

Item	Total Amount (Phase 1)		PDMC (ph1 min)	Sub-concessionaires (ph1 min)	PDMC (ph1 max)	Sub-concessionaires (ph1 max)
Land	0M USD		0M USD		0M USD	
Port Infrastructure	766 M USD		766 M USD		945 M USD	
Port Superstructure	139 M USD		139 M USD		139 M USD	
Terminal Infrastructure*	185 M USD		185 M USD		370 M USD	
Terminal Superstructure	127 M USD			127 M USD		282 M USD
Terminal Equipment	304 M USD			304 M USD		647 M USD
Free Trade Zone	46 M USD			46 M USD		46 M USD
Road connection	175 M USD			175 M USD		175 M USD
Total Capex	**1,742 M USD**		**1,090 M USD**	**652 M USD**	**1,454 M USD**	**1,150 M USD**

Introduction – General Assumptions – **Traffic Forecast**

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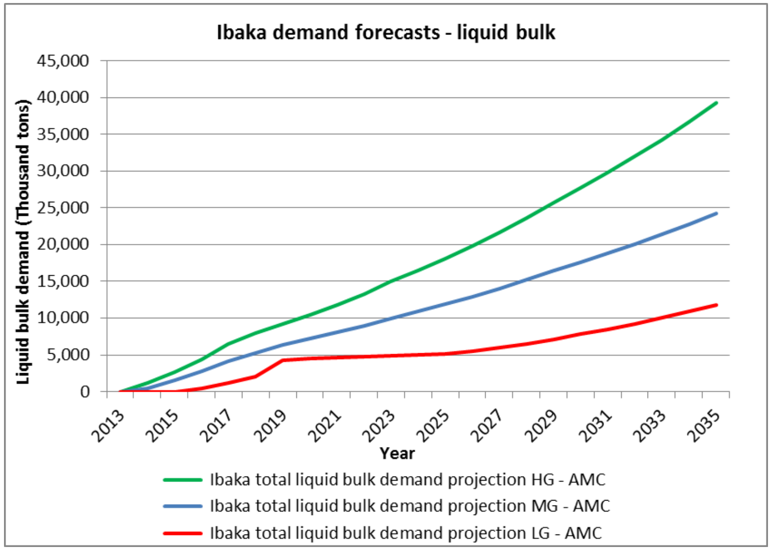
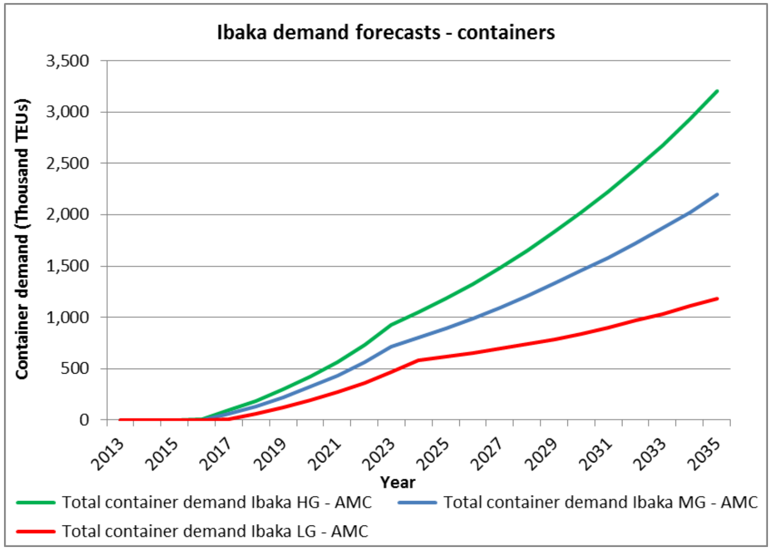
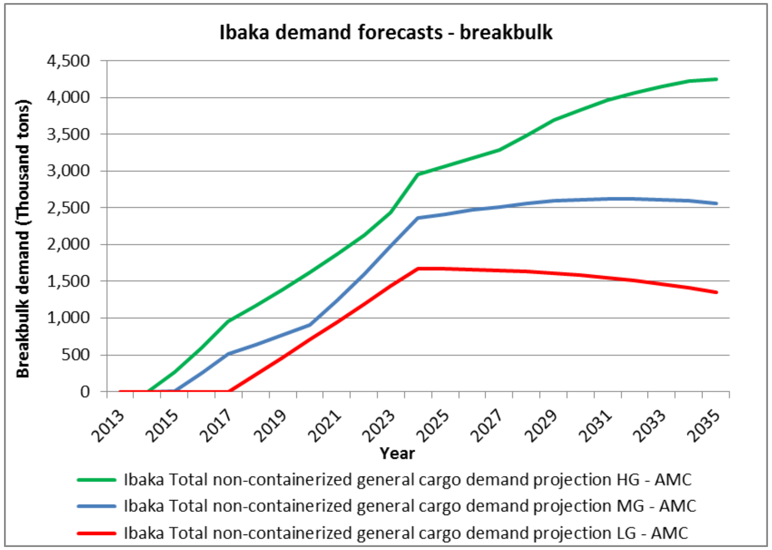
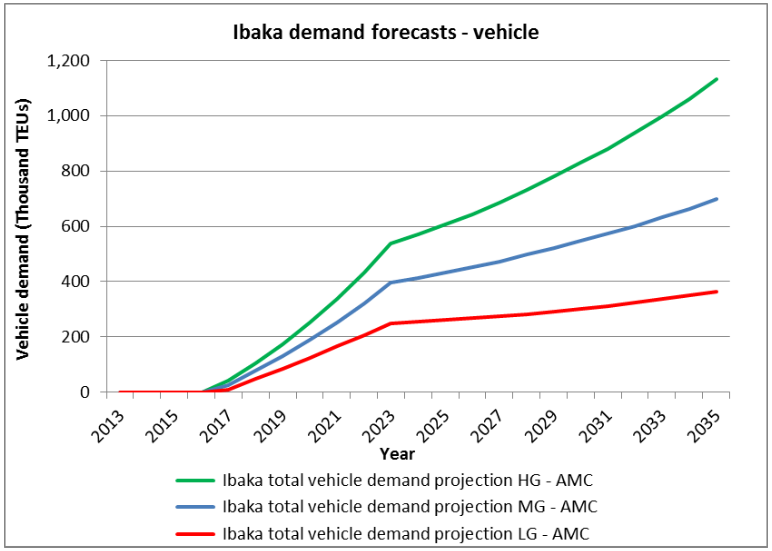
Traffic Forecasts for Business Units derived from Demand Forecast and trigger expansions; drive revenues and opex









Introduction – General Assumptions – **Revenue Allocation Overview**

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Main project related revenues accrue to the PDMC (and its sub-concessionaires)

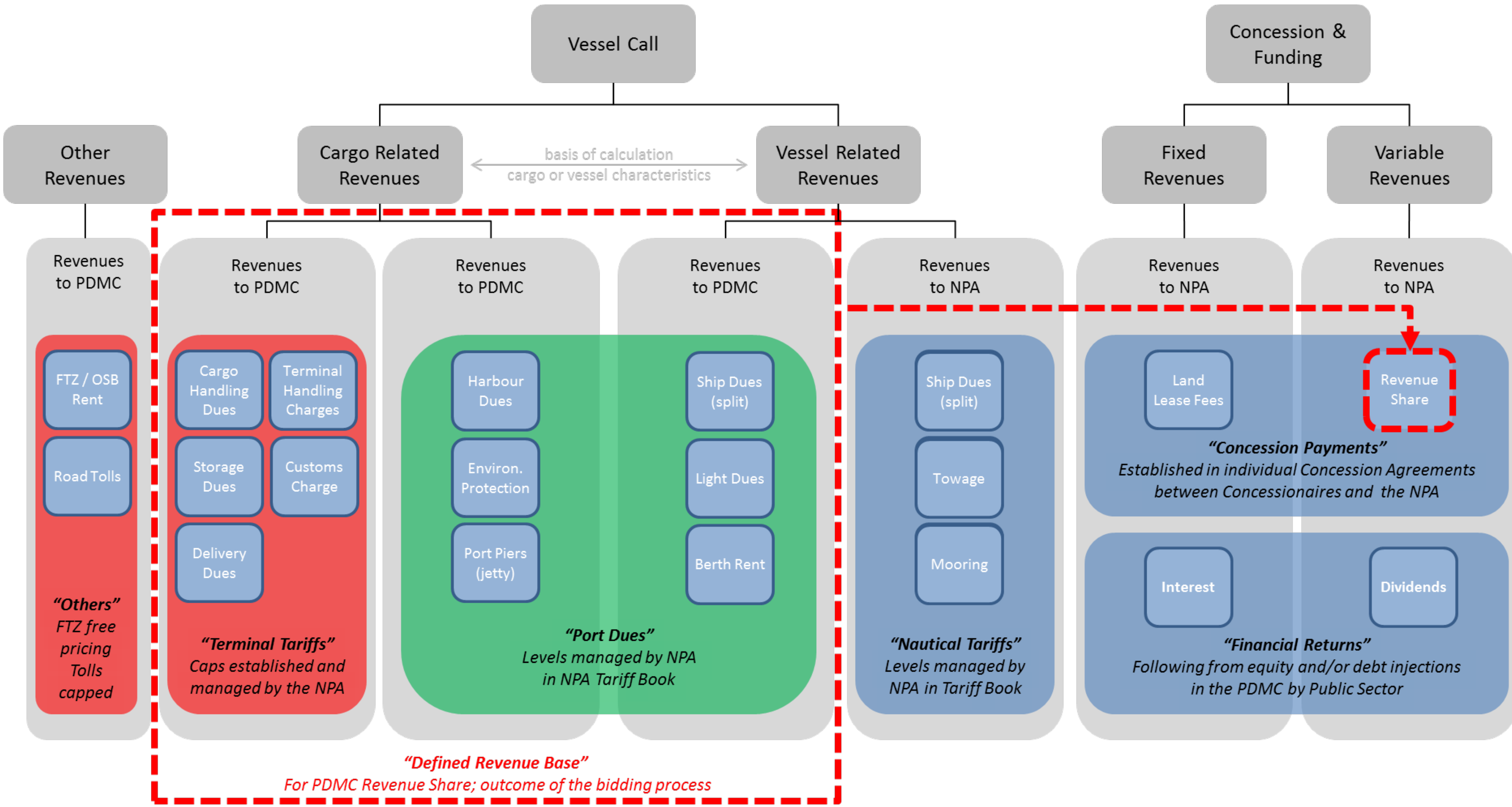

Figure 1.4 – Tariff Structure & Allocation

Introduction – General Assumptions – **Revenue Allocation Background**

Project to collect revenues connected to their investment and service responsibilities

Entity	Service	Tariff
NPA	Nautical Services: Towage & Mooring	Ship Dues (fixed component for Towage & Mooring)
	Nautical Services: Pilotage	Ship Dues (part of the variable component; 50% assumed)
	Nautical Services: Harbour Master	Ship Dues (part of the variable component; 50% assumed)
	Concession Grantor	Fixed Landlease Fees Variable Revenue Share over Defined Revenue Base
PDMC	Channel Development & Maintenance	Ship Dues (part of the variable component; 50% assumed)
	Solid and Liquid Waste Collection & Processing	Ship Dues (part of the variable component; 50% assumed)
	Breakwater & Land Development/Management	Harbour Dues
	Aids to Navigations	Light Dues
	Quay Development	Berth Rent
	Jetty development	Port Piers
	Environmental Management	Environmental Protection Fees
	Terminal Operations	Cargo Handling Dues Storage Dues Delivery Dues Customs Charges Terminal Handling Charges
	FTZ Management	FTZ Rent
	Port Road Development & Maintenance	Road Tolls

Introduction – General Assumptions – **WACC Overview**

For the Business Case model, the weighted average cost of capital (WACC) is calculated for each entity in order to use it as a valuable and realistic input for the model. The underlying assumptions for these three WACC's are as follows.

Subject	Leverage	Shareholding	Cost of Equity	Cost of Debt	Taxation	WACC
WACC - Business Units 1 *Containers & Breakbulk/RoRo*	Equity: 50% Debt: 50%	Private: 100 %	22.5%	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**14.23%**
WACC - Business Units 2 *Liquid Bulk, Dry Bulk & Offshore Supplies*	Equity: 50% Debt: 50%	Private: 100 %	20.0%	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**12.98%**
WACC - Business Units 3 *FTZ & Project Road*	Equity: 50% Debt: 50%	Private: 100 %	17.5%	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**11.73%**
WACC – Business Unit 4 *Port Management, WITHOUT Government Funding Support*	Equity: 50% Debt: 50%	NPA: 20% State: 20% Private: 60%	NPA: 10.0% State: 10.0% Private: 23.3%*	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**11.98%**
WACC – Business Units 5 *Nautical Services, NPA*						**10.00%**
WACC – Ibom DSP Project *Project*	Blended WACC based on underlying Business Units 1-5					**13.02%**
WACC – Concessionaire *PDMC*	Blended WACC based on underlying Business Units 1-4					**13.20%**
WACC – Concession Grantor, *NPA*						**10.00%**
WACC – State *AKSG*						**10.00%**

** It is assumed that the private sector's cost of equity increases when shareholding by the NPA/State increases. This is based on the private sector's preference for a privately funded PDMC: the higher the public shareholding, the higher the cost of equity by the private sector.*

Introduction – General Assumptions – **WACC Background**

LEVERAGE has been established on a conservative funding structure positioned between on-balance sheet (corporate) funding and off-balance sheet (leveraged/project) funding

SHAREHOLDING has been established on the assumption that private business units are 100% privately held and that public organisations are 100% government owned. In accordance to the PPP Structure, the PDMC is a private/public joint-venture with the private sector as majority shareholder

COST OF EQUITY has been established taking into account the nature of the organisation (public (10%) or private (>10%)) and the risk exposure of the underlying activities:

- High risk profile (22.5%): uncommitted volumes, fully exposed to market risks and competition: containers & general cargo / RoRo; also entities with high upfront investments (PDMC)
- Medium risk profile (20%): committed volumes, limited exposure to market risks: dry & liquid bulk, offshore supplies
- Low risk profile: (17.5 %): diversified clients/users combined with no/limited upfront investments (FTZ management); or combined with the ability to increase tariffs to compensate (toll road)

COST OF DEBT: *LIBOR* has been established at 1.0%, which relates to the current 1-year LIBOR rate (see below). *Margin* is sourced from the initial market consultation. *Financing Costs* cover initial fees and continuous debt-funding-related costs including reporting, monitoring, accounting, etc.

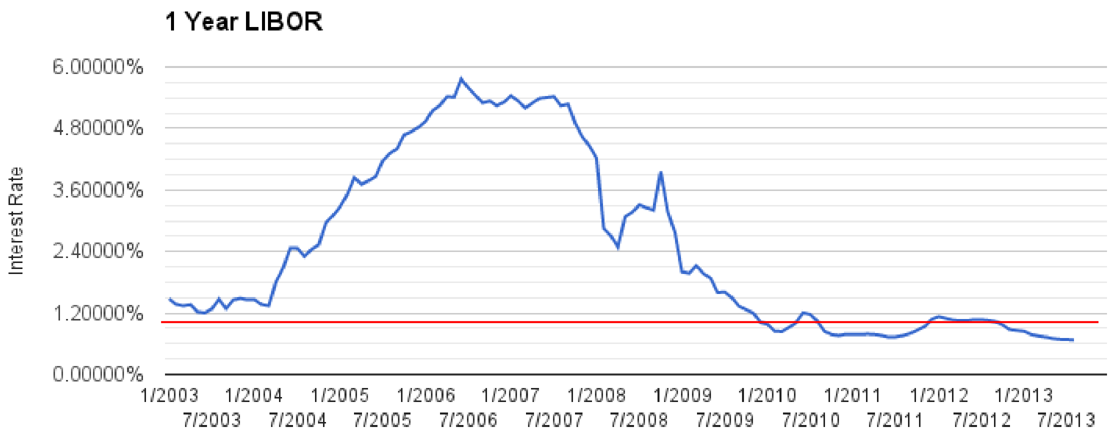

Figure 1.5 – 1 year LIBOR rate

Taxation: Corporate tax rate of 30% applies; however, due to FTZ status and associated tax holidays and fiscal incentives and due to other fiscal incentives and optimisations, the effective tax rate is assumed at 15%

Introduction – General Assumptions – **Others Main Assumptions**

Subject	Assumption
Indexation – Naira	8% annually from 2014, decreasing by 0.10% per annum until 2063 (see next page for reference)
Indexation – US Dollar	2% annually from 2014, assumed constant (see next page for reference)
Exchange Rate – USD-NGN	160 Naira to a Dollar, assumed constant (see next page for reference)
Tariffs: commercial discounts at start	-15% from available tariff books for all trades except petroleum products (-25%) and offshore supplies (0%)
Tariffs: erosion over time	-2% per annum with a maximum of -20% for all Terminal Tariffs, except for petroleum products : -30% and offshore supplies: 0% of -30% for all Port Dues, except for Ship Dues & Berth Rent: 0%.
Land rent price	In FTZ: USD 10.00 per m2 per annum; Offshore Supply Base: USD 50.00 per m2 per annum
PDMC Concession fixed fee	USD 0.05 for unused Concession Area; 50% discount during initial construction USD 5.00 for used port area; USD 1 for used FTZ area Concession Fees only applied in Business Case of Concessionaire (PDMC) & Concession Grantor (NPA)
PDMC Concession variable fee	Variable fee being a % of Defined Revenue Base up to an Equity IRR of 15% is attained Concession Fees only applied in Business Case of Concessionaire (PDMC) & Concession Grantor (NPA)
ICRC Fee	0.1% of total concession value, payable by the PDMC to the ICRC in 2015
Road Toll Dues	Are minimized based on an attained NPV=0 for the Toll Road Business Case
Maintenance Policy	Infrastructure maintenance starts after 5 years, with 5 year ramp-up; Equipment only 5 year ramp-up
Opex Ramp-Up	Simulating reducing inefficiencies: 150% at start; normalising to 100% in 10 years
Working Capital	30 debtor days & creditor days, except for wages. Annual interest on cash balance: 0.50%
Taxation	30 % corporate tax paid after tax holiday of 10 years (2014 – 2023). Only applied in bankability analysis. In feasibility analysis, tax is covered through effective tax rate (15% for private entities)

A complete documentation of the applied assumptions and inputs can be found in D-2 Financial Modelling

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Introduction – General Assumptions – **Inflation & Exchange Rates**

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The dominant currency in the model is the UD Dollar. Only specific cash flows are Naira-based, including a few revenues and the local costs (especially labour). These flows are exchanged to USD amounts based on the fixed exchange rate (160).

When real terms are presented, USD 2013 amounts apply. In case nominal terms are presented, the Naira amounts have been indexed on an annual basis at their decreasing inflation rate (from 8% in 2013 to 3% in 2063) and exchanged to USD at the fixed rate (160). In the nominal case, USD price levels (including tariffs) are indexed on a n annual basis at the fixed USD inflation rate (2%).

Figure 1.6 – Nigerian Inflation Rate

SOURCE: WWW.TRADINGECONOMICS.COM | NIGERIA NATIONAL BUREAU OF STATISTICS

Figure 1.7 – Naira/USD exchange rate

SOURCE: WWW.TRADINGECONOMICS.COM | OTC INTERBANK

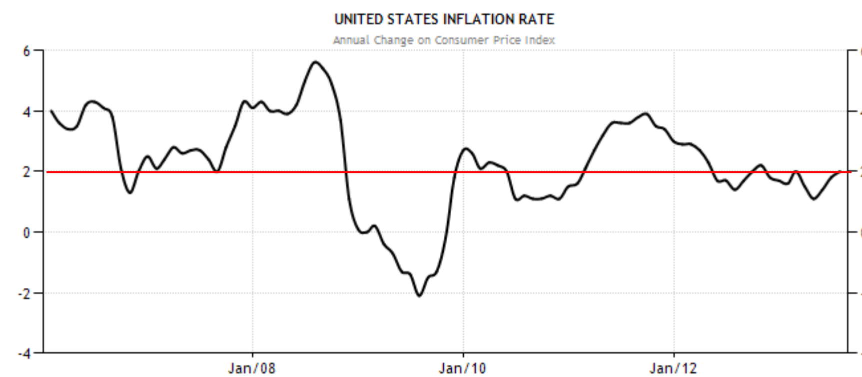


Figure 1.8 – US Inflation Rate

SOURCE: WWW.TRADINGECONOMICS.COM | BUREAU OF LABOR STATISTICS

Introduction – General Assumptions – **Tariff Policy**

Subject	Assumption
Terminal Tariffs	Base level based on tariffs at existing terminals 15% discount at start of operations (25% for petroleum products; 0% for Offshore Supplies) 2% annual price erosion from start operations until 20% has eroded (30% for petroleum products; 0% for Offshore Supplies) Regular annual inflation indexation
Nautical Tariffs	Base level based on NPA Tariff Book No discounts No erosion Regular annual inflation indexation
Port Dues	Base level based on NPA Tariff Book No discounts 2% erosion per annum starting in 2023 until 30% has eroded (0% for ship dues & berth rent) Annual inflation, indexation starting in 2020
Revenue Share (where applied)	Base level based on Business Case 10 year ramp-up period (+10% per annum)
Land Lease (where applied)	Base level based on Consultant's Estimate 50% discount during construction No erosion Regular annual inflation indexation

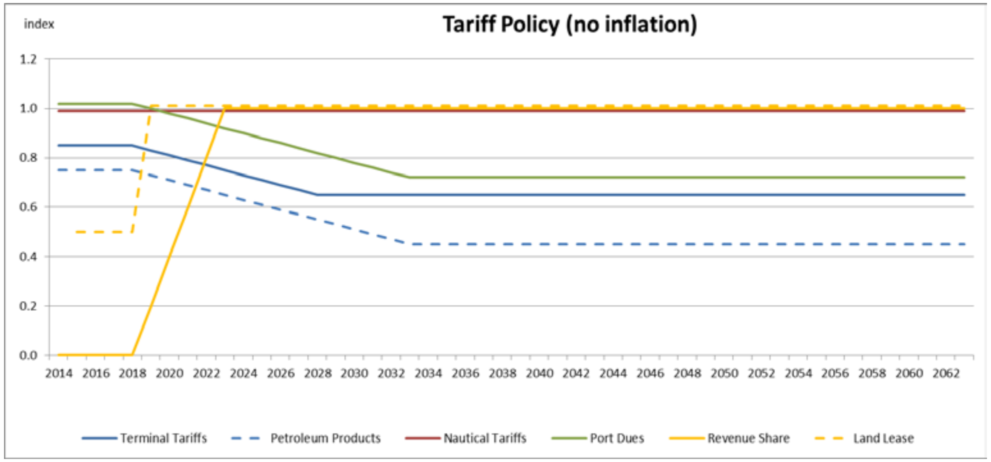


Figure 1.9 – Tariff Policy (no inflation)

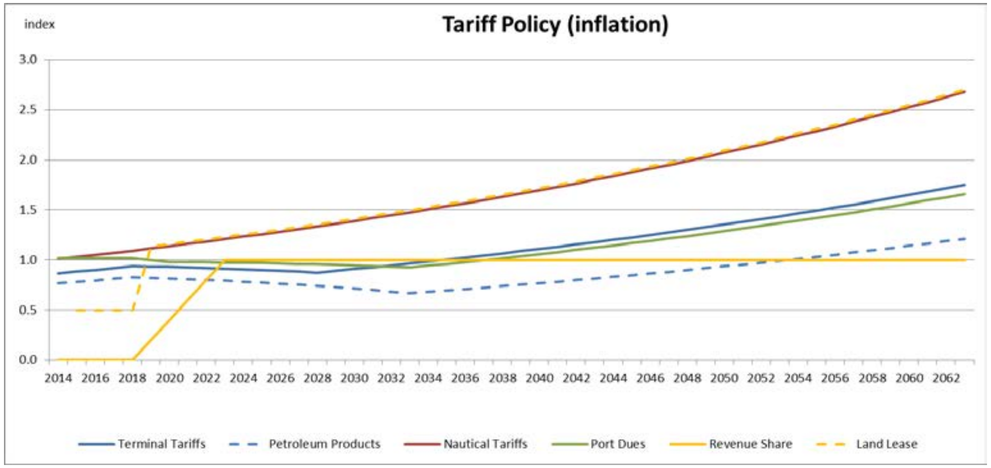
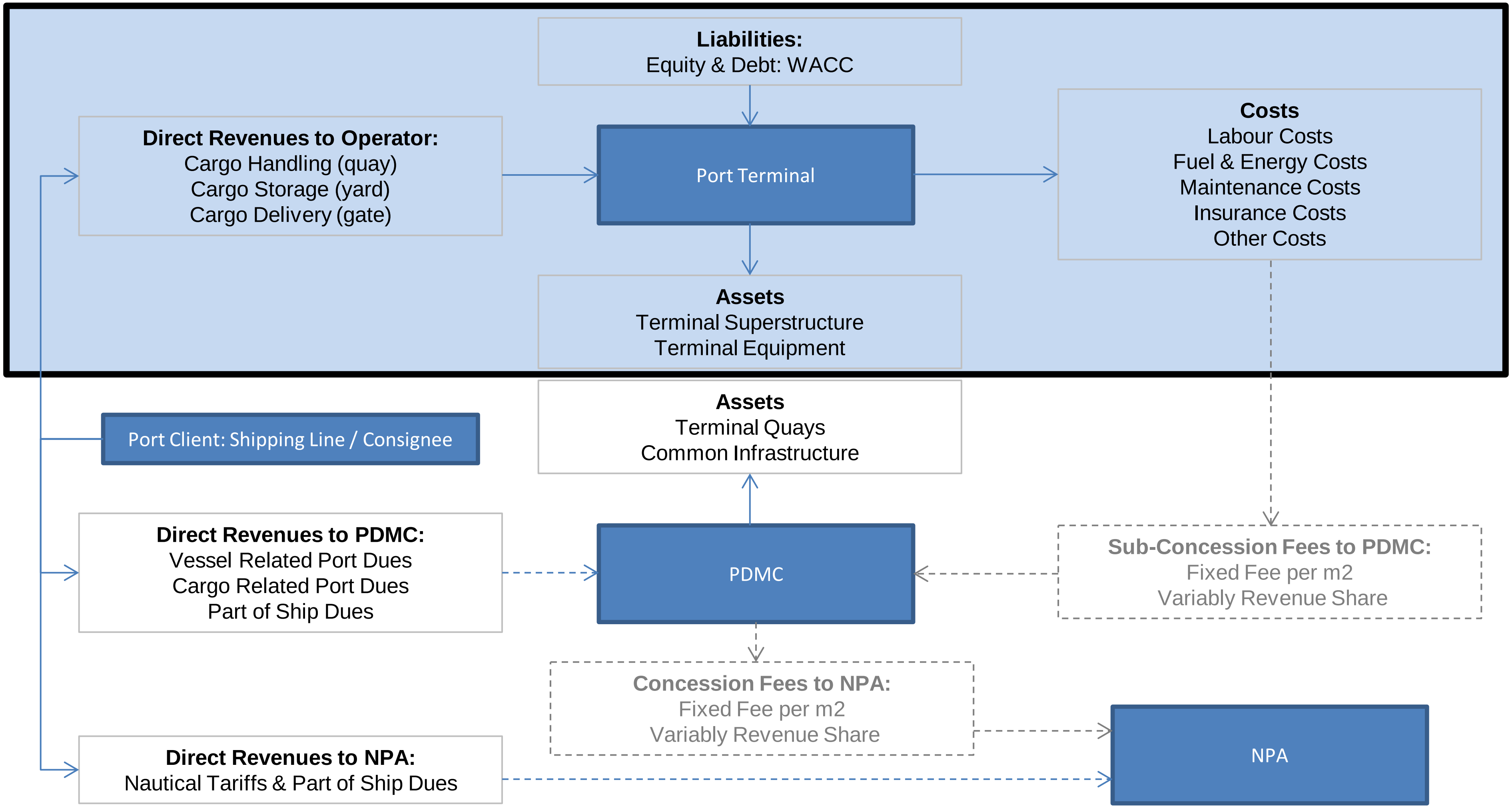


Figure 1.10 – Tariff Policy (with assumed inflation)

Contents

Business Model – Container Terminal

The Terminal Operator (or Terminal Sub-Concessionaire) shall invest in the terminal assets and operate it in accordance to industry standards. The Terminal Operator needs to run a viable business case, since he is investing its own equity and debt in his project.



Traffic, Land use & Employment – Container Terminal

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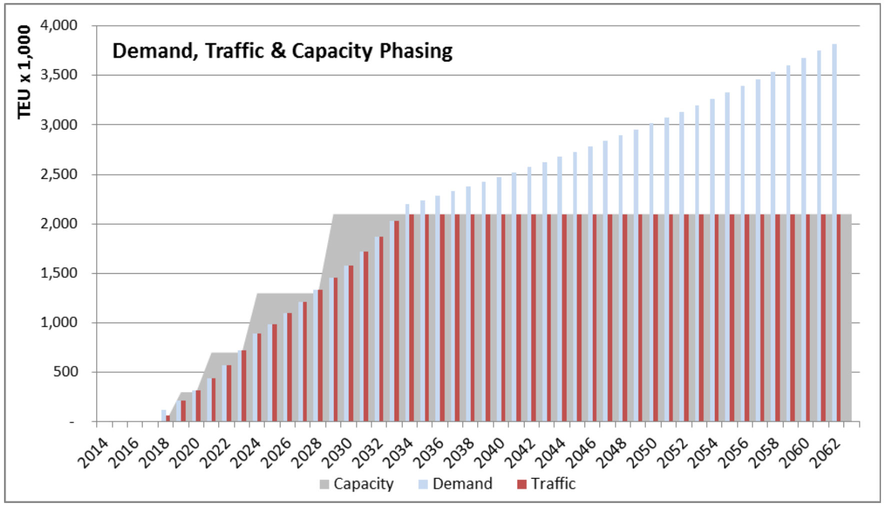
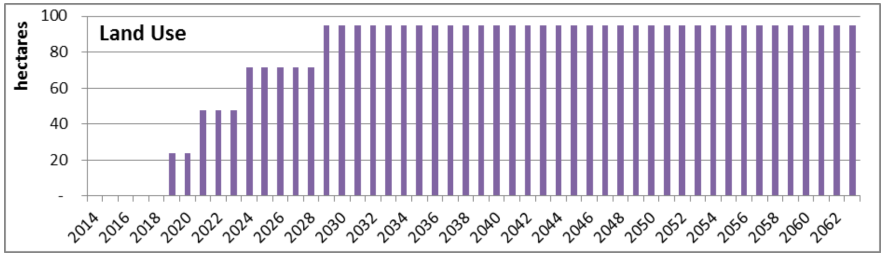
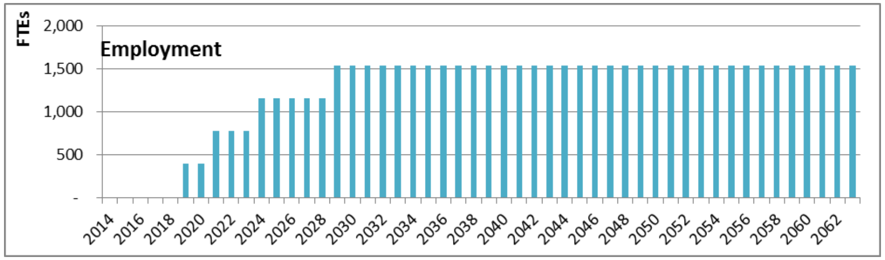
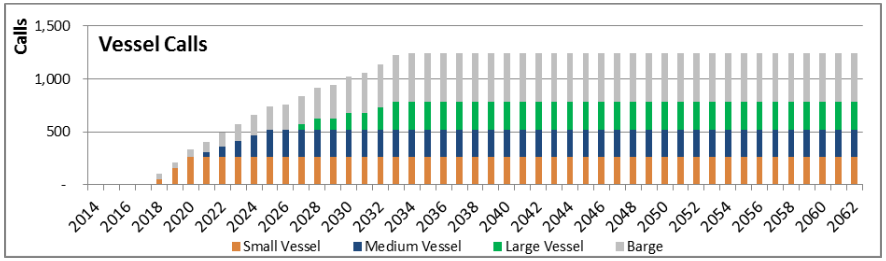
The traffic, land use and employment at the container terminal have the following characteristics :

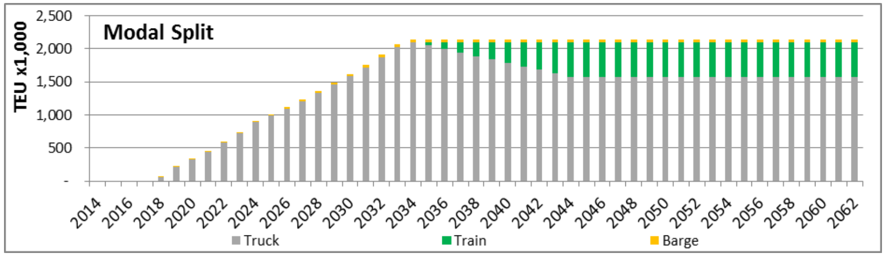
- The container terminal consists of 4 berths in 2030 (1,400m), achieving a throughput of 2,100,000 TEUs by 2034
- Beyond the Master Plan horizon, demand is expected to continue to grow, providing a basis for further expansions
- Over 1,200 container vessels call the port by 2035, including over 400 annual barge calls for distribution of full and empty containers between the terminal and regional ports.
- The container terminal requires around 100 hectares of land by 2030, which is mainly required for the stacking areas and empty storage.
- The container terminal will provide jobs to around 1,500 FTEs by 2030
- Trucking is the major modality: 75 percent of the TEUs shipped to/from the port are trucked to/from the hinterland; 25 percent by train, building up from 2034,assuming a rail connection is in place by then. Coastal trade remains modest to a limited number of regional destinations





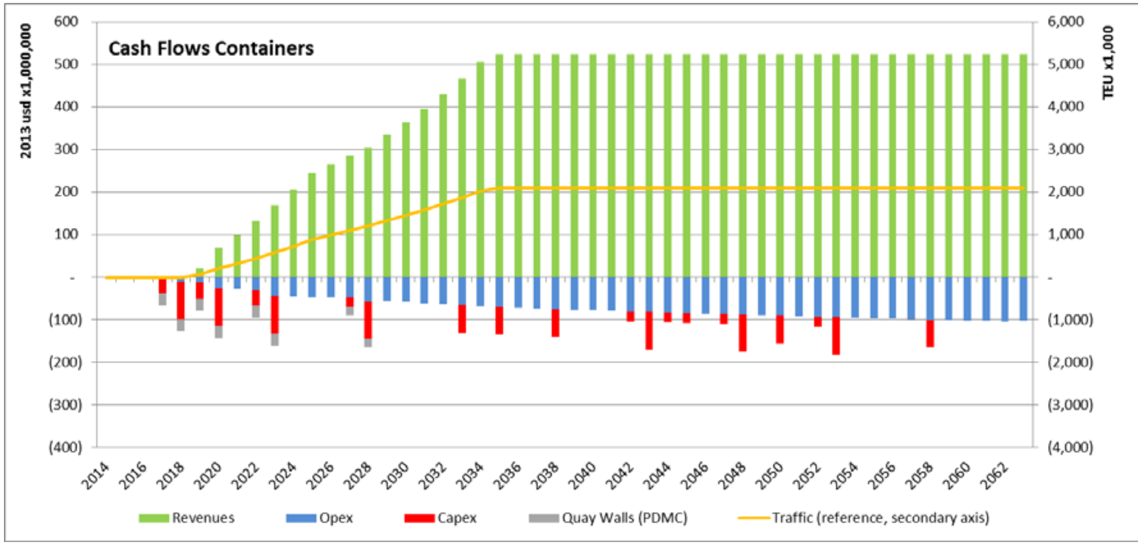






Project Performance – Container Terminal

Container terminal is viable with substantial returns



- The PDMC may sub-concession the container terminal to a third-party Operator
- The PDMC is expected to invest in quay extensions parallel to expansions of the terminal; coverage for quay investments comes from berth rent and other port dues.
- After the initial investments, continuous investments are required to keep up with increasing demand and to replace superstructure and equipment.
- Opex-per TEU levels are expected to drop as a result of efficiency gains through learning curves (short term) and economies of scale due to increasing trade (medium term)
- Tariffs and Port Dues show strong erosion over time, which is in accordance to tariff developments in the sector.

- The business case of the operator is viable with substantial returns. Relatively long payback period shows the impact of the early expansions and may pose funding challenges.

Investments - Containers - USD 2013		
Phase1 Capex Operator	125,355,120	USD
Phase 1 Capex PDMC (quay)	56,546,451	USD
Total Phase 1 Capex	**181,901,571**	**USD**
Additional first 10y Capex Operator	250,710,240	USD
Additional first 10y Capex PDMC (quays)	113,092,902	USD
Additional first 10y Capex	**363,803,142**	**USD**

Operator OPEX - Containers - USD 2013			
	avg. <5y	avg. >5y	
Labor	65	23	USD/TEU
Fuel & Electricity	7	5	USD/TEU
Maintenance	9	6	USD/TEU
Insurance	8	1	USD/TEU
Other	26	7	USD/TEU
Operator OPEX	**116**	**43**	**USD/TEU**

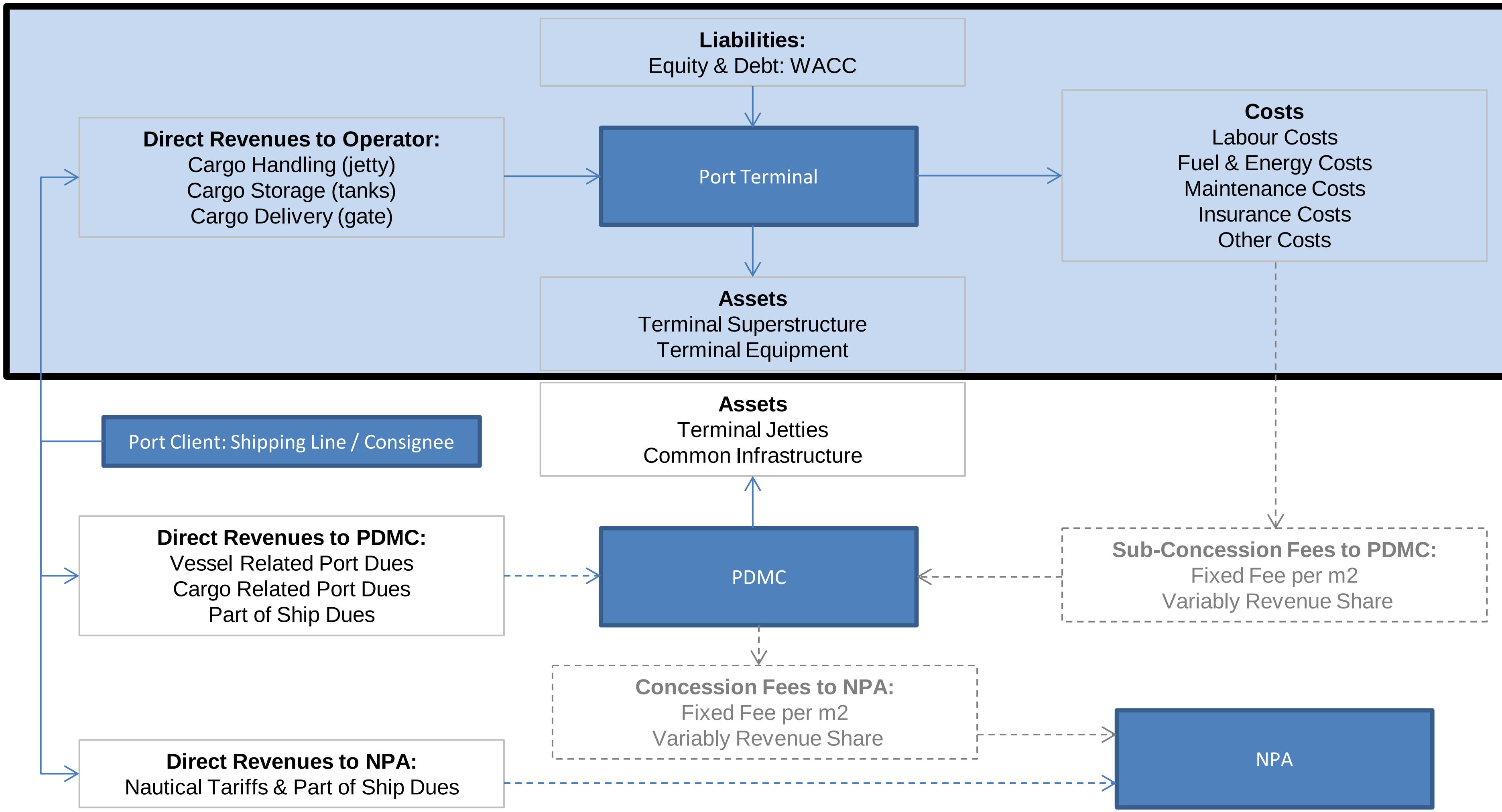
Operator Tariffs - Containers - USD 2013				
	2013	2019	2030	
Handling	65	54	40	USD/TEU
Storage	26	22	19	USD/TEU
Delivery	17	14	13	USD/TEU
Terminal Handling	245	203	153	USD/TEU
Customs Charge	39	32	25	USD/TEU
Operator Revenue	**392**	**326**	**250**	**USD/TEU**

Port Dues - Containers - USD 2013				
		2019	2030	
Towage & Mooring	NPA	1.99	0.76	USD/TEU
Ship Dues	NPA	30	18	USD/TEU
Ship Dues	PDMC	30	18	USD/TEU
Light Dues	PDMC	48	21	USD/TEU
Berth Rent	PDMC	1.07	0.41	USD/TEU
Harbour Dues	PDMC	63	49	USD/TEU
Environmental Protection	PDMC	4	3	USD/TEU
Port Dues Revenue		**177**	**110**	**USD/TEU**

Business Case - Containers - Feasibility Operator		
Project IRR	**37.17%**	**%**
Project NPV	**817,659,261**	**USD**
WACC	**14.23%**	**%**
Payback Period	**10.2**	**years**

Business Model – Petroleum Products Terminal

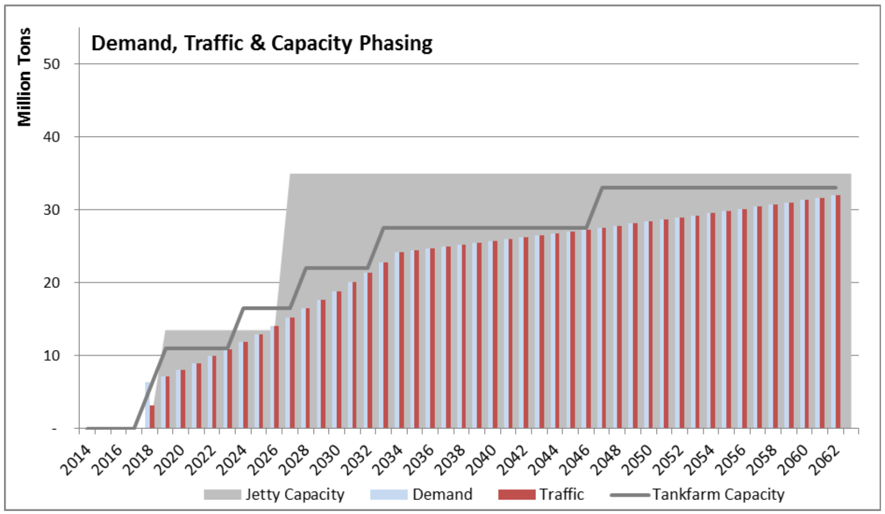
The Terminal Operator (or Terminal Sub-Concessionaire) shall invest in the terminal assets and operate it in accordance to industry standards. The Terminal Operator needs to run a viable business case, since he is investing its own equity and debt in his project.

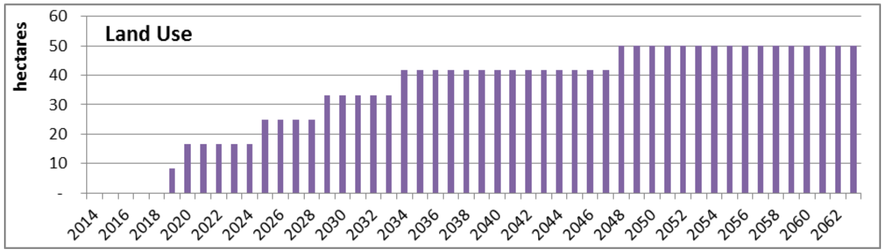


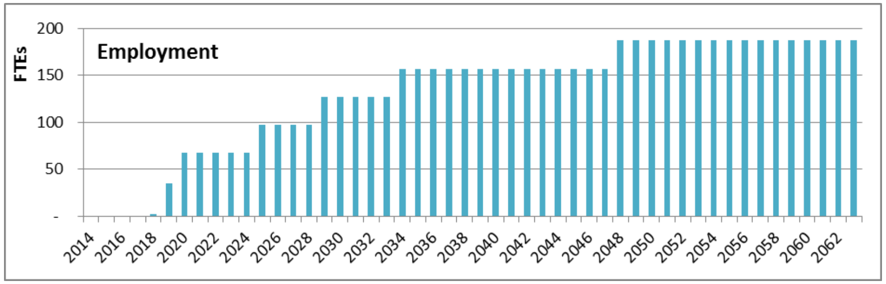
Traffic, Land use & Employment – Petroleum Products Terminal

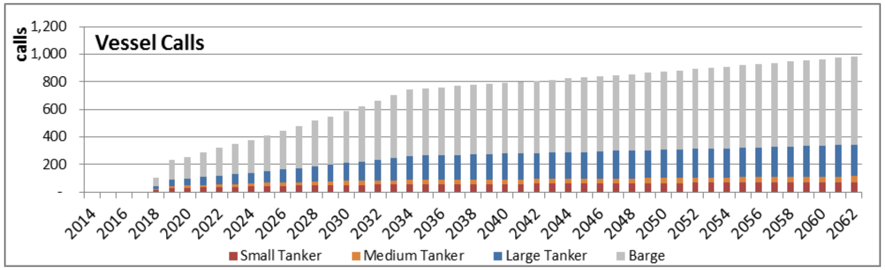
The traffic, land use and employment at the petroleum products terminal have the following characteristics :

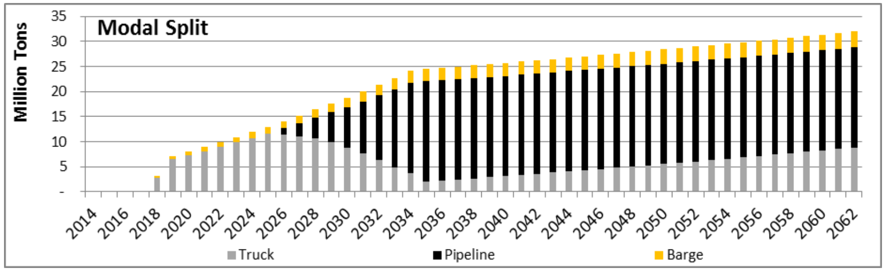
- The tank farm is continuously expanded in line with increasing demand; a second jetty is build in 2027 which allows the port to absorb demand well beyond the forecast horizon of 2035
- Almost 800 tankers call the port by 2040. 250 of which are ocean-going tankers bringing in products from overseas and the remainder consisting of barges distributing the products throughout the region (including offshore deliveries to rigs)
- The petroleum products terminal requires around 50 hectares of land by 2048, mainly used for the tank farm.
- The petroleum products terminal will provide a maximum number of 180 jobs by 2048; this is rather limited since the terminal process is expected to be highly automated.
- The modal split for hinterland transport is highly dependent on the construction of a pipeline: this should be operational by 2026 in order to reduce the number of trucks to the hinterland: by 2026 almost 800,000 truck moves are required for the petroleum products terminal





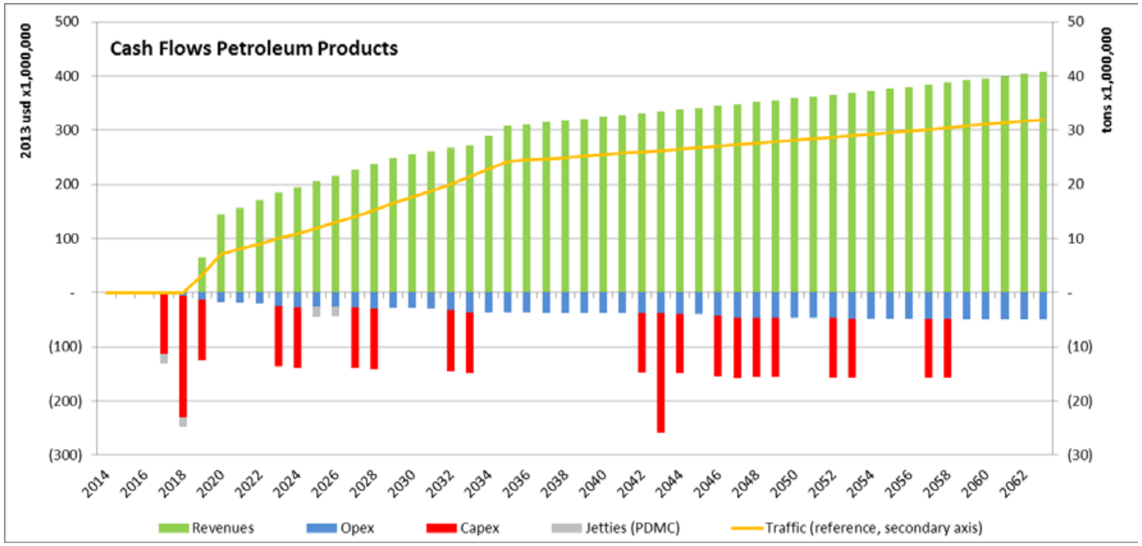






Project Performance – Petroleum Products Terminal

Petroleum products terminal is viable with substantial returns



- The PDMC may sub-concession the liquid terminal to a third-party Operator
- The PDMC is expected to invest in a second jetty parallel to expansions of the tank farm; coverage for jetty investments comes from berth rent and other port dues.
- After the initial investments, continuous investments are required to keep up with increasing demand and to replace superstructure and equipment. Although the terminal can physically start operating with only the initial phase of the tank farm, demand projections show the need for immediate expansion of the tank farm.
- Opex-per ton levels are expected to drop as a result of efficiency gains through learning curves (short term) and economies of scale due to increasing trade (medium term)
- Tariffs and Port Dues show strong erosion over time, which is in accordance to tariff developments in the sector.

- The business case of the operator is viable with substantial returns.

Investments - Petroleum Products - USD 2013		
Phase1 Capex Operator	224,056,800	USD
Phase 1 Capex PDMC (quay)	34,607,664	USD
Total Phase 1 Capex	**258,664,464**	**USD**
Additional first 10y Capex Operator	448,113,600	USD
Additional first 10y Capex PDMC (quays)	-	USD
Additional first 10y Capex	**448,113,600**	**USD**

Operator OPEX - Petroleum Products - USD 2013	avg. <5y	avg. >5y	
Labor	0.27	0.20	USD/ton
Fuel & Electricity	0.28	0.21	USD/ton
Maintenance	1.00	0.73	USD/ton
Insurance	0.52	0.24	USD/ton
Other	0.59	0.28	USD/ton
Operator OPEX	**2.66**	**1.66**	**USD/ton**

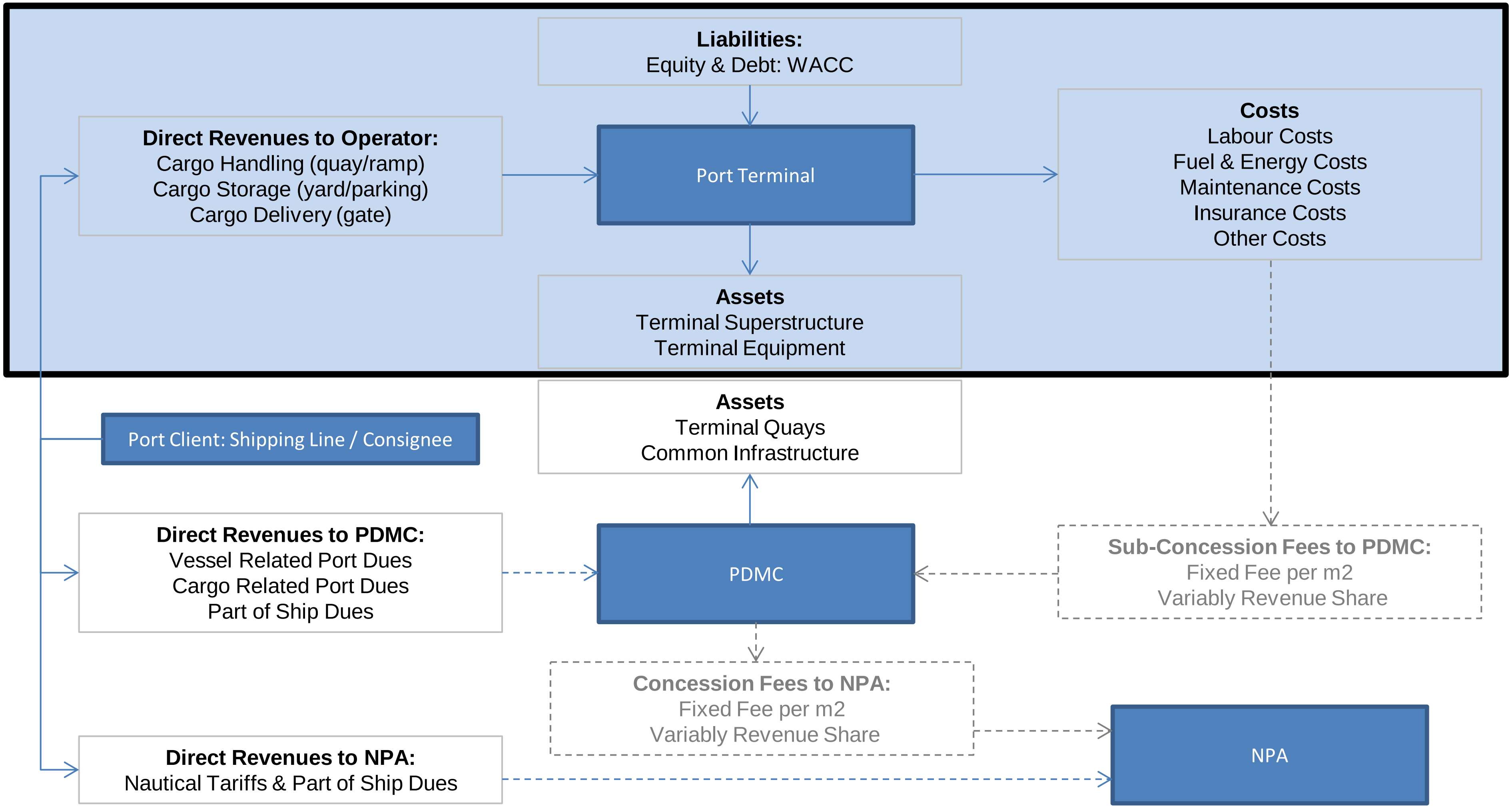
Operator Tariffs - Petroleum Products - USD 2013	2013	2019	2030	
Handling	6.78	4.95	3.46	USD/ton
Storage	21.19	15.47	10.81	USD/ton
Delivery	0.33	0.24	0.17	USD/ton
Terminal Handling	-	-	-	USD/ton
Customs Charge	-	-	-	USD/ton
Operator Revenue	**28**	**21**	**14**	**USD/ton**

Port Dues - Petroleum Products - USD 2013		2019	2030	
Towage & Mooring	NPA	0.04	0.04	USD/ton
Ship Dues	NPA	0.38	0.36	USD/ton
Ship Dues	PDMC	0.38	0.36	USD/ton
Light Dues	PDMC	0.60	0.45	USD/ton
Berth Rent	PDMC	0.02	0.01	USD/ton
Harbour Dues	PDMC	1.81	1.40	USD/ton
Environmental Protection	PDMC	0.10	0.08	USD/ton
Wharfage	PDMC	0.13	0.10	USD/ton
Port Dues Revenue		**3.45**	**2.81**	**USD/ton**

Business Case - Petroleum Products - Feasibility Operator		
Project IRR	**27.75%**	**%**
Project NPV	**625,752,344**	**USD**
WACC	**12.98%**	**%**
Payback Period	**8.8**	**years**

Business Model – Breakbulk & RoRo Terminal

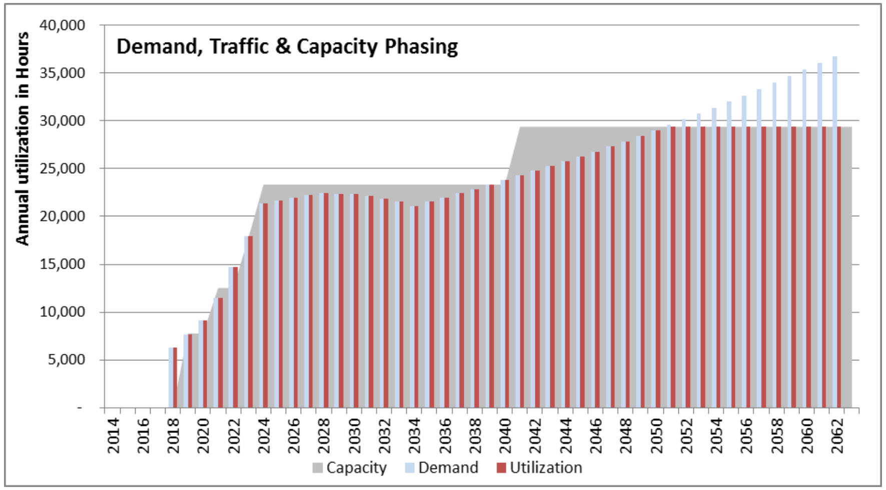
The Terminal Operator (or Terminal Sub-Concessionaire) shall invest in the terminal assets and operate it in accordance to industry standards. The Terminal Operator needs to run a viable business case, since he is investing its own equity and debt in his project.

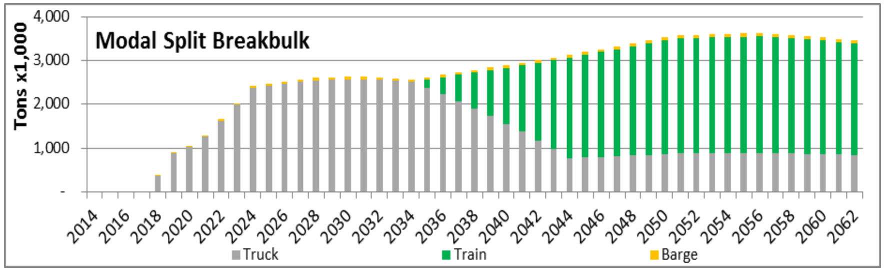


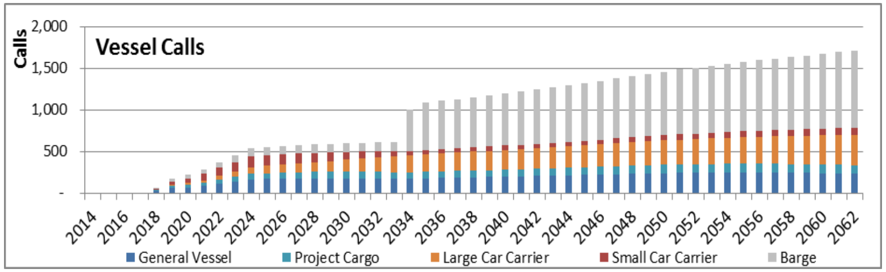
Traffic & Model Split – Breakbulk & RoRo

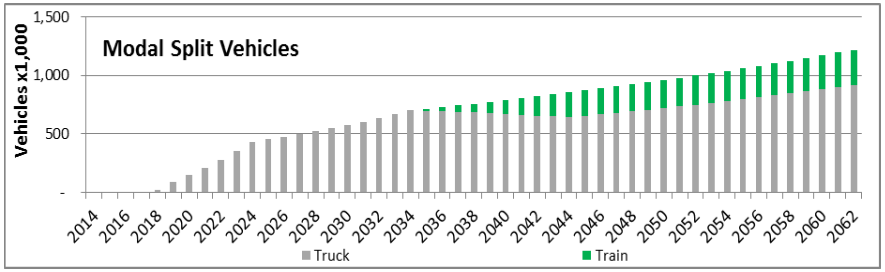
Overall, the following characteristics apply for the combined Breakbulk & RoRo terminal:

- The combined terminal consists of 6 berths by 2040 (1,500m). These berths are used for traditional breakbulk (bags, boxes, drums, pallets, non-unitised); industrial cargo (steel products); project cargo (generators, machines, large equipment) and cars and other vehicles. Changes in trades are also reflected on the combined terminal: over time, traditional breakbulk shall be replaced by steel products due to continuous containerisation and the expected increase in demand for(and possibly supply of) steel products. Vehicle imports continue to increae over time.
- Over 600 annual vessel calls are expected at the end of the forecast horizon (2035), comprising of general cargo vessels (250); car carriers (250) and barges for distribution of breakbulk products throughout the region (100). Since bagged dry bulk products are also distributed from the breakbulk terminal , barge calls shall significantly increase when the dry bulk terminal(s) are established.
- Trucking remains the dominant modality for land-sided transport of the goods. Once the railway link is established, a considerable share of breakbulk is expected to shift to rail (by that time: predominantly steel product), while also a fair share of vehicles is expected to move from truck to train.





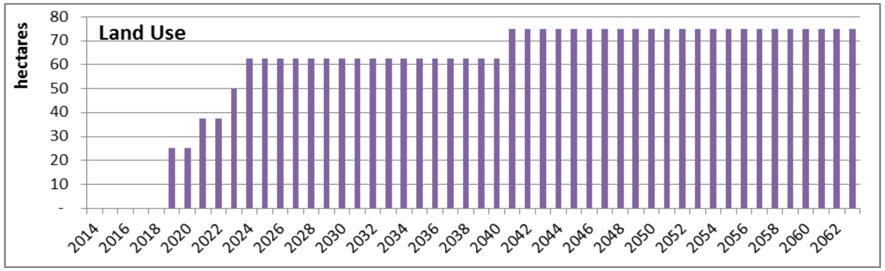


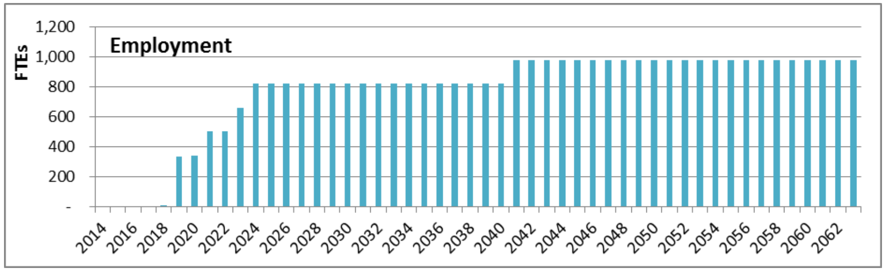


Land use & Employment – Breakbulk & RoRo

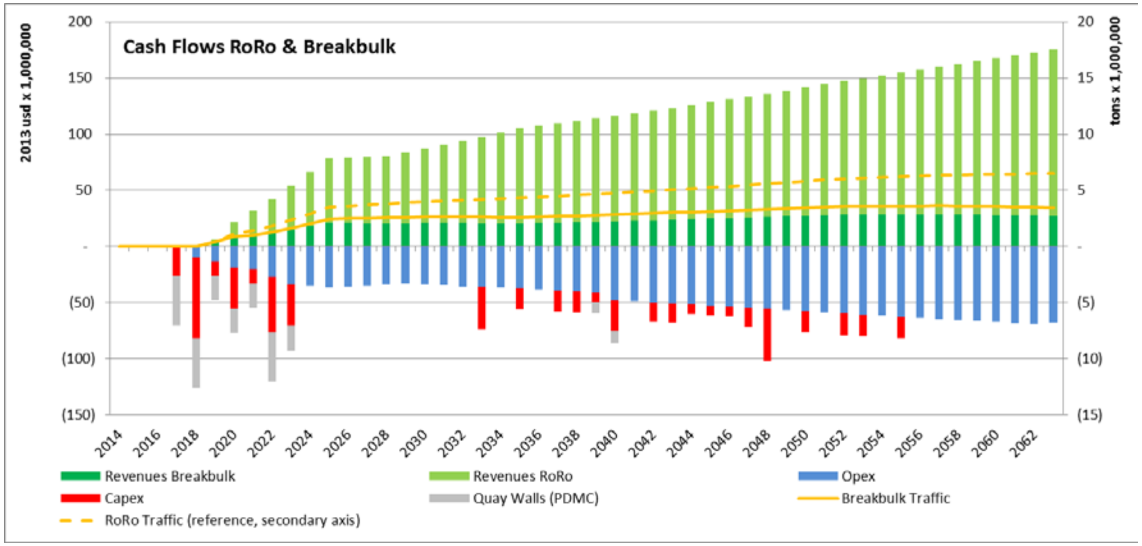
The land use and employment at the combined breakbulk & RoRo terminal have the following characteristics :

- Fully developed the combined terminal shall be around 75 hectares in size. This excludes any additional off-dock parking area for vehicles: It is assumed that cars are directly moved from the terminal to a storage location in the hinterland (at the FTZ) in order to minimize the use of scarce terminal area for long-term storage.
- Around 1,000 jobs are being created at the terminal





Project Performance – Breakbulk & RoRo Terminal 1/2



- Tariffs and Port Dues show strong erosion over time, which is in accordance to tariff developments in the sector.
- Opex-per ton levels are expected to drop as a result of efficiency gains through learning curves (short term) and economies of scale due to increasing trade (medium term)

Operator OPEX - Breakbulk & RoRo - USD 2013			
	avg. <5y	avg. >5y	
Labor	9.39	5.11	USD/ton
Fuel & Electricity	2.55	1.57	USD/ton
Maintenance	1.55	1.10	USD/ton
Insurance	1.04	0.25	USD/ton
Other	4.13	1.65	USD/ton
Operator OPEX	**19**	**10**	**USD/ton**

Operator Tariffs - Breakbulk - USD 2013				
	2013	2019	2030	
Handling	6.88	5.71	4.47	USD/ton
Storage	0.81	0.67	0.53	USD/ton
Delivery	0.68	0.56	0.44	USD/ton
Terminal Handling	3.75	3.11	2.44	USD/ton
Customs Charge	-	-	-	USD/ton
Operator Revenue	**12**	**10**	**8**	**USD/ton**

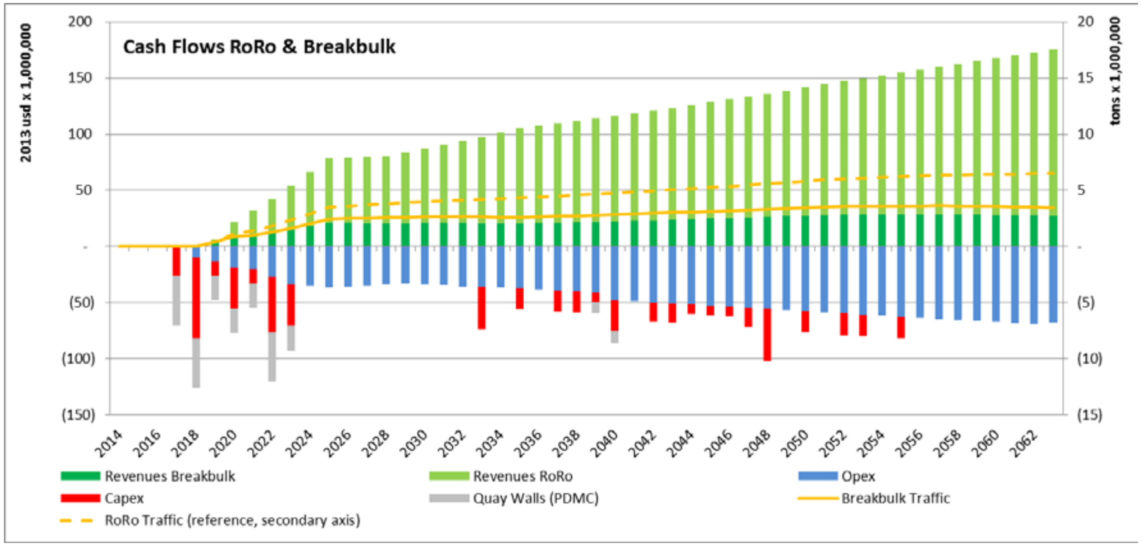
Port Dues - Breakbulk - USD 2013				
		2019	2030	
Towage & Mooring	NPA	0.16	0.15	USD/ton
Ship Dues	NPA	2.26	2.17	USD/ton
Ship Dues	PDMC	2.26	2.17	USD/ton
Light Dues	PDMC	4.14	3.09	USD/ton
Berth Rent	PDMC	0.17	0.17	USD/ton
Harbour Dues	PDMC	2.42	1.88	USD/ton
Environmental Protection	PDMC	0.10	0.08	USD/ton
Port Dues Revenue		**12**	**10**	**USD/ton**

Operator Tariffs - RoRo - USD 2013				
	2013	2019	2030	
Handling	31	26	20	USD/unit
Storage	32	26	21	USD/unit
Delivery	24	20	15	USD/unit
Terminal Handling	100	83	65	USD/unit
Customs Charge	-	-	-	USD/unit
Operator Revenue	**187**	**155**	**122**	**USD/unit**

Port Dues - RoRo - USD 2013				
		2019	2030	
Towage & Mooring	NPA	0.76	0.50	USD/unit
Ship Dues	NPA	18.10	15.60	USD/unit
Ship Dues	PDMC	18.10	15.60	USD/unit
Light Dues	PDMC	26.33	17.60	USD/unit
Berth Rent	PDMC	0.24	0.18	USD/unit
Harbour Dues	PDMC	57.67	44.73	USD/unit
Environmental Protection	PDMC	2.43	1.88	USD/unit
Port Dues Revenue		**124**	**96**	**USD/unit**

Project Performance – Breakbulk & RoRo Terminal 2/2

Breakbulk & RoRo terminal is viable with modest returns



Investments - Breakbulk & RoRo - USD 2013		
Phase1 Capex Operator	49,133,040	USD
Phase 1 Capex PDMC (quay)	43,980,573	USD
Total Phase 1 Capex	**93,113,613**	**USD**
Additional first 10y Capex Operator	196,532,160	USD
Additional first 10y Capex PDMC (quays)	175,922,292	USD
Additional first 10y Capex	**372,454,452**	**USD**

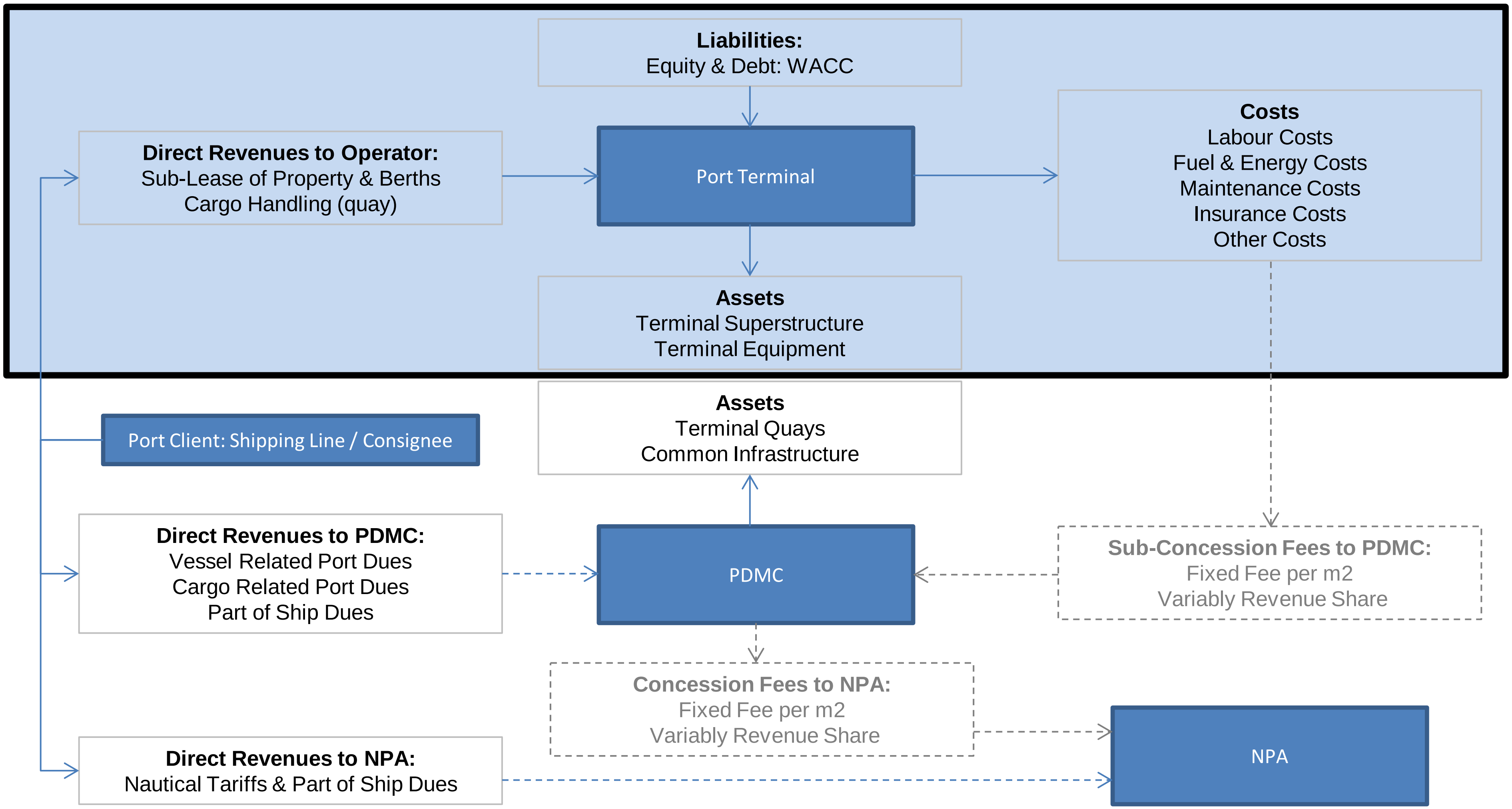
Business Case - Breakbulk & RoRo - Feasibility Operator		
Project IRR	**15.32%**	**%**
Project NPV	**17,806,885**	**USD**
WACC	**14.23%**	**%**
Payback Period	**14.8**	**years**

- The PDMC may sub-concession the combined breakbulk & RoRo terminal to a third-party Operator
- The PDMC is expected to invest in quay extensions parallel to expansions of the terminal; coverage for quay investments comes from berth rent and other port dues.
- After the initial investments, continuous investments are required to keep up with increasing demand and to replace superstructure and equipment.
- Heavy investments in the initial years are caused by the early need for terminal expansions due to capacity constraints. These constraints are caused by the traffic mix in the early years which is dominated by traditional breakbulk for which handling efficiency is substantial lower than the other trades on the terminal.

- The business case of the operator is viable with modest returns. The long payback period shows the impact of the early expansions and may pose funding challenges.

Business Model – Offshore Supply Base

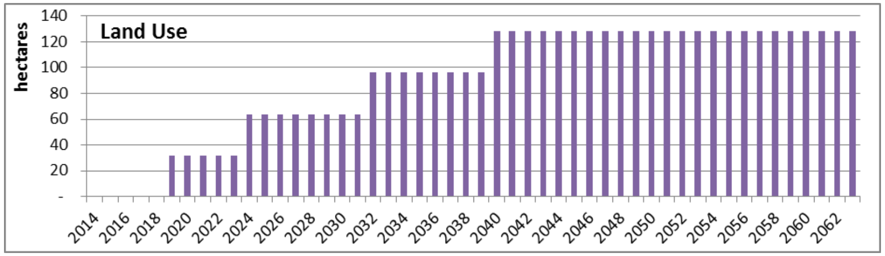
The Terminal Operator (or Terminal Sub-Concessionaire) shall invest in the terminal assets and operate it in accordance to industry standards. The Operator shall sub-lease part of its terminal to tenants seeking a base of operations with respect to off-shore activities. Besides leasing out property and dedicated berths, the operator shall continue to provide basic tasks of cargo handling on behalf of its tenants. The Terminal Operator needs to run a viable business case, since he is investing its own equity and debt in his project.

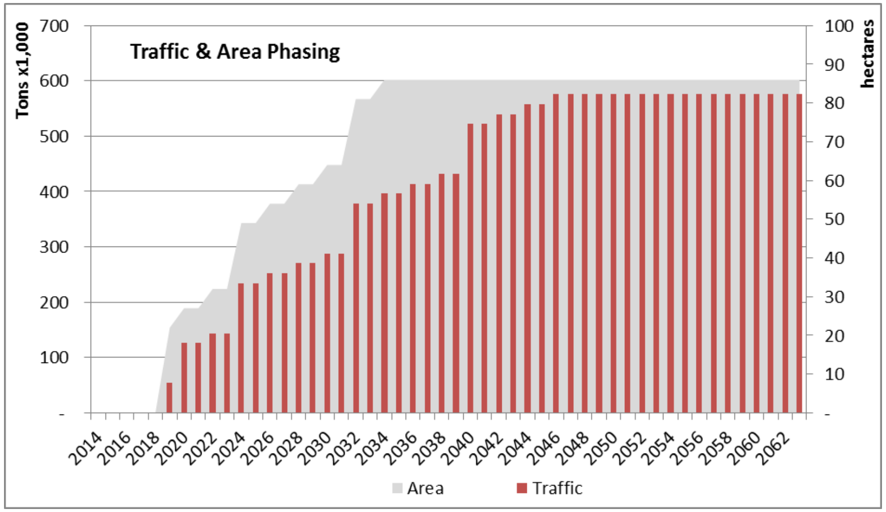


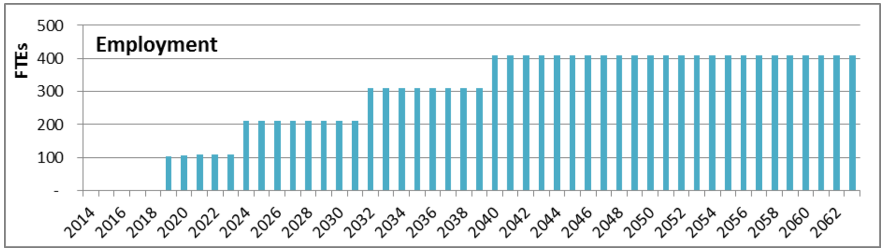
Traffic, Land use & Employment – Offshore Supply Base

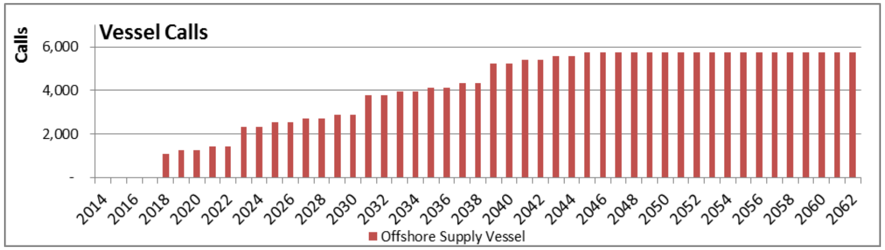
The traffic, land use and employment at the offshore supply base have the following characteristics :

- With the increase of tenants/users, the area of the base shall grow along with this driver and traffic is build up for each tenant after it has assumed business at the base.
- The forecast for this terminal is supply-driven and assumes 1 user leasing 10ha per 200m dedicated berth and 4 users leasing 5ha each per 200m common user berth. The common user clients are expected to handle 1 vessel every 2 days, while the dedicated clients are expected to handle 2 vessels per day.
- Over 5,000 offshore supply vessels are expected to call the port on an annual basis, once the base is fully developed. This entails around 15 calls per day. The operational implication of this extensive vessel traffic is expected to be modest, due to the limited size of these vessels, which allows them to easily manoeuvre along with larger ocean-going vessels. Call sizes are small (assumed at 100 tons per call)
- Fully developed the total terminal area shall exceed 120 hectares, providing sufficient area for the tenants to develop their offshore business close to dedicated and common-user quays (800m).
- The terminal is projected to offer direct employment to around 400 people. This excludes any employment by the tenants of the base, which may be substantial, depending on the actual activities.
- Modal split is not considered relevant since the relation of the base to the distant hinterland is considered marginal.









Project Performance – Offshore Supply Base

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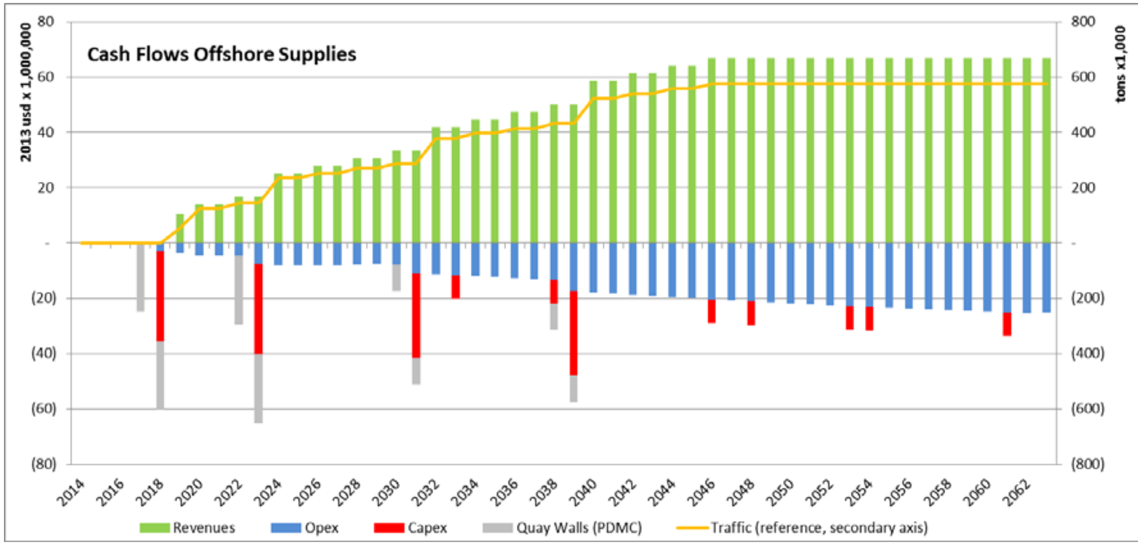
Offshore Supply Base is viable with modest returns



- The PDMC may sub-concession the Offshore Supply Base to a third-party Operator
- The PDMC is expected to invest in quay expansions parallel to market-driven terminal expansions; coverage for quay investments comes from berth rent and other port dues.
- After the initial investments, continuous investments are required to keep up with increasing demand and to replace superstructure and equipment.
- Opex-per ton levels are relatively high; especially due to the labour-intensive nature of the operations, combined with relatively low volumes. Levels are expected to remain relatively steady over time, since significant efficiency gains are not expected due to the small scale and high degree of specialisation and diversity of the activities on the terminal.
- Tariffs and Port Dues show are also expected to remain stable over time. The terminal shall sub-lease plots on his side to third parties, for which he charges an annual land lease. The lease income shall complement the modest income from operational activities.

- The business case of the operator is viable with modest returns.

Investments - Offshore Supplies - USD 2013		
Phase1 Capex Operator	32,609,280	USD
Phase 1 Capex PDMC (quay)	49,782,850	USD
Total Phase 1 Capex	**82,392,130**	**USD**
Additional first 10y Capex Operator	32,609,280	USD
Additional first 10y Capex PDMC (quays)	49,782,850	USD
Additional first 10y Capex	**82,392,130**	**USD**

Operator OPEX - Offshore Supplies - USD 2013			
	avg. <5y	avg. >5y	
Labor	26.70	21.87	USD/ton
Fuel & Electricity	2.80	2.05	USD/ton
Maintenance	2.62	4.49	USD/ton
Insurance	2.54	1.23	USD/ton
Other	9.75	6.08	USD/ton
Operator OPEX	**44.40**	**35.71**	**USD/ton**

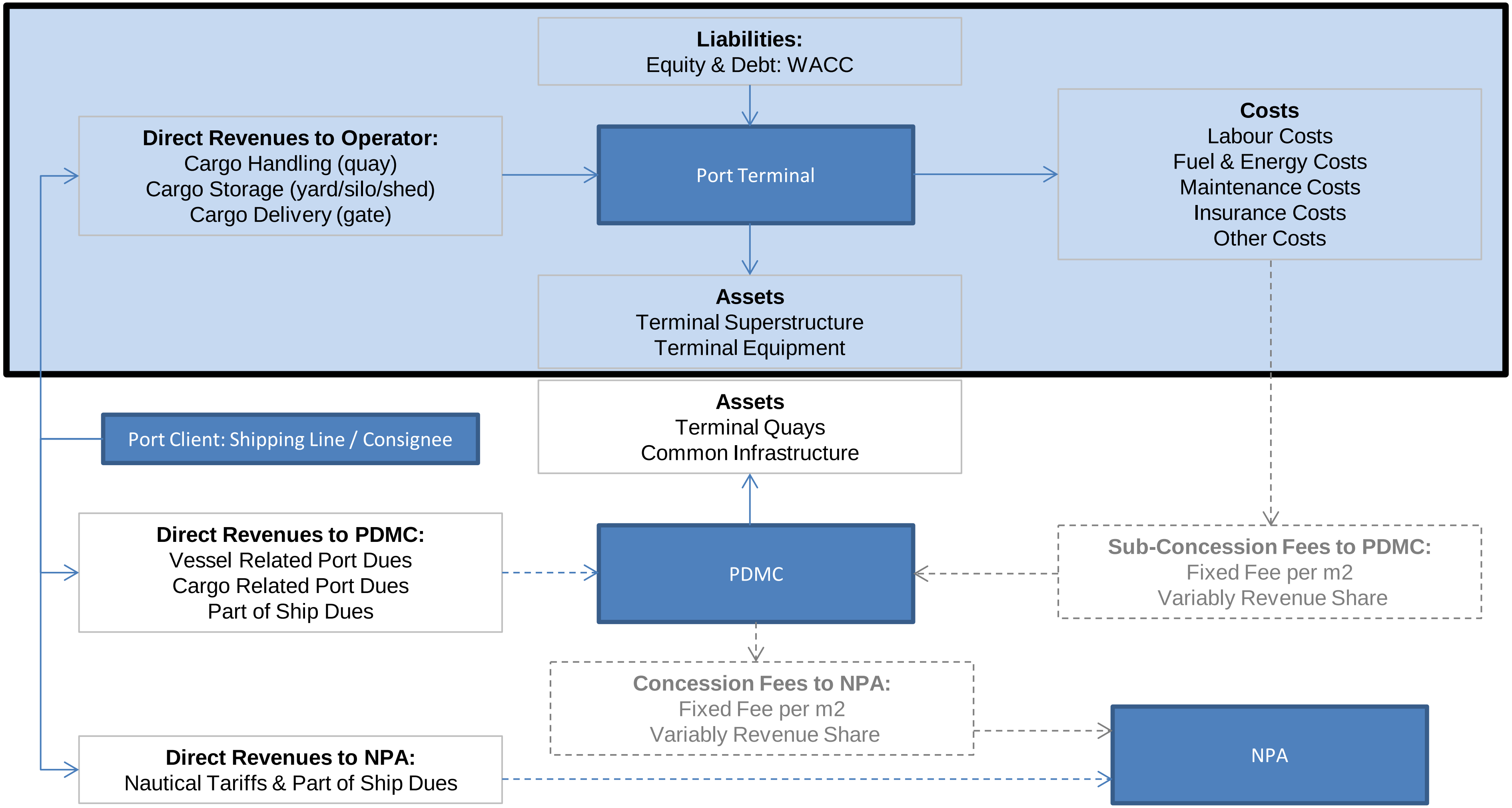
Operator Tariffs - Offshore Supplies - USD 2013				
	2013	2019	2030	
Handling	6.34	6.34	6.34	USD/ton
Storage	1.22	1.22	1.22	USD/ton
Delivery	0.50	0.50	0.50	USD/ton
Terminal Handling	3.75	3.75	3.75	USD/ton
Customs Charge	-	-	-	USD/ton
Operator Revenue	**11.81**	**11.81**	**11.81**	**USD/ton**
Land Lease		50	USD /m2	USD/m2/y
Land Lease per ton		185	104	USD/ton
Total Revenue		**197**	**116**	**USD/ton**

Port Dues - Offshore Supplies - USD 2013				
		2019	2030	
Towage & Mooring	NPA	-	-	USD/ton
Ship Dues	NPA	-	-	USD/ton
Ship Dues	PDMC	-	-	USD/ton
Light Dues	PDMC	-	-	USD/ton
Berth Rent	PDMC	-	-	USD/ton
Harbour Dues	PDMC	1.76	1.37	USD/ton
Environmental Protection	PDMC	0.10	0.08	USD/ton
Port Dues Revenue		**1.86**	**1.44**	**USD/ton**

Business Case - Offshore Supplies - Feasibility Operator		
Project IRR	**14.94%**	**%**
Project NPV	**74,654,837**	**USD**
WACC	**12.98%**	**%**
Payback Period	**11.1**	**years**

Business Model – Dry Bulk Terminal

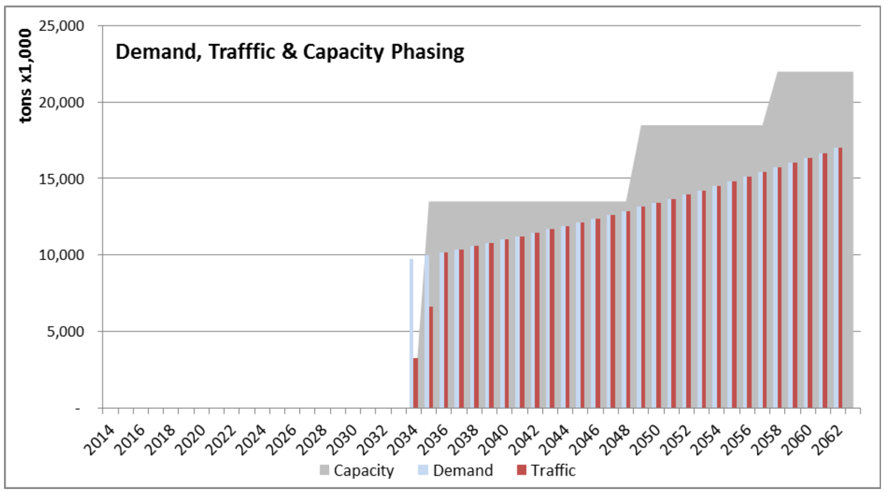
The Terminal Operator (or Terminal Sub-Concessionaire) shall invest in the terminal assets and operate it in accordance to industry standards. The Terminal Operator needs to run a viable business case, since he is investing its own equity and debt in his project.

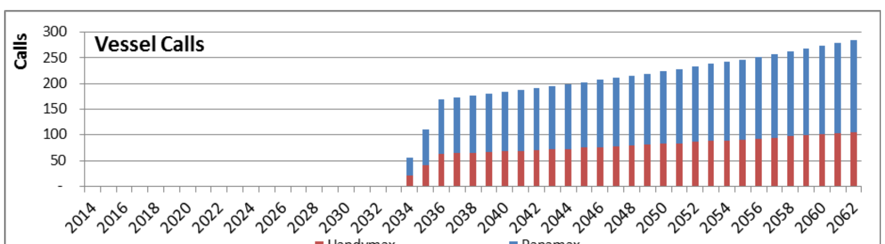


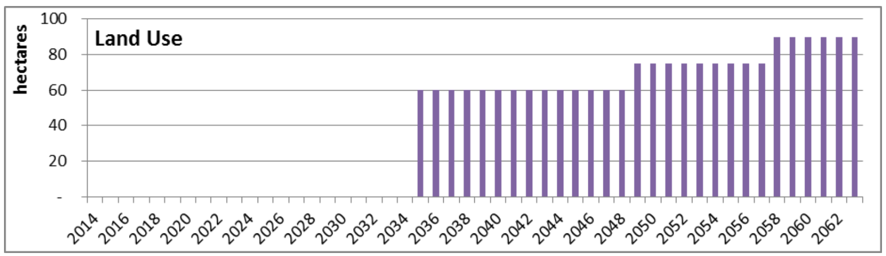
Traffic, Land use & Employment – Dry Bulk Terminal

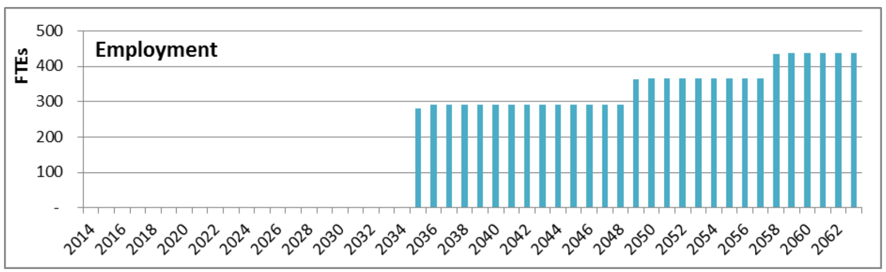
The traffic, land use and employment at the dry bulk terminal have the following characteristics :

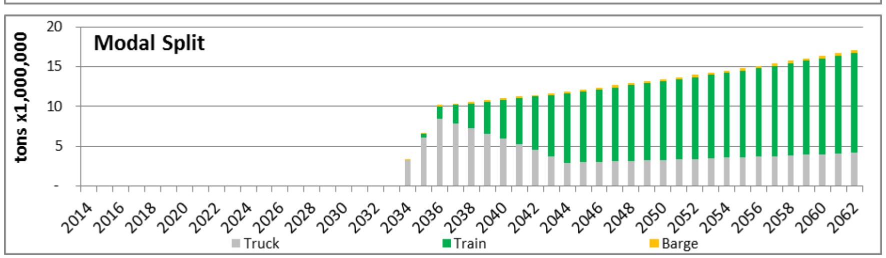
- Industrial-size dedicated dry-bulk activities projected to start when railway is available and when industrial client controlling volumes steps in. Both cannot be enforced, therefore dry bulk is not considered mandatory in the initial phase. Simulated to start in 2035, but may be earlier. Tender shall provide incentives to attract committed dry bulk volumes to accelerate development of dry bulk terminals.
- Considering captiveness of cargo, a 3-year ramp up to the market volumes is assumed in this postponed dry bulk development
- Fully developed, the dry bulk terminal consists of 6 berths (1,800m): 2 for cement; 2 for grains and 2 for other dry bulks. Total throughput capacity: 20 million tons per annum.
- The entire facility, for all its dry bulk trades is expected to attract over 300 vessels per annum on the long run
- Fully developed, the dry bulk terminal requires around 90 hectares of land and provides direct employment to over 400 people
- The train (once available) will be the primary modality for dry bulks: 75 percent of the tons shipped to/from the port are transported by train once the railway is operational .





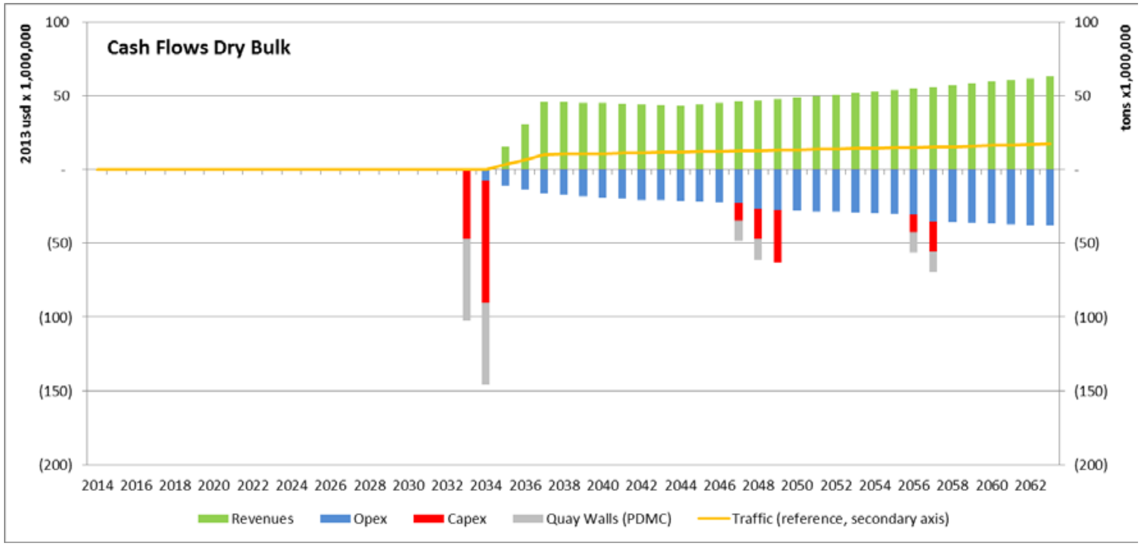






Project Performance – Dry Bulk Terminal

Dry Bulk terminal is viable on the long run or when significant volumes can be committed at an early stage



- The PDMC may sub-concession the Dry Bulk Terminal to a third-party Operator
- Although dry bulk operations may physically start with 1 berth, the early stage investments here show 4 berths to allow connection to the market forecast (2 berths for cement, 1 for grains, 1 for others)
- Revenue-stagnation in period 2038-45 caused by tariff erosion and modest autonomous growth after the forecast period (2035)
- Opex-per ton levels are relatively low due to high degree of automation. Levels remain relatively stable due to rapid ramp-up to market forecast minimizing the effects of economies of scale.
- Tariffs are expected to further erode during the initial years of operation.
- Port Dues show limited erosion since the postponed start of operations (2035) lies beyond the period in which the Port Dues are expected to erode for all trades (erosion has therefore already been taken into account in this output).
- The business case of the operator is viable with modest returns and strongly dependent on the availability of rail services and commitment of volumes

Investments - Dry Bulk - USD 2013		
Phase1 Capex Operator	32,326,272	USD
Phase 1 Capex PDMC (quay)	27,878,396	USD
Total Phase 1 Capex	**60,204,668**	**USD**
Additional first 10y Capex Operator	96,978,816	USD
Additional first 10y Capex PDMC (quays)	83,635,188	USD
Additional first 10y Capex	**180,614,004**	**USD**

Operator OPEX - Dry Bulk - USD 2013	avg. <5y	avg. >5y	
Labor	1.07	0.94	USD/ton
Fuel & Electricity	0.50	0.50	USD/ton
Maintenance	0.09	0.22	USD/ton
Insurance	0.10	0.06	USD/ton
Other	0.35	0.34	USD/ton
Operator OPEX	**2.11**	**2.06**	**USD/ton**

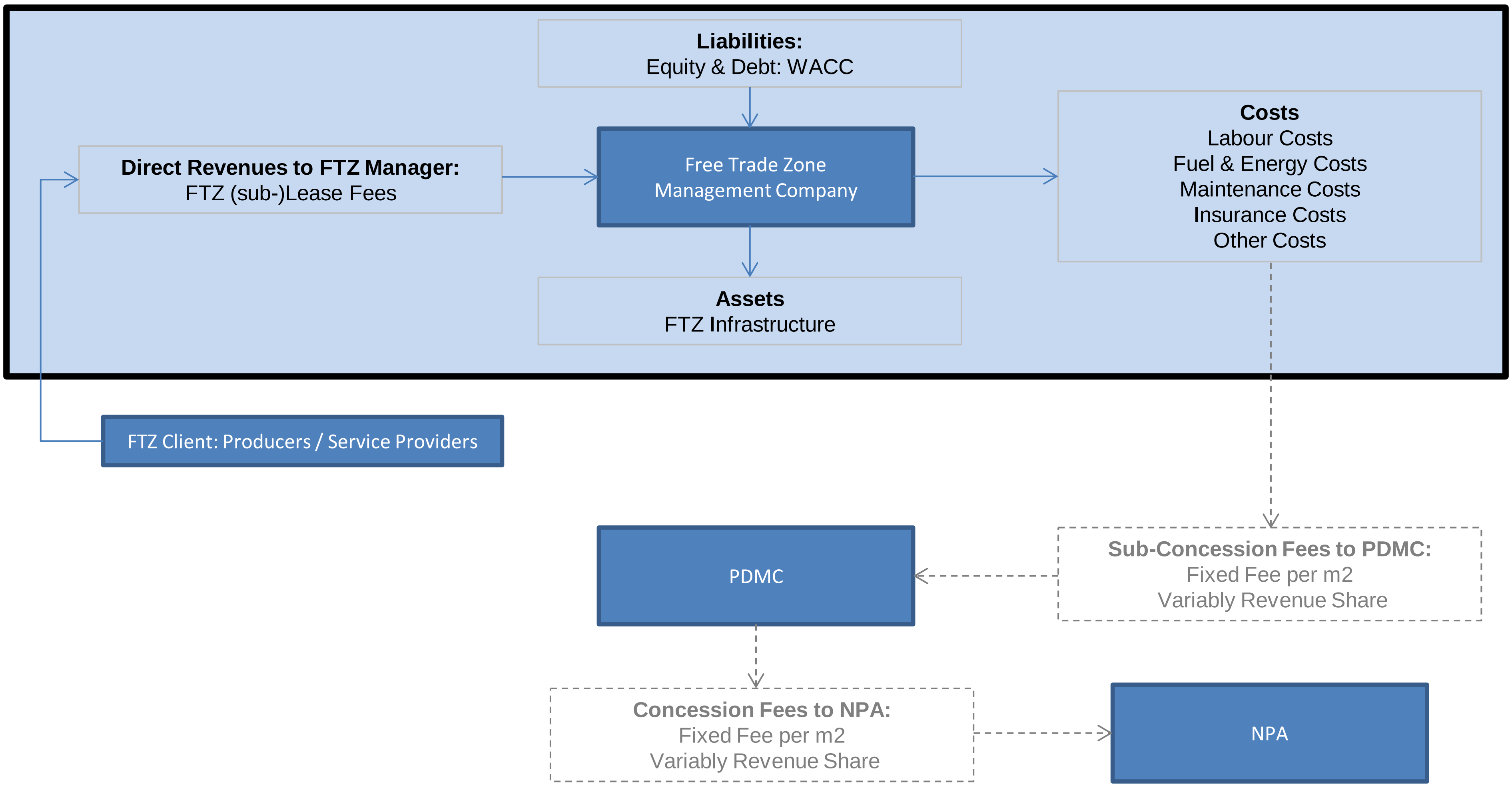
Operator Tariffs - Dry Bulk - USD 2013	2013	2035	2050	
Handling	4.53	3.76	2.94	USD/ton
Storage	0.49	0.40	0.32	USD/ton
Delivery	0.68	0.56	0.44	USD/ton
Terminal Handling	-	-	-	USD/ton
Customs Charge	-	-	-	USD/ton
Operator Revenue	**5.70**	**4.73**	**3.70**	**USD/ton**

Port Dues - Dry Bulk - USD 2013		2035	2050	
Towage & Mooring	NPA	0.02	0.02	USD/ton
Ship Dues	NPA	0.36	0.35	USD/ton
Ship Dues	PDMC	0.36	0.35	USD/ton
Light Dues	PDMC	0.37	0.37	USD/ton
Berth Rent	PDMC	0.01	0.01	USD/ton
Harbour Dues	PDMC	1.73	1.73	USD/ton
Environmental Protection	PDMC	0.07	0.07	USD/ton
Port Dues Revenue		**2.92**	**2.91**	**USD/ton**

Business Case - Dry Bulk - Feasibility Operator		
Project IRR	**13.33%**	**%**
Project NPV	**470,678**	**USD**
WACC	**12.98%**	**%**
Payback Period	**27.2**	**years**

Business Model – Free Trade Zone Management Company

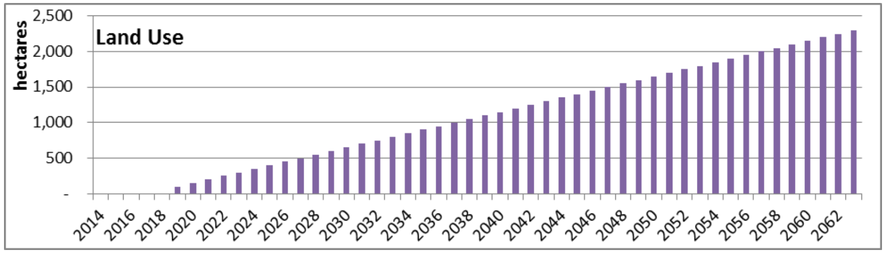
The FTZ Manager (or FTZ Sub-Concessionaire) shall attract tenants to the FTZ and subsequently invest in basic FTZ infrastructure allowing his tenants to invest in their own superstructure. The FTZ Manager may invest in warehousing or other superstructure if this is deemed viable. After specific FTZ land has been developed, the FTZ Manager shall maintain the property and provide basic FTZ services. The Manager needs to run a viable business case, since he is investing its own equity and debt in his project. His revenue base consists of sub-lease fees collected from tenants.

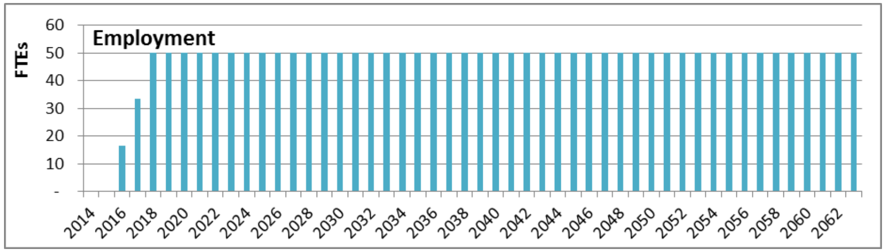


Traffic, Land use & Employment – Free Trade Zone

The FTZ has the following characteristics:

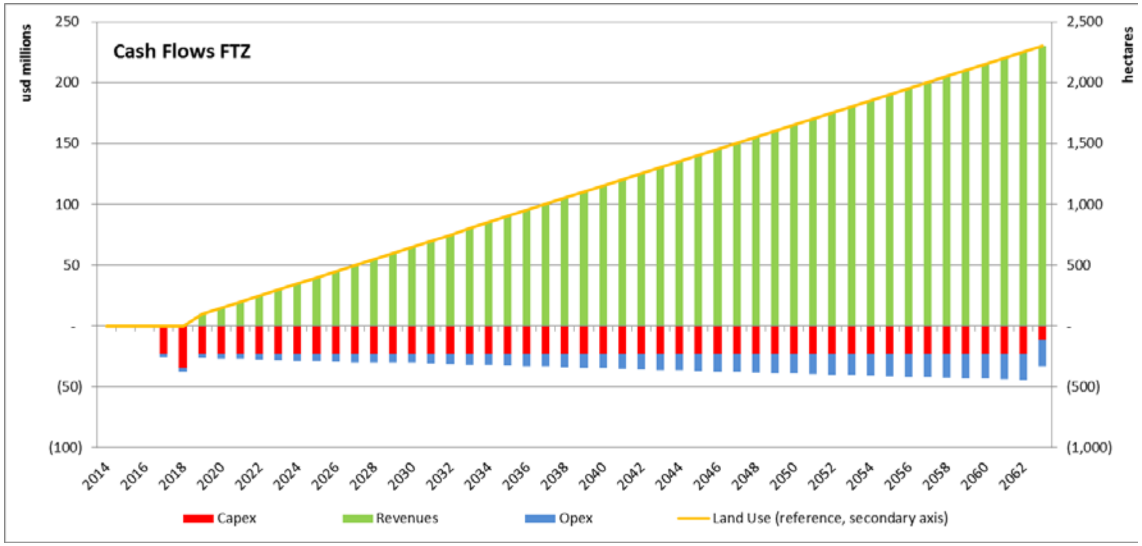
- The FTZ shall provide land to tenants who shall develop their facilities in the Free Trade Zone.
- The FTZ requires 2,300 hectares of land by 2063, based on the assumption that the FTZ expands by 50 hectares annually between 2018 and 2063. By the end of the forecast horizon (2035), the FTZ is expected to be around 1,000 hectares
- Managing the FTZ entails attracting tenants; managing land development and maintaining the existing common-user infrastructure e(e.g. internal roads). The FTZ management organisation is therefore not expected to render significant employment: only around 50 jobs. Indirect employment through the operators and service providers at the FTZ is however expected to be substantial.





Project Performance – Free Trade Zone

FTZ is viable with substantial returns



Investments - Free Trade Zone - USD 2013		
Land Development per m2	46	USD/m2
Land Development per ha	462,783	USD/ha
Phase1 Capex FTZ Manager	46,278,300	USD
Phase 1 Capex PDMC	-	USD
Total Phase 1 Capex	**46,278,300**	**USD**
Additional first 10y Capex FTZ Manager	451,213,425	USD
Additional first 10y Capex PDMC	-	USD
Additional first 10y Capex	**451,213,425**	**USD**

FTZ Manager OPEX - Free Trade Zone - USD 2013	avg. <5y	avg. >5y	
Labor	0.42	0.12	USD/m2
Fuel & Electricity	0.23	0.20	USD/m2
Maintenance	0.24	0.24	USD/m2
Insurance	0.32	0.24	USD/m2
Other	0.28	0.16	USD/m2
FTZ Manager OPEX	**1.48**	**0.97**	**USD/m2**
FTZ Manager OPEX	**14,842**	**9,677**	**USD/ha**

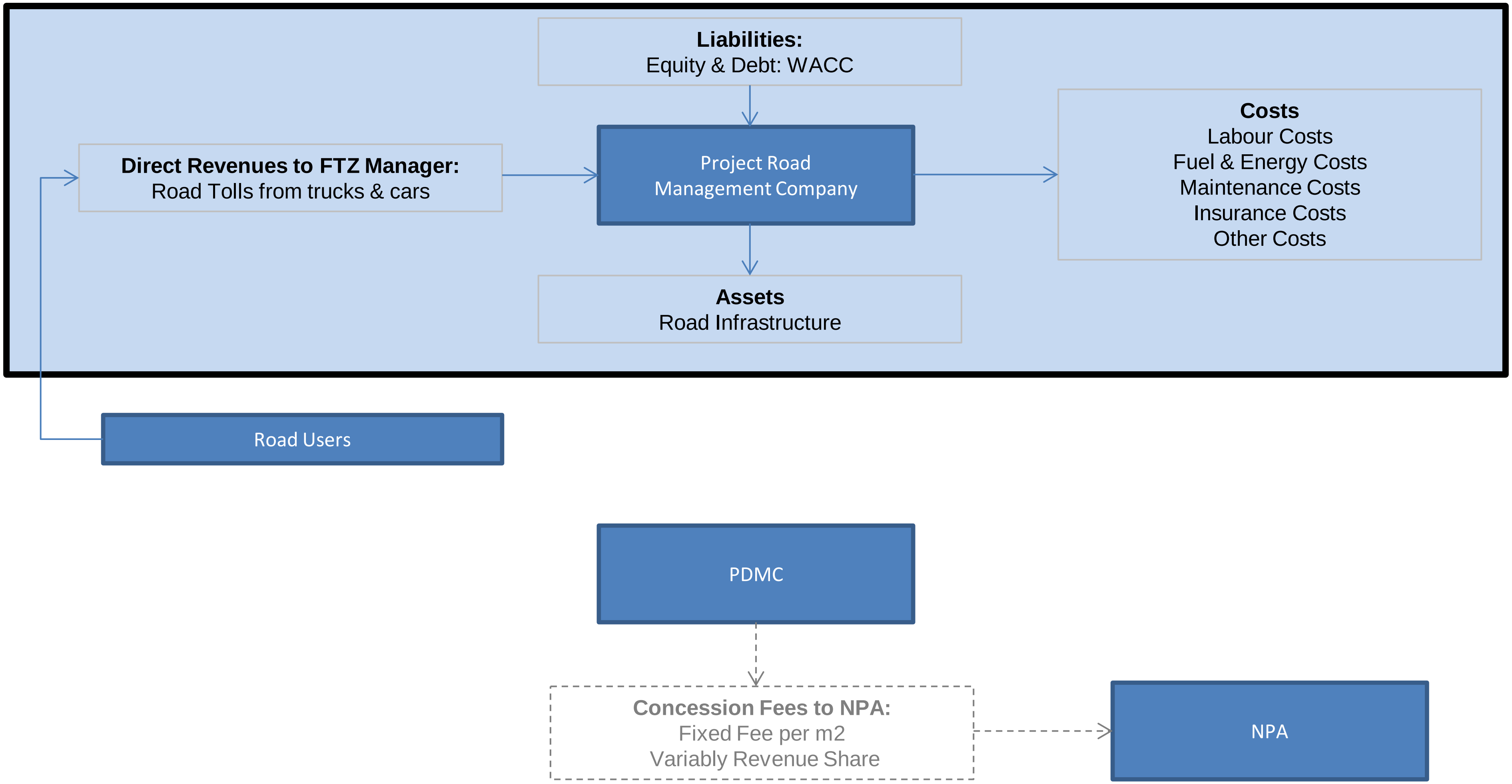
FTZ Manager Tariffs - Free Trade Zone - USD 2013	2019	2030	
Annual Land Lease Fees per m2	10	10	USD/m2
Annuel Land Lease Fees per ha	100,000	100,000	USD/ha

Business Case - Free Trade Zone - Feasibility FTZ Manager		
Project IRR	**18.48%**	**%**
Project NPV	**155,742,777**	**USD**
WACC	**11.73%**	**%**
Payback Period	**15.4**	**years**

- The PDMC may sub-concession FTZ Management to a third-party
- A minimum initial development of 100ha is envisaged, but annual growth of the FTZ is expected in accordance to regional developments and development of the port
- Opex-per m2 levels are relatively low since the main operating responsibilities and expenses are allocated to the tenants themselves. With a fixed staff of 50, labour costs per ha decline when the FTZ increases in size over time.
- A fixed rate of 10 USD per m2 per annum is charged to tenants for the FTZ land. This provides them with 1) a prepared plot with common infrastructure (internal roads, utility connections); 2) basic FTZ services; 3) fiscal and other incentives due to the FTZ status; and 4) proximity to the Ibom Deep Sea Port. This price is benchmarked against international peers. The price is less than the OSB, since the OSB provides superior access to OSB berths.
- No direct revenues and costs are envisaged for the PDMC (in case of sub-concessioning) and the NPA
- The business case of the operator is viable with substantial returns.

Business Model – Project Road Management Company

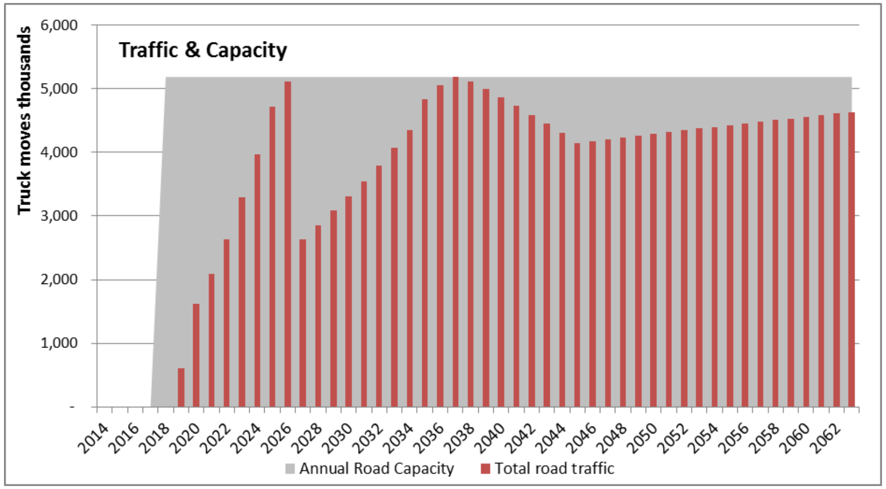
The Road Manager (or Road Sub-Concessionaire) shall invest in the Project Road connecting the Port to the Federal Highway System. After opening it shall maintain the road and provide basic road-side services. The Manager needs to run a viable business case, since he is investing its own equity and debt in his project. His revenue base consists of tolls collected from road users. The level of toll is minimised based on the assumption the Manager is capable of attaining his minimum required return (WACC).

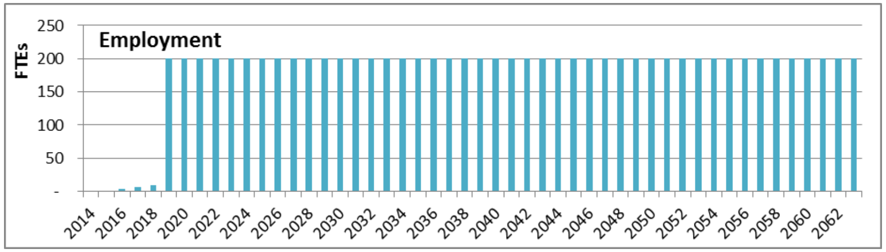


Traffic & Employment – Project Road Management Company

The road has the following characteristics:

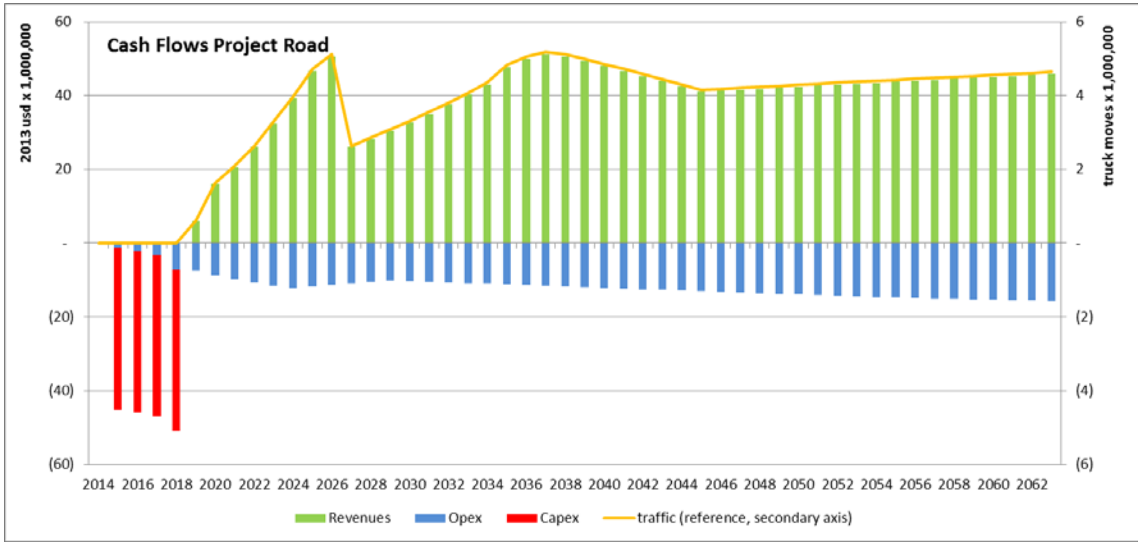
- The maximum capacity of the dual-carriage way is set at just over 5 million truck moves per annum.
- The traffic & capacity graph illustrates the moments when the pipeline connection becomes operational (2027), the moment the dry bulk terminal is operational (2035) and the moment the rail connection is operational (2035). These development have a direct impact I the use of the road.
- The project road will provide jobs to around 200 employees who are involved in manning toll booths, providing road-side services and management/back-office. Employees carrying out maintenance are not taken into account here: it is expected that this will be executed by third parties and therefore, these are covered though the maintenance OPEX.





Project Performance – Project Road Management Company

Project Road is viable without generating excess returns



Investments - Project Road - USD 2013		
Phase1 Capex Road Manager	175,018,500	USD
Phase 1 Capex PDMC	-	USD
Total Phase 1 Capex	**175,018,500**	**USD**
Additional first 10y Capex Road Manager	-	USD
Additional first 10y Capex PDMC	-	USD
Additional first 10y Capex	**-**	**USD**

Road Manager OPEX - Project Road - USD 2013			
	avg. <5y	avg. >5y	
Labor	1.52	1.56	USD/truck
Fuel & Electricity	0.09	0.05	USD/truck
Maintenance	0.93	0.79	USD/truck
Insurance	0.38	0.20	USD/truck
Other	0.69	0.52	USD/truck
Operator OPEX	**3.60**	**3.12**	**USD/truck**

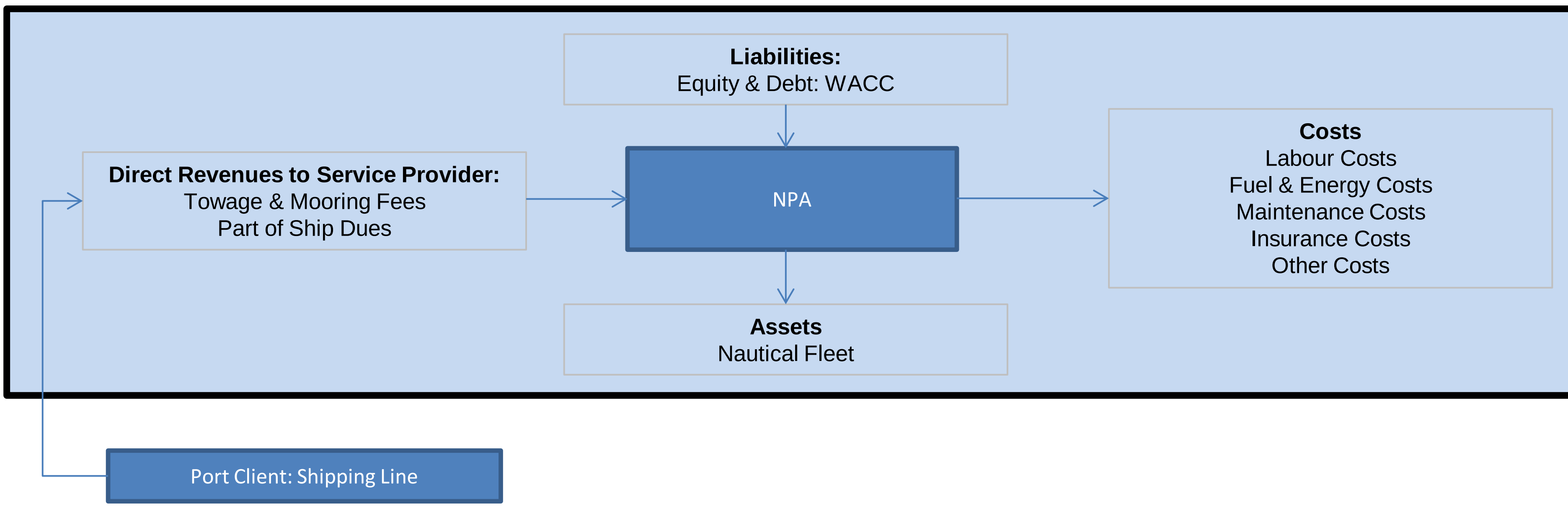
Road Manager Tariffs - Project Road - USD 2013			
	2019	2030	
Road Toll for Cars per 1-way trip	9.88	9.88	USD/truck
Road Toll for Trucks per 1-way trip	2.82	2.82	USD/car

Business Case - Project Road - Feasibility Operator		
Project IRR	**11.71%**	**%**
Project NPV	**0**	**USD**
WACC	**11.73%**	**%**
Payback Period	**13.8**	**years**

- The PDMC may sub-concession Road Management to a third-party
- The business case is dominated by large initial investments to develop the dual carriage-way.
- Revenues directly connect to the expected road use, which is impacted by development of the pipeline and the railway.
- Opex-per m2 levels are relatively stable and dominated by labour costs.
- A toll of around 10 USD per truck and 3 USD per car is charged in order for the road management company to cover its expenses; to recover its investments and to generate sufficient returns. Considering all other costs to move trade from its origin to its destination, these costs are low: limited impact on total cost of transport.
- No direct revenues and costs are envisaged for the PDMC (in case of sub-concessioning) and the NPA
- The business case of the operator is viable without excess returns: NPV of "0" is achieved by setting the toll to its current level.

Business Model – Nautical Services (NPA)

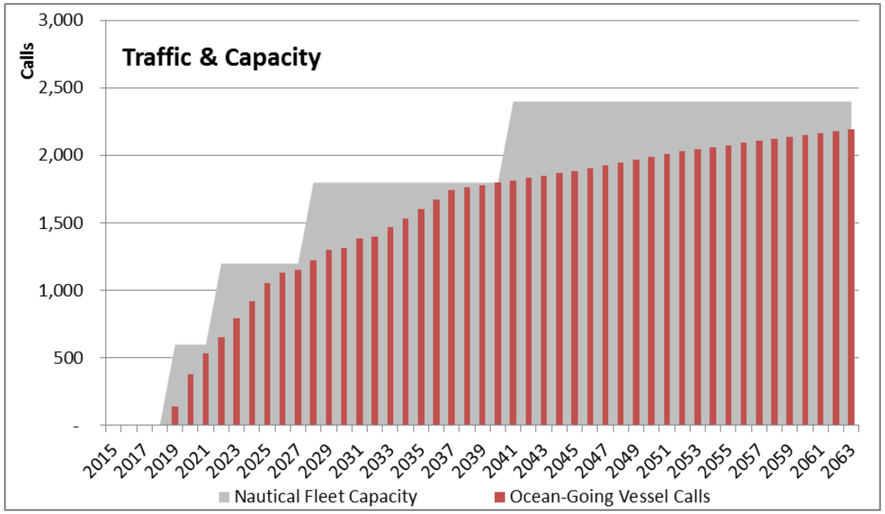
The NPA shall provide nautical services for the Project: Towage, mooring, pilotage and harbour master tasks. It shall invest in and operate the nautical fleet and it shall be compensated through specific parts of the Ship Dues.

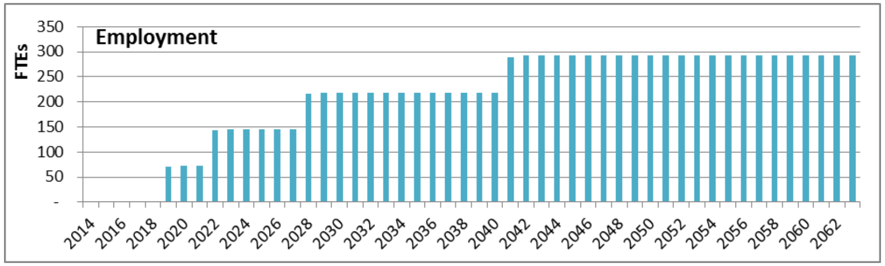


Traffic & Employment – Nautical Services (NPA)

The provision of nautical services has the following characteristics :

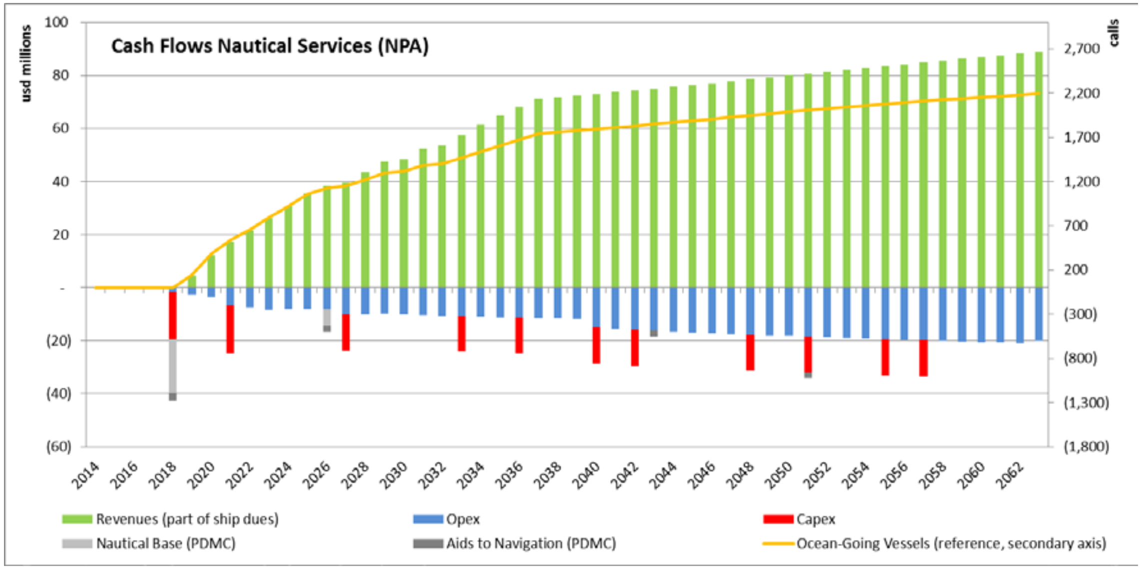
- The NPA invest in the nautical fleet and expands the fleet based on demand for the services, which is driven by vessel calls by ocean-going vessels.
- Over 2,000 ocean-going vessels are expected in the port on the long run.
- The nautical services provides jobs to nearly 300 employees once fully developed. This includes crews for the nautical fleet and people working in the harbour master's office.





Project Performance – Nautical Services (NPA)

Nautical services are viable with substantial returns



Investments - Nautical Services - USD 2013		
Phase1 Capex NPA	18,026,250	USD
Phase 1 Capex PDMC (base & aids)	23,106,375	USD
Total Phase 1 Capex	**41,132,625**	**USD**
Additional first 10y Capex NPA	13,585,000	USD
Additional first 10y Capex PDMC (base & aids)	8,554,275	USD
Additional first 10y Capex	**22,139,275**	**USD**

NPA OPEX - Nautical Services - USD 2013			
	avg. <5y	avg. >5y	
Labor	5,193	4,243	USD/call
Fuel & Electricity	1,400	1,025	USD/call
Maintenance	2,404	1,515	USD/call
Insurance	486	151	USD/call
Other	2,672	1,422	USD/call
NPA OPEX	**12,155**	**8,356**	**USD/call**

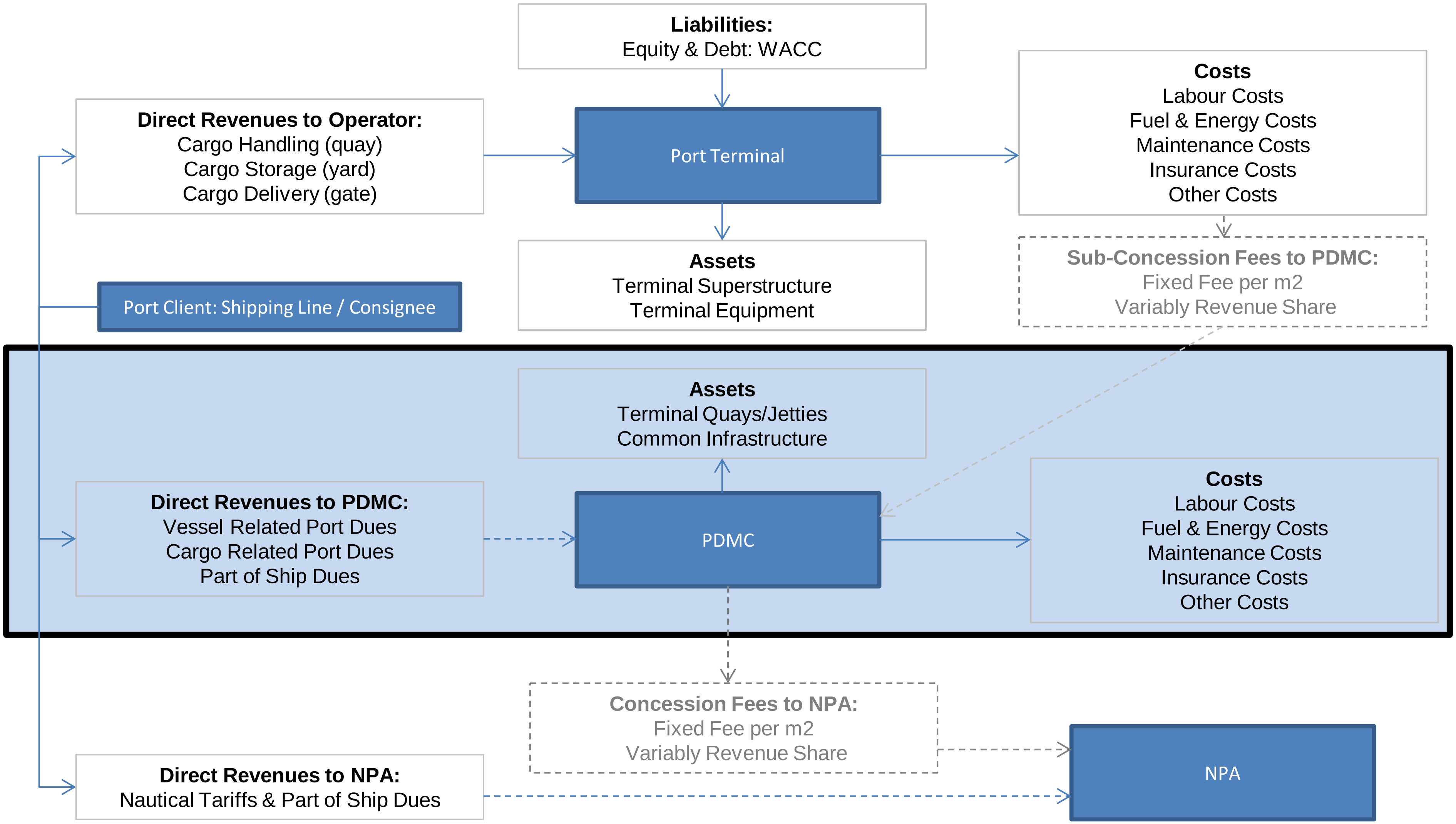
NPA Tariffs - Nautical Services - USD 2013			
	2019	2030	
Towage (fixed part ship dues)	454	378	USD/call
Mooring (fixed part ship dues)	1,786	1,473	USD/call
50% of variable part ship dues	29,501	35,043	USD/call
NPA Revenues	**31,741**	**36,893**	**USD/call**

Business Case - Nauticla Services - Feasibility NPA		
Project IRR	**14.13%**	**%**
Project NPV	**213,135,462**	**USD**
WACC	**10.00%**	**%**
Payback Period	**9.6**	**years**

- The NPA shall retain responsibilities for the nautical services, including the investments in the fleet. The PDMC shall provide the nautical base from which the fleet operates and the aids to navigation which are needed for safe vessel traffic in the port and the channel.
- The NPA may sub-concession their responsibilities to third-parties.
- Expansion of the fleet is connected to expected vessel traffic. Expansion of the aids to navigation and the nautical base by the PDMC are connected to the widening of the channel, which is also connected to the vessel traffic.
- Opex-per call levels are expected to drop as a result of economies of scale
- Revenues for the nautical services are directly derived from the shipping lines by means of the Ship Dues. The consist of a fixed component for towage and mooring and a variable component charged on the vessel's GT, for pilotage and harbourmaster tasks. Since this variable part also provides coverage for channel development/maintenance and waste management (both PDMC responsibilities), part of this variable component is shared with the PDMC.

Business Model – Port Management (PDMC)

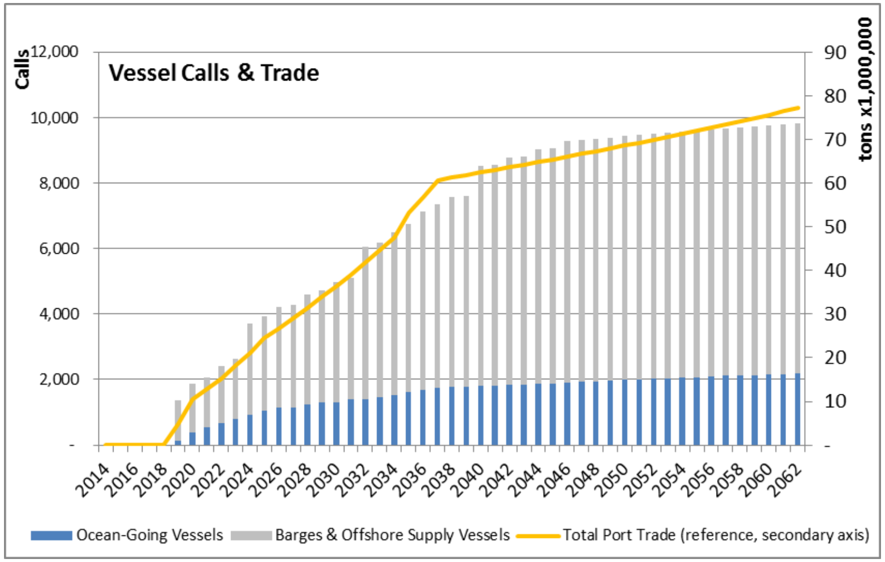
Apart from the operational business units (which may be sub-concessioned), the PDMC also holds the responsibilities for developing the common user infrastructure including the quays and jetties. Investments and expenses can be recovered by the various Port Dues which are (partly) allocated to the PDMC. No concession payments to the NPA and no sub-concession income from sub-concessionaires are taken into account at this stage.

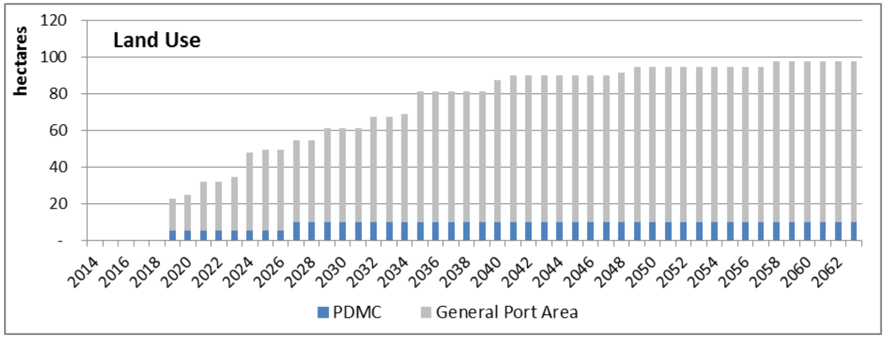


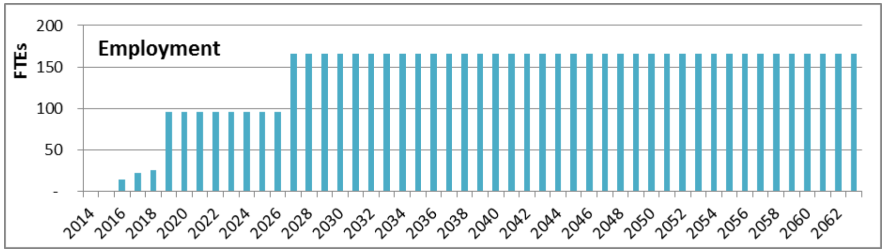
Traffic, Land use & Employment – Port Management (PDMC)

The traffic, land use and employment of the supplier of the common infrastructure (PDMC) have the following characteristics :

- By the end of the forecast horizon (2035), the port shall handle approximately 60 million tons of goods (containerized, breakbulk, liquid bulk, dry bulk).
- Nearly 10,000 vessels shall call the port annually once it has fully developed. The majority of these calls are barges and offshore supply vessels. Around 2,000 calls by ocean-going vessels are expected. The ocean-going vessels pay port dues to the PDMC (and the NPA; part of the Ship Dues).
- The PDMC, for its own activities (port management) only uses a limited area: up to 10 hectares after an expansion by 2027. Besides this area, the port manager (PDMC) also holds the responsibilities of the general port area outside the gate of the individual terminals. This area is assumed at 20% of the total terminal area and comprises of internal roads, public parking, road sidings and other general areas within the concession area. Over 1,200 container vessels call the port by 2035, including over 400 annual barge calls for distribution of full and empty containers between the terminal and regional ports.
- The PDMC shall employ around 160 persons, which are predominantly involved in port management, which covers a broad range of non-operational tasks such as finance & control, marketing, account management, contract management. Maintenance is not considered part of this, as it is expected that third service providers shall be involved in the maintenance of the common infrastructure.

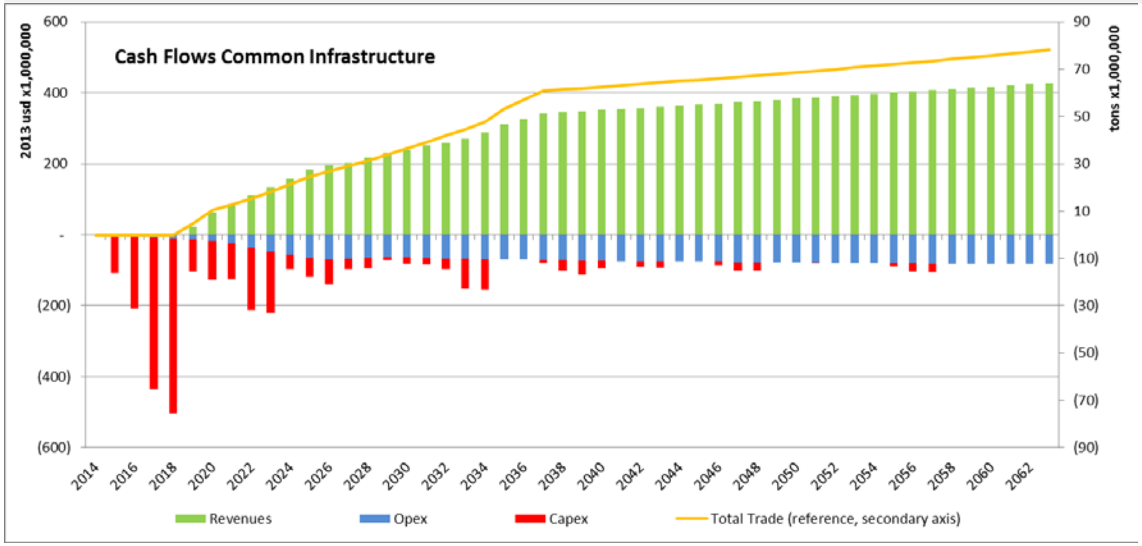






Project Performance – Port Management (PDMC)

PDMC is not viable without value being transferred from the operational business units



Investments - Common Infrastructure - USD 2013		
Phase1 Capex Operators	652,451,040	USD
Phase1 Capex NPA	18,026,250	USD
Phase 1 Capex PDMC Common Infra	**1,089,876,749**	**USD**
Total Phase 1 Capex	**1,760,354,039**	**USD**
Additional first 10y Capex Operators	1,379,178,705	USD
Additional first 10y Capex NPA	18,026,250	USD
Additional first 10y Capex PDMC Common Infra	**887,273,612**	**USD**
Additional first 10y Capex	**2,284,478,567**	**USD**

PDMC OPEX - Common Infrastructure - USD 2013	avg. <5y	avg. >5y	
Labor	0.25	0.09	USD/ton
Fuel & Electricity	0.06	0.03	USD/ton
Maintenance	0.84	0.85	USD/ton
Insurance	0.85	0.20	USD/ton
Other	0.51	0.25	USD/ton
Operator OPEX	**2.52**	**1.42**	**USD/ton**

PDMC Port Dues - Common Infrastructure - USD 2013	2019	2030	
Ship Dues (50%)	0.89	1.27	USD/ton
Light Dues	1.46	1.55	USD/ton
Berth Rent	0.04	0.04	USD/ton
Harbour Dues	2.47	3.45	USD/ton
Environmental Protection	0.13	0.19	USD/ton
Port Piers	0.09	0.05	USD/ton
Port Dues Revenue	**5.08**	**6.55**	**USD/ton**

- The PDMC invests in all common user infrastructure, which covers the channel, basins, breakwater, general port area, quay walls, jetties, berths and land reclamation. It will do so in accordance to its concession agreement (initial investments) and in accordance to market developments (expansions). The strong growth of trade during the forecast period (2035), triggers many terminal expansions and a channel widening.
- Opex-per TEU levels are expected to drop as a result of efficiency gains through learning curves (short term) and economies of scale due to increasing trade (medium term)
- The PDMC needs to cover its costs and investments through the port dues it receives. Part of the dues (Ship Dues) are shared with the NPA to allow NPA to cover its costs and investments for the nautical fleet/services .

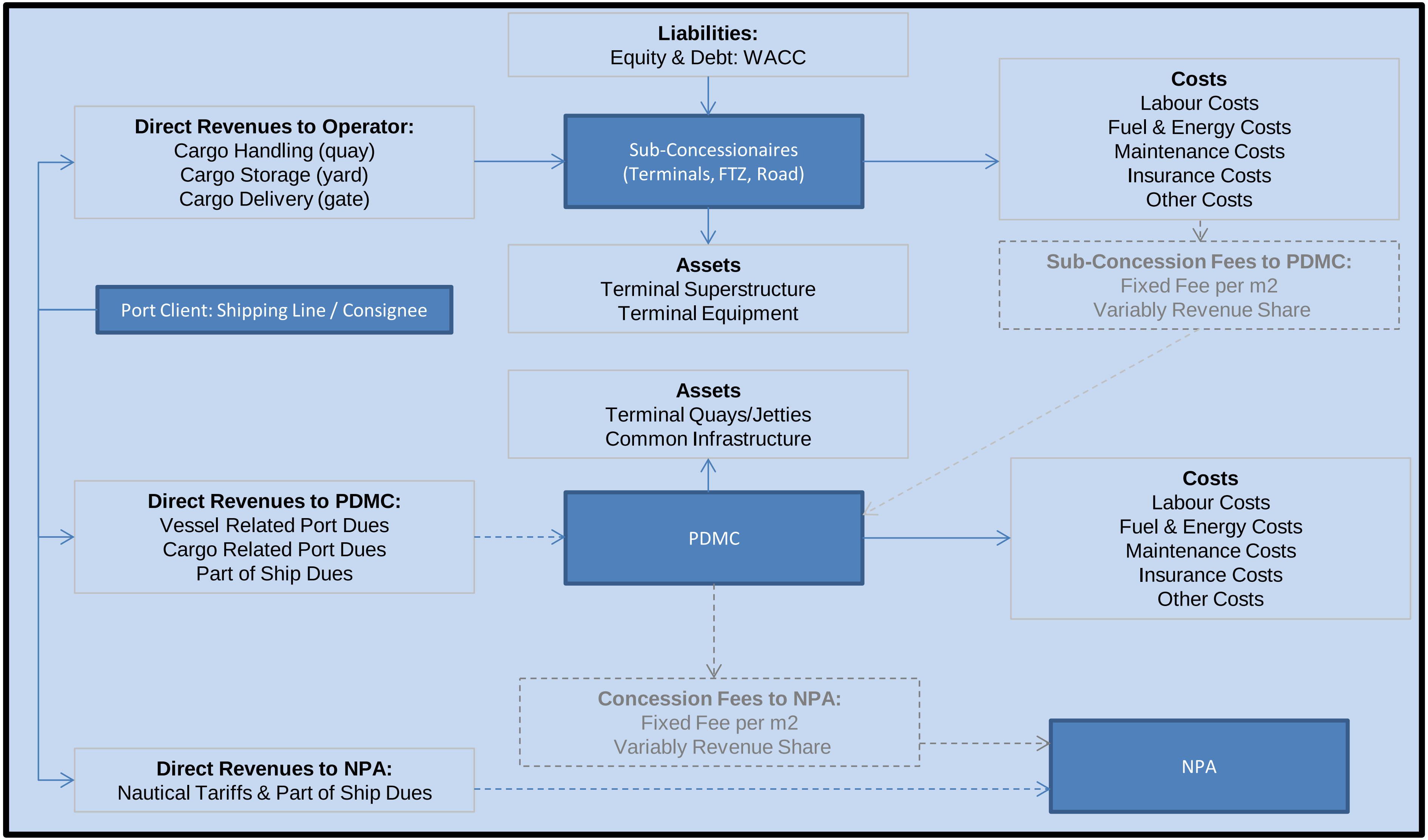
Business Case - Common Infrastructure - Feasibility PDMC		
Project IRR	**10.65%**	**%**
Project NPV	**(649,973,564)**	**USD**
WACC	**11.98%**	**%**
Payback Period	**22.9**	**years**

- With a negative NPV, the business case of the PDMC is not viable at this stage. This is expected since the substantial investments and associated costs in common infrastructure cannot be recovered solely with the Port Dues. Part of the value from the operational business units needs to be shifted to the PDMC to a viable case for the Port Manager. Sub-concession fees may be used for this end.

Contents

Business Model – Ibom DSP Project

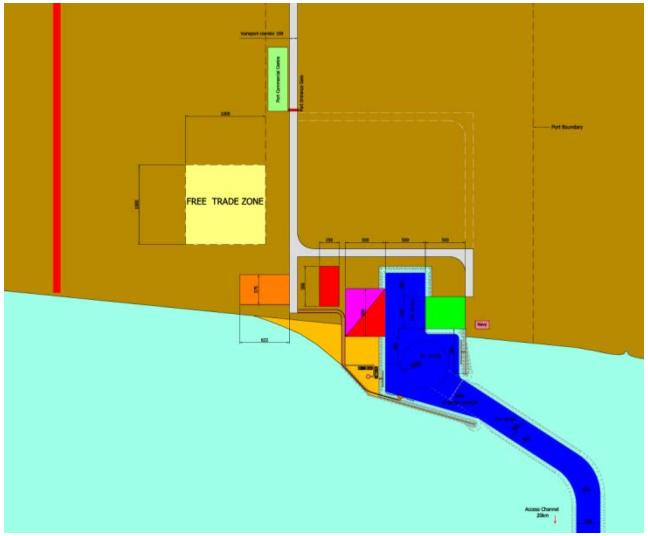
Once the viability of all individual business units in the project are established, the viability of the entire project may be established taking into account all public and private entities. No (sub-)concession payments are taken into account on this level.

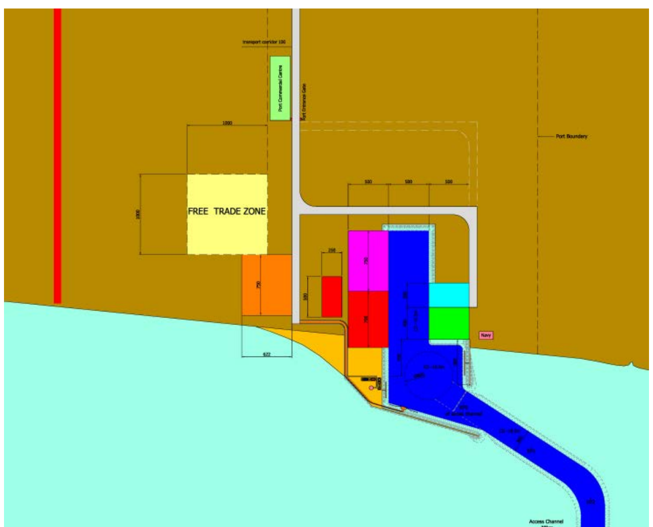


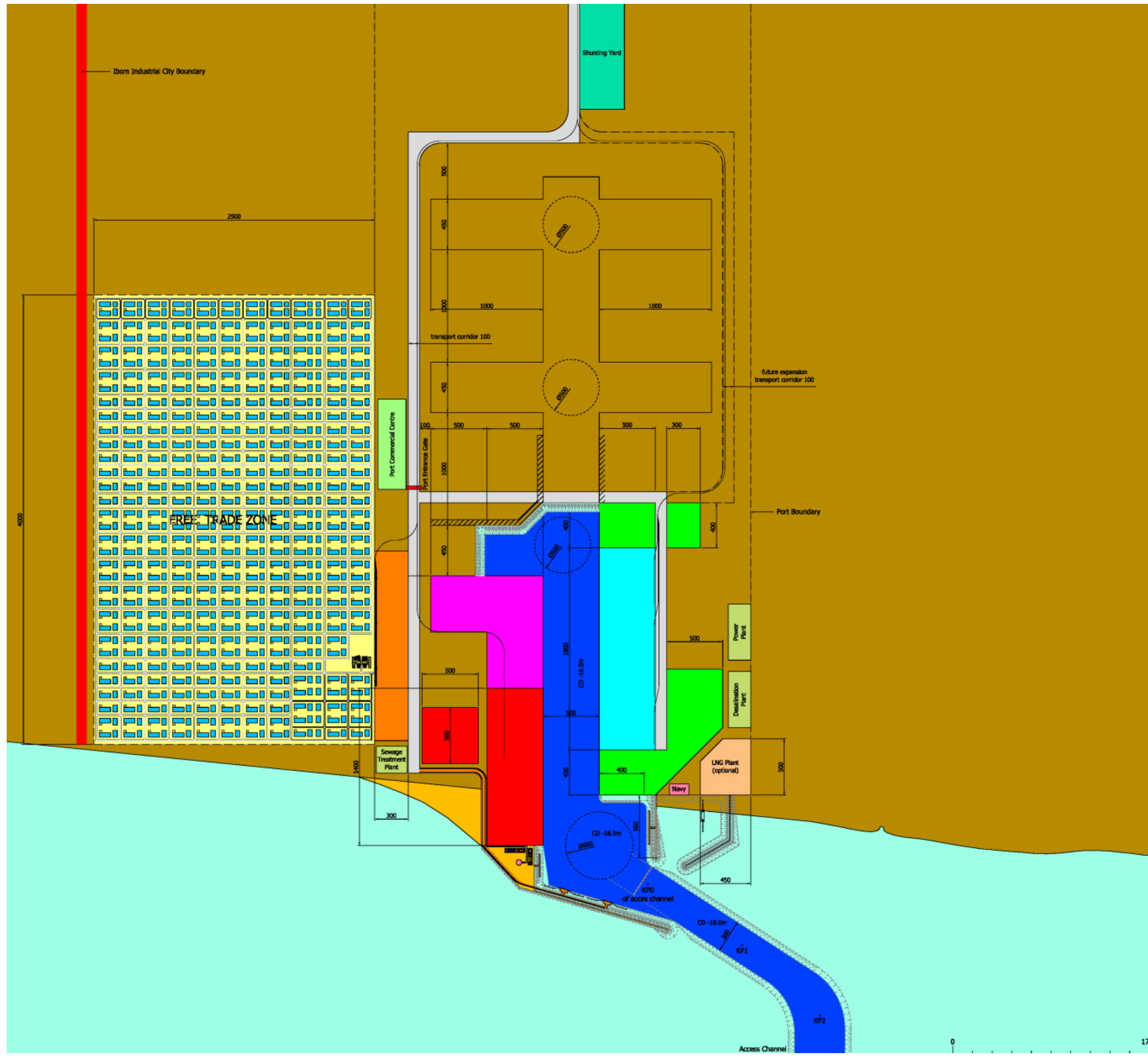
Project Performance – Project Characteristics 1/2

The Ibom DSP Project Covers the phased development of a Deep Sea Port and adjacent Free Trade Zone in Akwa Ibom State, Nigeria.

Reference designs for Minimal First Phase Development (top left); Maximum First Phase (bottom left); and Master Plan 2035 (right)

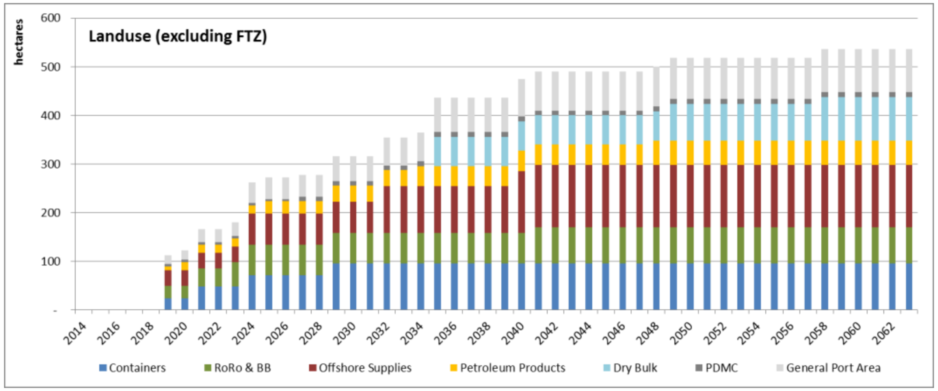


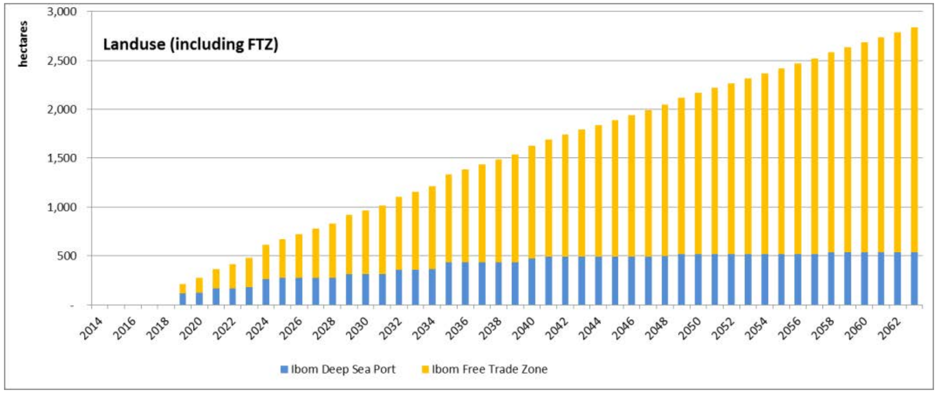


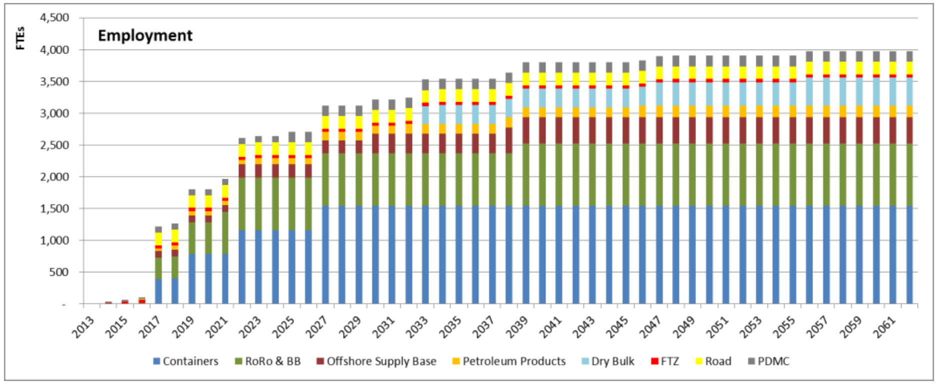


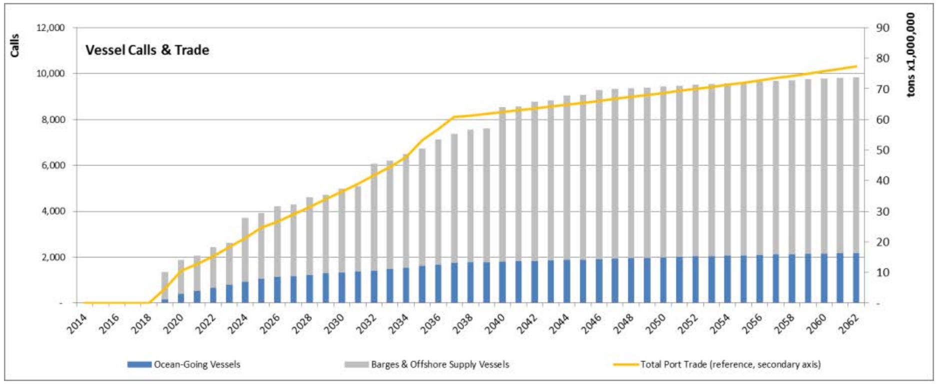
Project Performance – Project Characteristics 2/2

Primary project output comprises of the collective output from the underlying operational business units. A total area of nearly 3,000 hectares is used to develop the Project, comprising of the Deep Sea Port (500 hectares) and the Free Trade Zone (2,500 hectares). Total direct employment from the project is estimated at 4,000 jobs. The port is forecasted to process over 75 million tons of trade per annum. 10,000 vessel calls are projected per annum, comprising of 2,000 ocean-going ships and 8,000 calls by offshore supply vessels and barges.





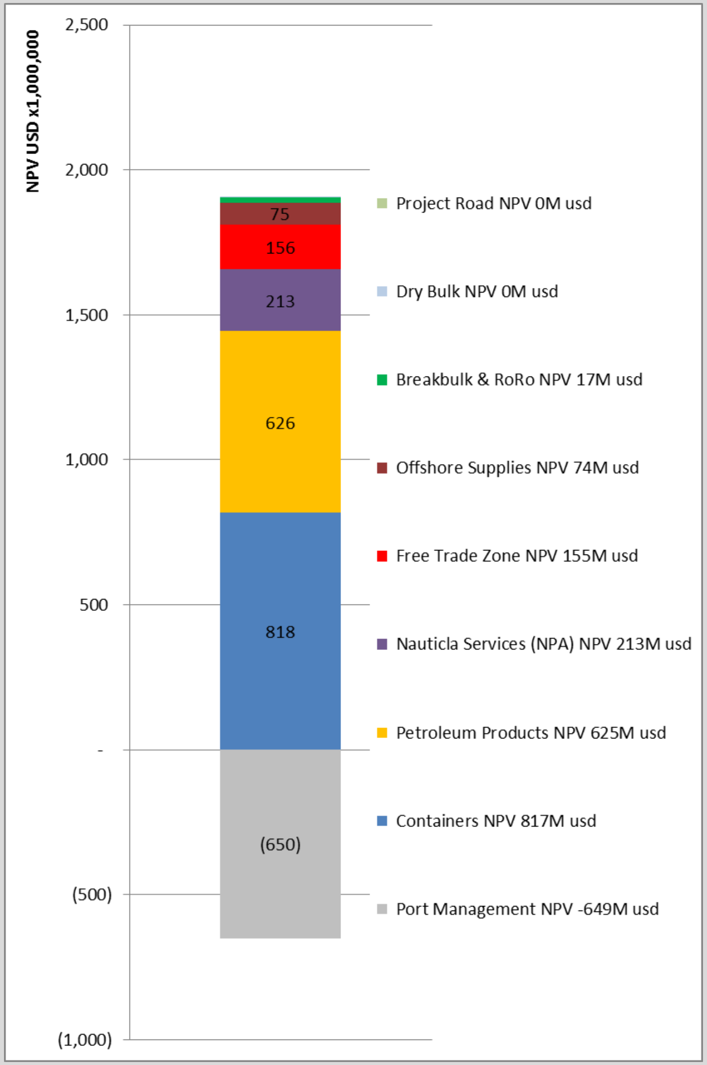




Project Performance – Project Viability 1/2

The Net Present Value of the entire project is the cumulative NPV of all underlying entities, including the terminals, the FTZ, the road, the nautical services (NPA) and the port management (PDMC)

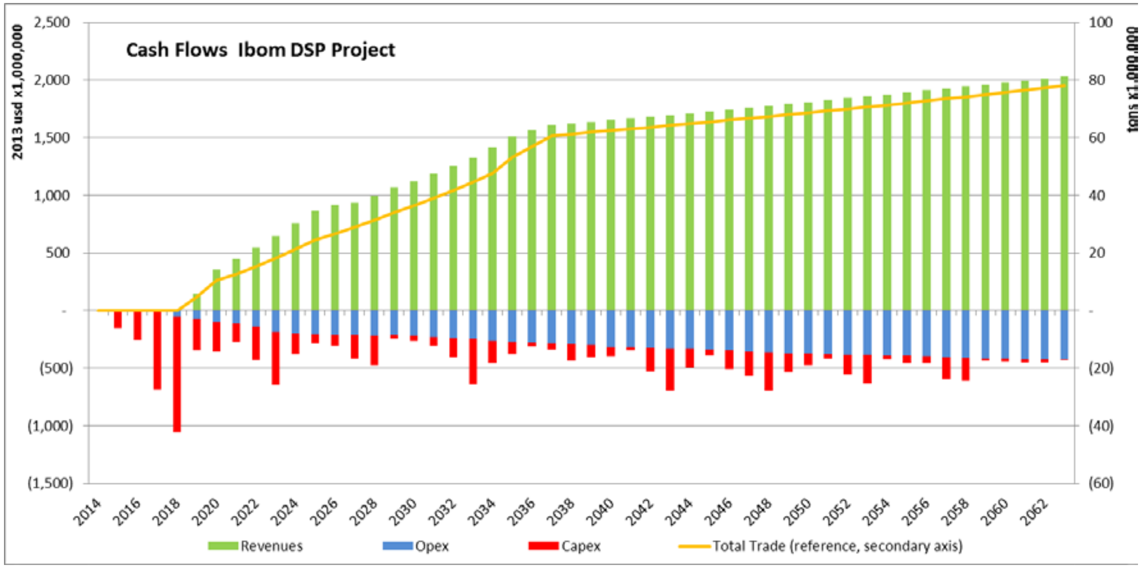
4	IBOM DSP PROJECT	1,255M
5	CONCESSIONAIRE – PDMC	
1A	CONTAINER TERMINAL	817M
1B	BREAKBULK/RORO TERMINAL	17M
1C	PETROLEUM PRODUCTS TERMINAL	625M
1D	OFFSHORE SUPPLY BASE	74M
1E	DRY BULK TERMINAL	0.5M
1F	FTZ MANAGEMENT	155M
1G	TOLL ROAD MANAGEMENT	0M
2	PORT MANAGEMENT	-649M
6	CONCESSION GRANTOR – NPA	
3	NAUTICAL SERVICES	213M



Project Performance – Project Viability 2/2

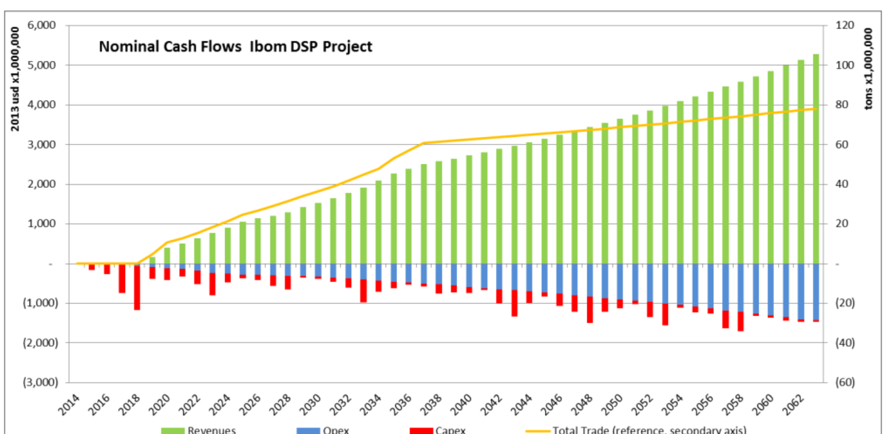
Felak Concept Limited mtbs

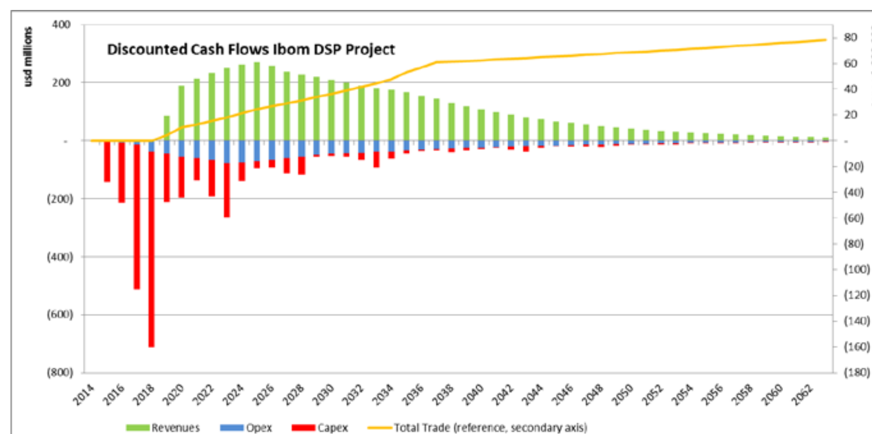
The Ibom DSP Project, covering all public and private activities, is viable, having an Internal Rate of Return of 16.9% and a Net Present Value in excess of 1.2B USD (using blended Weighted Average Cost of Capital of 13.02%.



Investments - Ibom DSP Project - USD 2013		
Phase1 Capex Operators	652,451,040	USD
Phase1 Capex NPA	18,026,250	USD
Phase 1 Capex PDMC Common Infra	1,089,876,749	USD
Total Phase 1 Capex	**1,760,354,039**	**USD**
Additional first 10y Capex Operators	1,379,178,705	USD
Additional first 10y Capex NPA	18,026,250	USD
Additional first 10y Capex PDMC Common Infra	887,273,612	USD
Additional first 10y Capex	**2,284,478,567**	**USD**

Business Case - Ibom DSP Project - Feasibility Ibom DSP Project		
Project IRR	**16.89%**	**%**
Project NPV	**1,255,193,910**	**USD**
WACC	**13.02%**	**%**
Payback Period	**13.9**	**years**

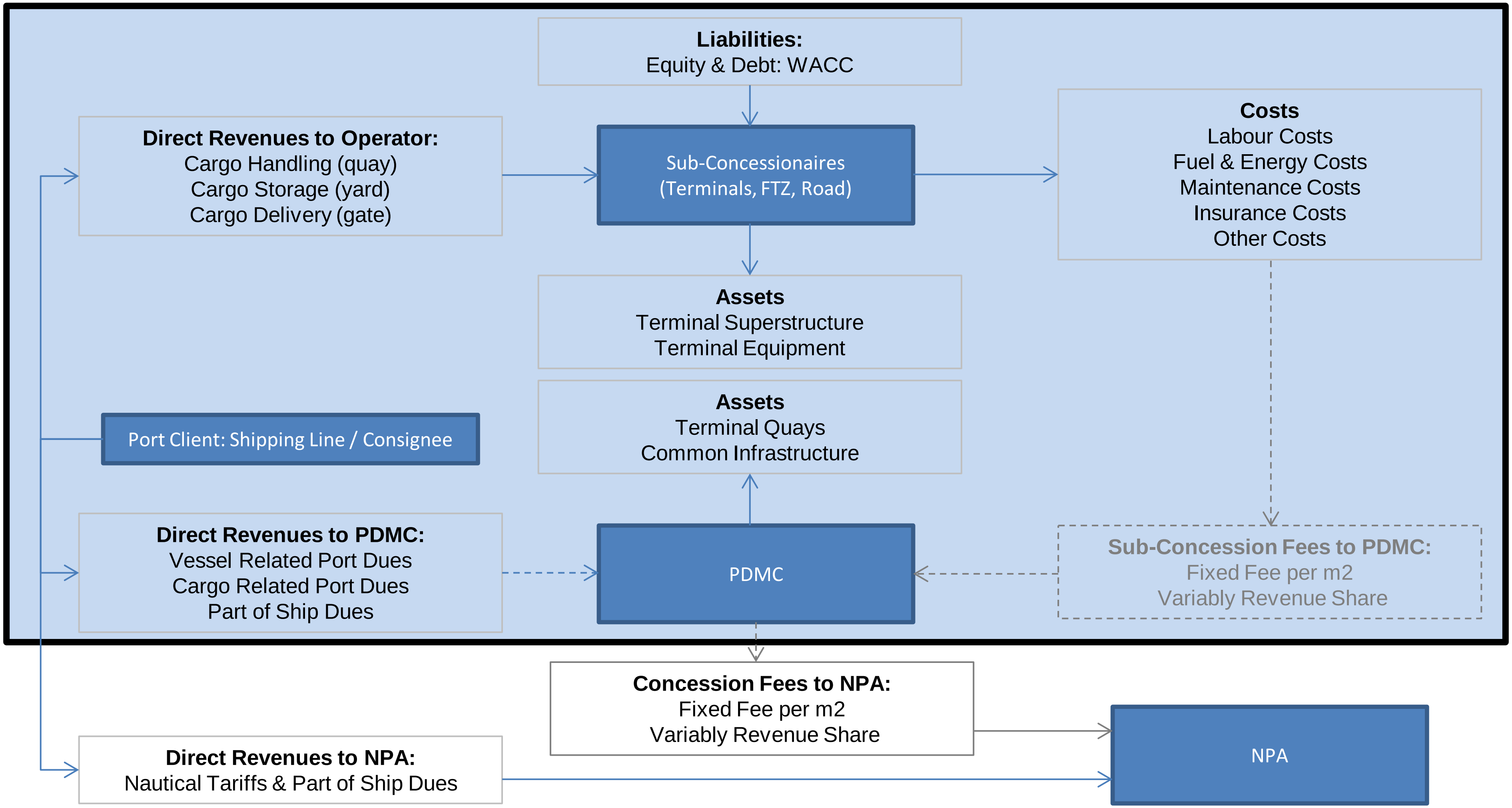




Contents

Business Model – Concessionaire (PDMC)

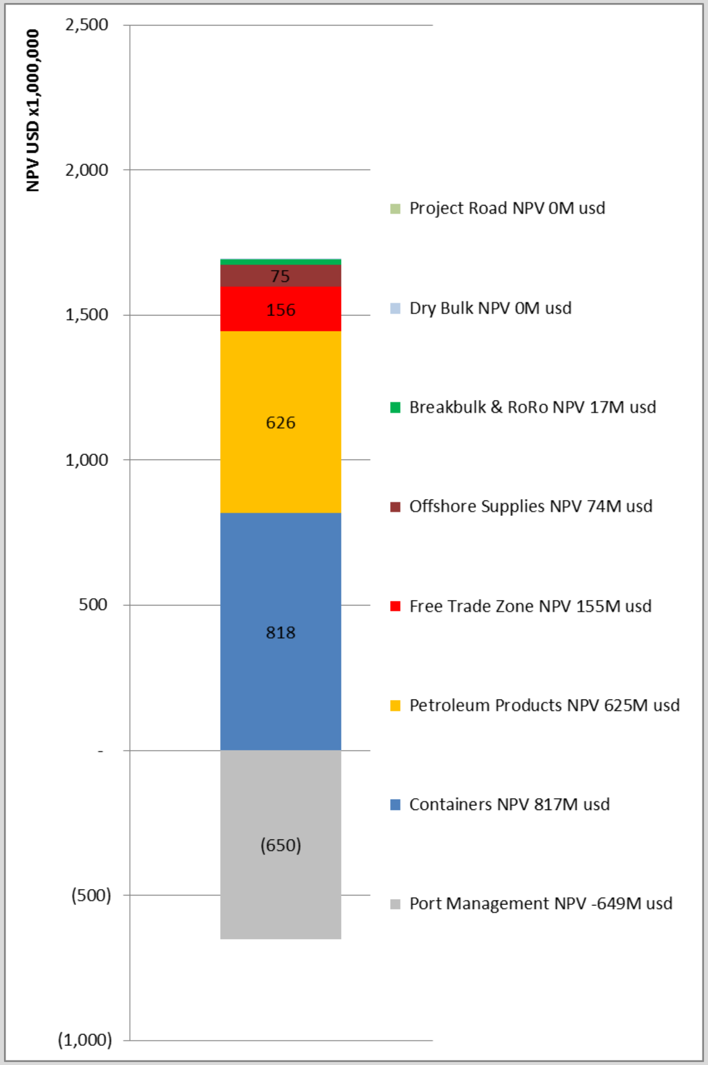
The PMDC is the Concessionaire and according to the Concession Agreement it shall be responsible for the entire Private development. This excludes the investments and operational responsibilities allocated to the NPA, but it includes all other investments and responsibilities, including those which he may sub-concession to third-parties.



Project Performance – Concessionaire Viability 1/2

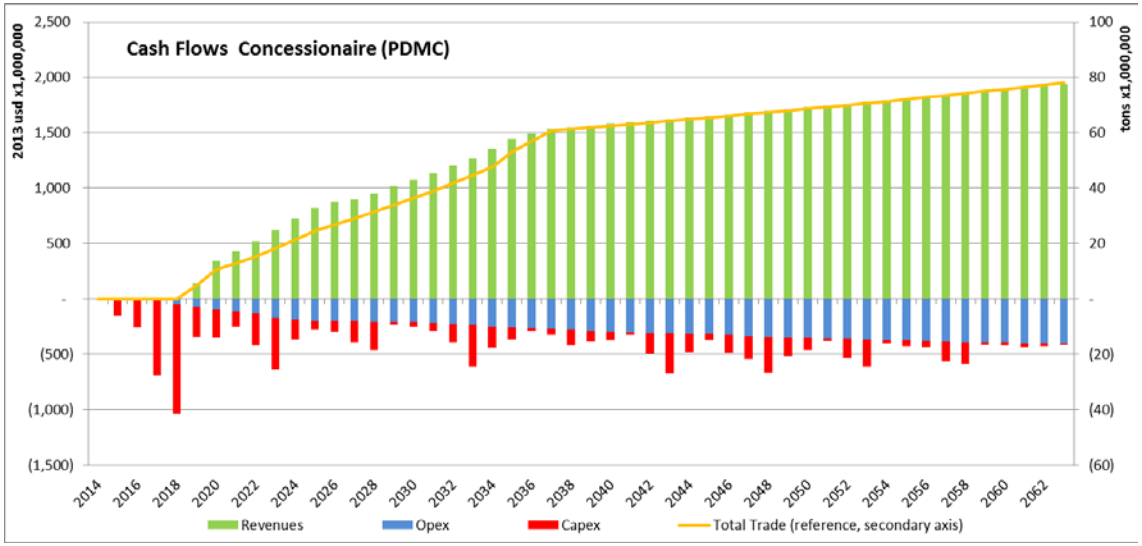
The Net Present Value of the Concessionaire is the cumulative NPV of all underlying entities, including the terminals, the FTZ, the road and the port management (PDMC). The nautical services are excluded as these functions are not ceded to the PDMC.

4	IBOM DSP PROJECT	1,255M
5	CONCESSIONAIRE – PDMC	1,042
1A	CONTAINER TERMINAL	817M
1B	BREAKBULK/RORO TERMINAL	17M
1C	PETROLEUM PRODUCTS TERMINAL	625M
1D	OFFSHORE SUPPLY BASE	74M
1E	DRY BULK TERMINAL	0.5M
1F	FTZ MANAGEMENT	155M
1G	TOLL ROAD MANAGEMENT	0M
2	PORT MANAGEMENT	-649M
6	CONCESSION GRANTOR – NPA	
3	NAUTICAL SERVICES	213M



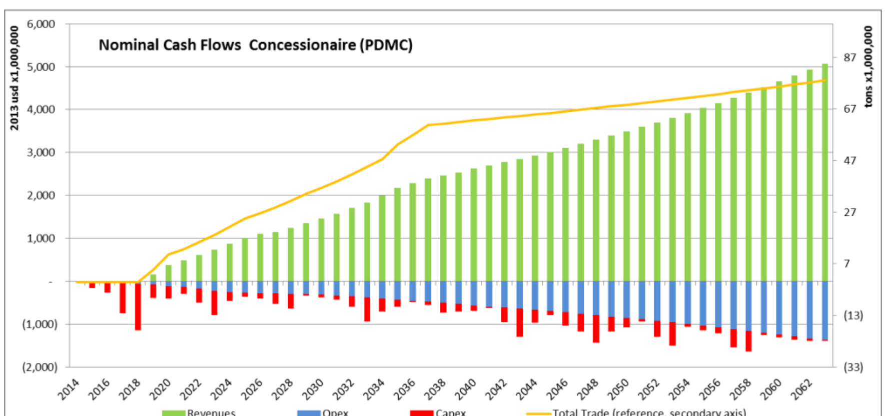
Project Performance – Concessionaire Viability 2/2

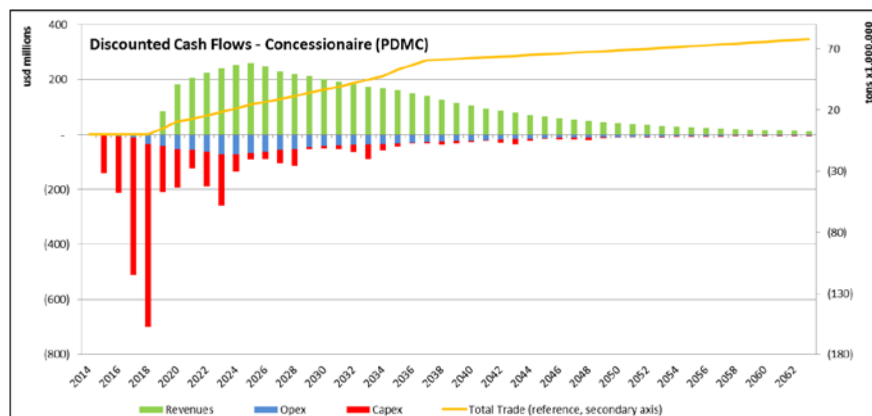
The Concessionaire (PDMC), covering all public activities, is viable, having an Internal Rate of Return of 18.4% and a Net Present Value in excess of 1.0B USD (using blended Weighted Average Cost of Capital of 13.20%. Considering the overall feasibility of the Concessionaire, concession payments may be established between the Concessionaire and the Concession Grantor (NPA).



Investments - Concessionaire - USD 2013		
Phase1 Capex Operators	652,451,040	USD
Phase 1 Capex PDMC Common Infra	1,089,876,749	**USD**
Total Phase 1 Capex	**1,742,327,789**	**USD**
Additional first 10y Capex Operators	1,379,178,705	USD
Additional first 10y Capex PDMC Common Infra	887,273,612	**USD**
Additional first 10y Capex	**2,266,452,317**	**USD**

Business Case - Concessionaire - Feasibility PDMC		
Project IRR	**18.36%**	**%**
Project NPV	**1,042,113,219**	**USD**
WACC	**13.20%**	**%**
Payback Period	**13.1**	**years**





Concession Payments

Concession Payments are established between the Concessionaire (PDMC) and the Concession Grantor (NPA) to take into account the value of the land and to shift excess returns to the Government.

Up to USD 1bn of the Concessionaire's NPV may be shifted to the Concession Grantor. Beyond this level , the NPV of the Concessionaire's Business Case turns negative and his business not financially feasible.

Concessionaire NPV can be shifted to the Concession Grantor in two ways: shifting additional public investment responsibilities to the Concessionaire or by introducing concession payments from the Concessionaire to the Concession Grantor. The former option (shifting investment responsibilities) is not apparent, since nearly all investments are already allocated to the PDMC. Only investments in the fleet may be shifted, but it is assumed here that this responsibility is not ceded to the PDMC.

2 types of Concession Payments are established between the Concessionaire and the Concession Grantor (NPA): A fixed landlease fee and a variable royalty fee.

Fixed Landlease

The fixed landlease applies to the entire concession area , but differentiates for unused/to-be-developed area and used area. Within the used area, there is a differentiation between used port area and used Free Trade Zone area. The landlease is levied on an annual basis, but may be payable in monthly or quarterly instalments. The level of the landlease fees is comparable to ports worldwide and therefore n accordance to international standards. The landlease fee is also applied to cover the value of the land, which is not taken into account separately in the investments. By establishing a landlease, no further compensation by the Concessionaire for land value is required. Since the landlease is a fixed payment, it has a relatively low risk profile (from the perspective of the Concession Grantor). The following values apply:

- Used Port Land: USD 5.00 per m2 annum
- Used Free Trade Zone Land: USD 1.00 per m2 per annum
- Unused Concession Area: USD 0.05 per m2 per annum

The landlease fees are adjusted for inflation on an annual basis.

Concession Payments

Variable Royalty

The variable royalty is established to further shift project value (NPV) from the Concessionaire (PDMC) to the Concession Grantor (NPA). A Revenue Share is used as the mechanism of the royalty. The variable nature of the royalty makes this payments less certain than the fixed landlease fees: the level depends on actual project performance (revenue generated).

The revenue share shall be a % of the Defined Revenue Base, which comprises of the dues, fees, charges and tariffs which are formerly established by the NPA and collected by the PDMC (or its sub-concessionaires). See visual below. In the Business Case, the Revenue Share is payable on an annual basis, but shorter timeframes may be adopted (monthly, quarterly).

The actual level of the Revenue Share is a primary financial bidding parameter, which means that the definite % is only established upon signing of the Concession Agreement. The actual level depends on the viability of the Concession (currently established at around USD 1.0bn NPV) and on the competitiveness of the Concession Tender (with many interested Bidders, higher bids are expected. The Business Case model shows that a revenue share of around 20% would render a Concessionaire NPV of around 0. As a conservative assumption, as Revenue Share of 10% is assumed at this stage.

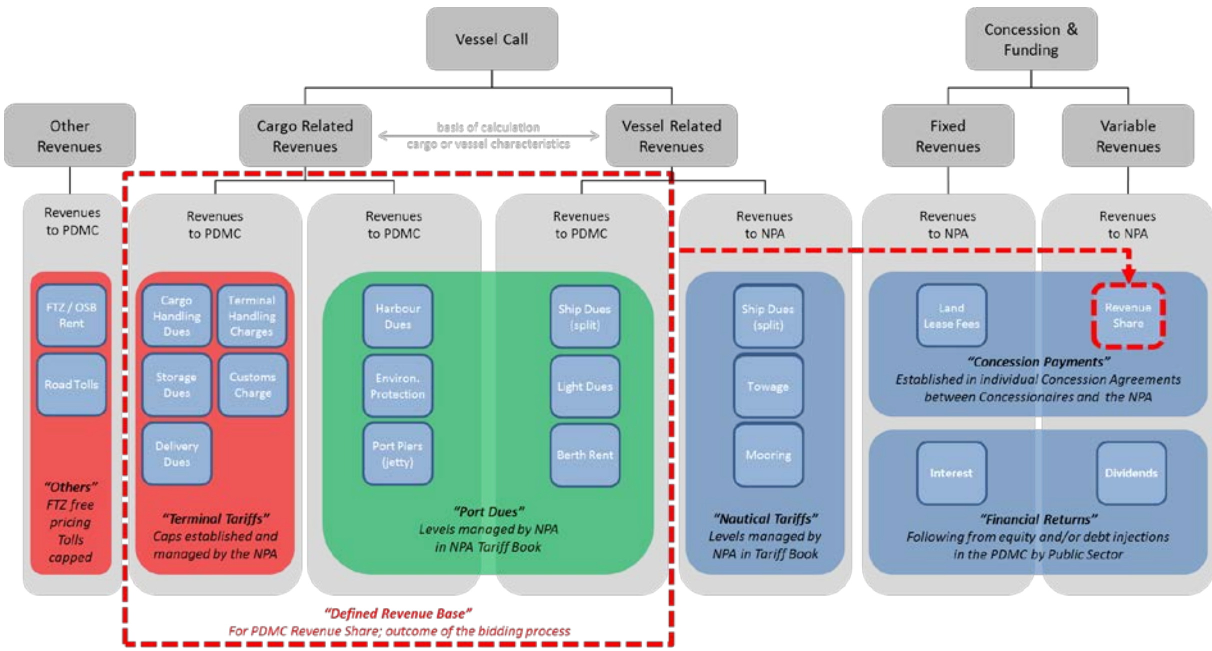
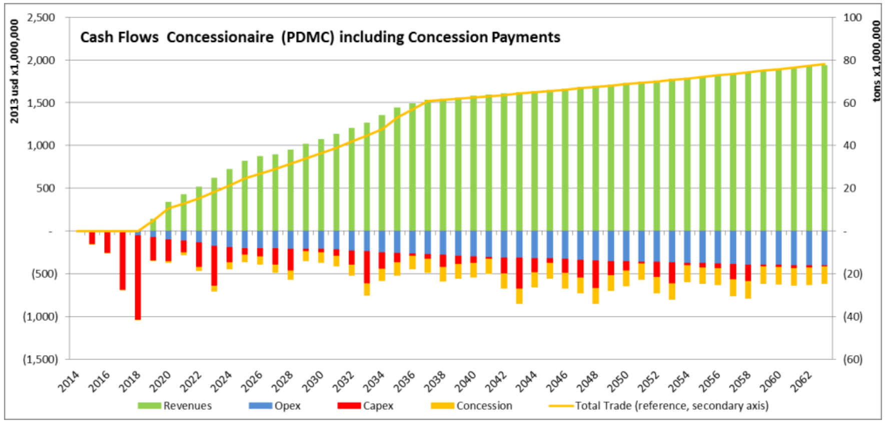


Figure 4.1 – Tariff Structure & Allocation

final version – confidential

Concession Payments

By means of concession payments, project value is transferred from the Concessionaire (PDMC) to the Concession Grantor (NPA) and the Public-Private Partnership becomes more balanced. Due to differences in discount rates between Private (13.2%) and Public (10.0%), the concession payments would absorb around 500m USD in NPV from the Concessionaire, while providing nearly 900m USD in NPV to the Concession Grantor.

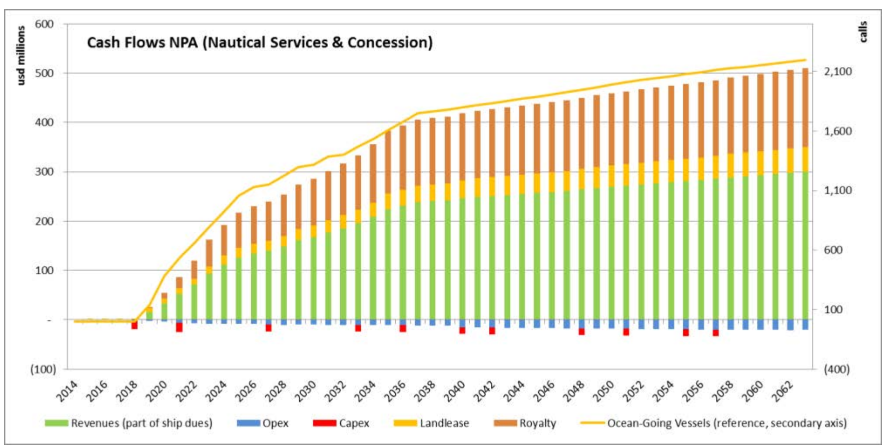


Business Case - Concessionaire - Feasibility PDMC		
Project IRR	18.36%	%
Project NPV	1,042,113,219	USD
WACC	13.20%	%
Payback Period	13.1	years

Business Case - Concessionaire - Feasibility PDMC		
Project IRR	15.88%	%
Project NPV	508,581,539	USD
WACC	13.20%	%
Payback Period	13.1	years

PRIVATE: PDMC

PUBLIC: NPA



Business Case - NPA - Nautical Services & Concession		
Project IRR	17.63%	%
Project NPV	1,160,238,369	USD
WACC	10.00%	%
Payback Period	6.1	years

The Business Case of the Concession Grantor is further build-up by including committed public co-investment in the PDMC and the associated financial returns .

Contents

Bankability PDMC & Government Funding Support – Introduction

ICRC PPP Manual for Nigeria

The term "bankability" refers to the general willingness of private sector lenders to provide financing for a PPP project. In practice, however, it is often used as a broader term to reflect the overall attractiveness of a project to equity investors as well (as they will rarely move forward without bank support). If a project is perceived to be "unbankable," then investors and lenders are unlikely to participate and as a consequence the government will not be able to move forward with the project under a PPP model.

Many factors can make a project unbankable such as a weak enabling environment, unconvincing user demand, a lack of confidence in government's long-term commitment to the project, an insufficient tariff structure, general regulatory uncertainty, poorly designed projects, and other project-level and economy-wide risks (e.g. labour unrest, currency stability, etc.). Given the variety of factors that can influence a project's perceived bankability, it is critical for governments to make the project attractive to potential lenders during the project design phase, otherwise the tendering process will be wasted as the project will be unable to reach financial closure.

Some of the major project characteristics that investors and lenders look at to determine a project's bankability include:

- **Enabling environment**: To reach an investment decision, the lenders/investors would also consider the likely changes in the regulatory and political conditions over the duration of their investment. Consistency in approach to regulation can reduce regulatory risk.
- **Government support**: If the lenders/investors are not confident about the robustness of the project cash flows, they may require financial support from the government in the form of a grant, guarantee, or equity contribution to provide them with additional comfort for investing in the project.
- **Robustness of the cash flows**: The lenders/investors would primarily value the likelihood of project cash flows to service debt by looking at coverage ratios and margins. The lenders/ investors may securitize these project cash flows so that they can allocate risks / returns of debt most efficiently.
- **Third-party support**: International development institutions may also provide financing for the project, through loans and equity, project guarantees, country risk guarantee, partial or full risk guarantees, etc. Currency support, in the case of swaps or other forms of financial derivatives, may also be used to reduce macro-level economic risks.

Bankability PDMC & Government Funding Support – Methodology

Project Bankability needs to be tested to verify whether critical debt funding can be arranged by the PDMC to fund its investments in the Project.

In this financial analysis bankability is tested in three ways:

1. By qualitatively assessing the 4 major project characteristics that investors and lenders look at to determine a project's bankability
2. By quantitatively assessing the financial feasibility of the PDMC in the perspective of lenders and comparing it to the derived feasibility (NPV)
3. By quantitatively assessing the bankability of the project through key financial indicators (DSCR & RoE)

In case the project shows problematic bankability, measures need to be explored to improve DSCR levels. Government Funding Support (GFS) is a means to prevent viability issues such as lacking financial feasibility and/or bankability. The need for GFS is explored in this section.

Government Funding Support

Government Funding Support (GFS) is a means for the Government to improve critical project characteristics to ensure private involvement in the project and therewith enable the Public-Private Partnership (PPP). In case of the Ibom DSP Project, it is expected that GFS is required to ensure project bankability for the PDMC. Besides, GFS is considered a means to enable the committed 20/20/60 (federal/state/private) project funding structure.

Government Funding Support can be provided in various structures and by various public entities.

Available structures include non-refundable grants, re-fundable grants, (soft) loans and regular loans. For the Ibom DSP Project, it is assumed that GFS shall be in the form of a soft loan. Reasons for this is that a regular loan from the government (on regular commercial terms) would not materially improve bankability from banker's perspective and that (non-refundable or refundable) grant funding is not required due to the positive medium to long term outlook for the project. A soft loan would provide necessary 'seed-funding' for the PDMC and the soft terms are justified by the economic value which is generated by the project.

In the Ibom DSP Project, it is assumed that GFS shall be provided by the Federal Ministry of Finance of Nigeria. As the primary public entities in the project, the NPA (Concession Grantor) and the Akwa Ibom State Government (Concession Co-Signatory) are expected to inject 20% equity in the project.

Other public bodies may be involved in the provision of the GFS. This includes the Petroleum Trust Fund (and its successors) or the National Sovereign Investment Agency (NSIA; possibly in combination with the IFC/WorldBank).

This section shall explore the need for GFS.

** Further elaboration on the 20/20/60 capital contribution can be found in the PPP Structuring Plan, included in the Project Procurement File (PPF). Considerations for the shareholding in the PDMC can be found on the next page (coming from the PPF).*

Considerations of shareholding structure PDMC

Initial public shareholding in the PDMC may vary between 10 and 20 percent per entity (NPA & AKSG, 20-40 percent combined). A 20/20/60 shareholding structure is however recommended and assumed in the OBC.

Primary considerations in relation to shareholder structures underline a recommendation for a 20/20/60 shareholding scenario:

Consideration	Shareholding Scenario (NPA/AKSG/Private)	
	10/10/80	20/20/60
Public commitment to the project	Yes	Yes
Private commitment to the project	Yes	Yes
Public procurement required for the PDMC	No	Yes
Market appetite for the project	To be tested	To be tested
Public capital at risk (public equity vs. public loans)	Less	More
Private majority stake possible in PDMC with private consortium	Yes	Yes

Conclusion: the 20/20/60 shareholding structure is recommended and assumed in the OBC. This will be further tested during the tender process market consultation in the FBC phase.

Bankability PDMC – Qualitative Assessment

Bankability of the PDMC is only expected when critical project characteristics are properly covered by the Government, including Government Funding Support.

Bankability issues arise when commercial banks (and investors) are unable or unwilling to provide sufficient funding and/or funding at regular market conditions. This position by banks and investors can be caused by various project and market characteristics which typically revolve around their risk-exposure. As indicated by the ICRC, 4 main characteristics determine how banks and investors look at specific funding opportunities: the Enabling Environment; the availability of Government Support; the Robustness of Cash Flows; and the availability of Third-Party Support.

Characteristic	Lenders' Perspective	Consequence
Enabling Environment	Lenders and equity investors would designate the project's regulatory and political environment during the course of their involvement as 'uncertain'. The main reason for this is the fact that a) the country has no experience yet of Greenfield port development projects under PPP; and b) the NPA only relatively recently transformed to a landlord port authority (2004).	Stable environment required. Change-of-Law clause in Concession Agreement
Government Support	Lenders and equity investors expect the government to provide financial support for the initial phase of the project, while remaining on arm's length from decisions with respect to DBFOM(T) responsibilities as designated to the PDMC (Design, Build, Finance, Operate , Maintain, and Transfer-back).	Governments Support Funding (GFS) required for PDMC. Limited equity investment by government in PDMC.
Robustness of Cash Flows	Since ports and terminals have to deal with significant market risks (compared to other PPP sectors), lenders and equity investors expect the government to improve the robustness of the expected cash flows a) by not embarking on competing commercial deep-sea port project(s) in the vicinity of this project; and b) by maintaining the current tariff levels for the Defined Revenue Base of the project.	No competing projects in the region Maintain tariff levels
Third-Party Support	Lenders and equity investors expect the project to be developed in such a way that international finance institutions may be involved for certain aspects. To this extent, public shareholding in the PDMC should remain limited as this limits the PDMC to apply for certain international instruments such as country risk insurance. Besides, lenders and equity investors require relevant public guarantees to be in place to become eligible for development funds.	Limited equity investment by government in PDMC. Public guarantees required on public equity+GFS and on Termination Compensation

Bankability PDMC – Quantitative Assessment 1: Feasibility 1/2

Lenders and financial investors assess port infrastructure project from different perspective. From their point-of-view, a feasible project may not necessarily mean that the project is bankable. Proper risk and scope adjustments need to be taken into account to establish preliminary bankability.

When assessing the project from a bankability perspective, a banker's point-of-view is required. Therefore, adjustments to the Base Case are made to simulate this point-of-view:

Initial Phase Only

Since debt funding is required for the initial phase of the project, banks tend to focus on the initial years of the project. To this extent, only the initial development phase is taken into account. This means that only the first phases of the terminals are developed and that further growth (value) beyond this initial scope is not taken into account by the banks.

In the Bankability Case only the first phases of all terminals are considered and only the first 100ha of the FTZ.

Tariff Reductions

As indicated on previous page, the robustness of the cash flows is considered critical in this project. Without any solid commitments from the NPA on the exclusivity of the port in the Eastern region, lenders assume additional competition from other deep-sea port initiatives in the region. Besides, without any solid commitments from the NPA on maintaining the revenue base at its current levels, lenders will assume that the terminal tariffs shall further erode due to this increased competition and that the level of all port dues shall also be further reduced over time by the regulator.

In the Bankability Case 20% additional tariff and port due erosion is assumed in excess of the assumed erosion in the base case.

WACC Increase

Without any Government Funding Support, lenders and investors shall consider the PPP not balanced: Private sector and its financiers would need to absorb nearly all project risks. This substantial risk exposure would cause an increase in the PDMCs cost of finance (WACC) due to higher required Returns on Equity (RoE) by private investors; and higher interest rates combined with lower debt gearing levels by the banks. A substantial financial contribution would bring balance to the PPP and provide comfort to banks and investors.

In the Bankability Case, required RoE for the private investor in the PDMC is increased by 5%, while the margin on commercial debt is increased with 1% and debt/equity gearing reduced to 40/60. These changes constitute an increase of the PDMC WACC of 2.5%.

On the next page, the Commercial Case is compared to the Bankability Case.

Bankability PDMC – Quantitative Assessment 1: Feasibility 2/2

The project's viability from a commercial perspective is established in the financial analysis. However, from a lender's perspective, the project needs to be "bankable", implying: a focus on Phase 1; a conservative approach towards future tariffs; and a proper reflection of investors' and lenders' risk exposure in the WACC of the PDMC. Without Government Funding Support (GFS) by the public sector, the PDMC case would be considered not-feasible from a banker's perspective.

When adjusting the Base Case of the PDMC to take into account lenders' points-of-view, substantial NPV shall be lost, rendering the project "not feasible" and therefore not bankable. Bankability can only be ascertained when public sector takes risk-mitigating positions with respect to competition, tariff erosion, and direct public contribution through Government Funding Support (GFS).

The visual below shows the deterioration of the NPV of the PDMC after taking into account concession payments to the Concession Grantor; after reducing the focus to the initial investments only; after taking into account further tariff erosion over time; and after adjusting the PDMC WACC to take into account the increased risk exposure with the absence of substantial government co-funding through GFS.

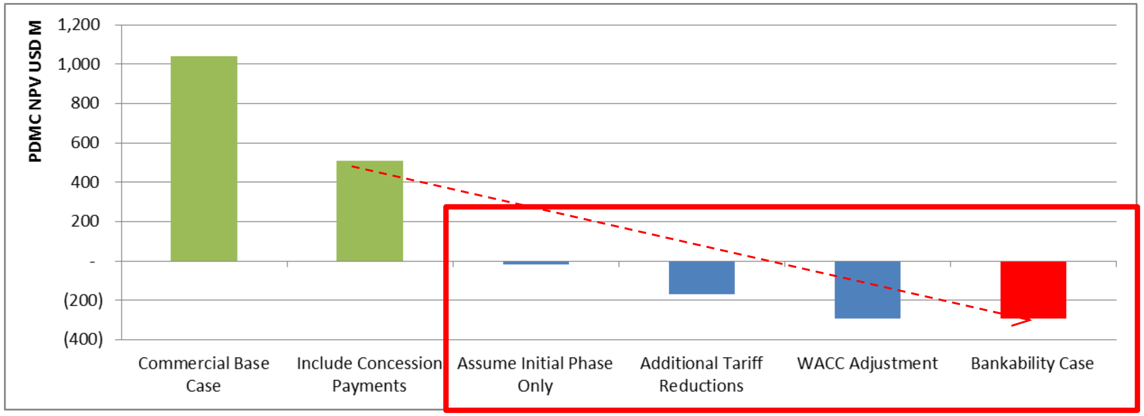


Figure 5.1 – Deterioration of NPV with the absence of Government Funding Support

Bankability PDMC – Quantitative Assessment 2: DSCR & RoE

Project Bankability needs to be tested to verify whether critical debt funding can be arranged by the PDMC to fund its investments in the Project.

In this financial analysis bankability is tested by assessing the Debt Service Cover Ratio (DSCR) for the PDMC. To do so, funding assumptions are made and the DSCR levels are generated from the Business Case Model.

In case the project shows problematic bankability, measures need to be explored to improve DSCR levels.

The case continuous from the bankability case as defined in previous section, taking into account the perspective of financiers. (on project scope, tariff erosion, and WACC) and taking into account the assumptions on Concession Fees (landlease and royalty).

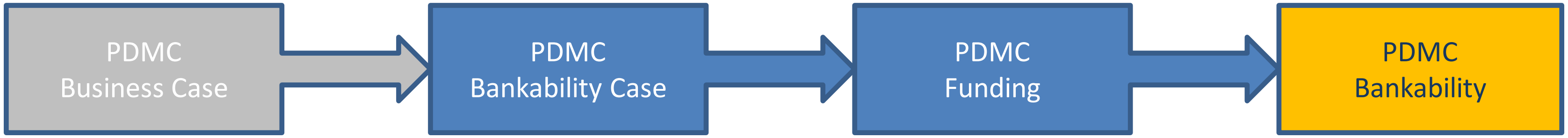
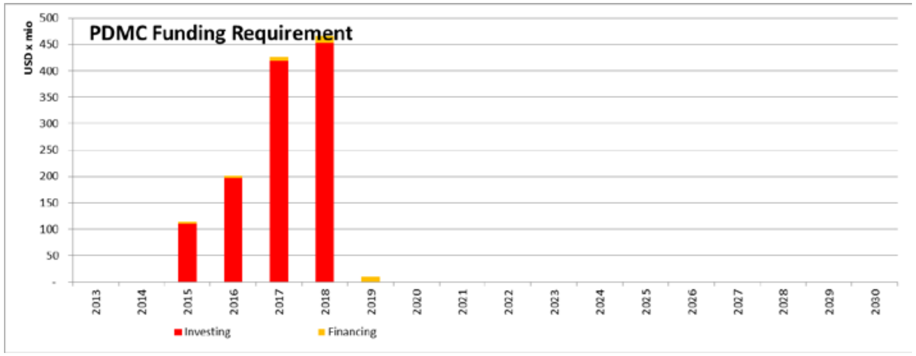


Figure 5.2 – Quantification of Project Bankability

Bankability PDMC & Government Funding Support – Introduction

The case which is used to explore DSCR levels of the PDMC has the following characteristics:

1. **Sub-concessioning by the PDMC:** PDMC shall sub-concession to third parties some of its investment responsibilities as ceded to him in the Concession Agreement. This includes the individual terminals, the free trade zone management and the project road management.
2. **Concession Payments:** Are assumed on the levels as established in the Viability Analysis. This applies to fixed land-lease payments and variable royalty (revenue share, 10%).
3. **Initial investment phase only:** funding is arranged by the PDMC for the development of the initial phase of the project as established in the Concession Agreement. This covers all initial infrastructure works and the superstructure/equipment for the first terminals (containers/general cargo/cars, liquid bulk, offshore supplies). Construction/investment period is 2015-18. Returns on Equity of PDMC shareholders are established on the entire project life, to reflect continuing income after initial debt service period.
4. **Tariff Erosion:** In the case without Governmental Funding Support, additional tariff erosion is taken into account.
5. **Terms of Commercial Debt:** Shall be adjusted for the availability or absence of Governmental Funding Support.
6. **Nominal amounts:** Inflation and price escalation is taken into account in order to simulate the expected funding requirements during the initial construction phase.
7. **Taxation:** Taxation is taken into account for the PDMC based on an assumed 30% tax rate coming into effect after a 10 year tax holiday.
8. **Defined PDMC equity structure**: The equity structure in the PDMC shall be in accordance to the structure as defined in the PPP Structuring Plan: Private Sector 60%; NPA 20% and State 20%. Injections are made parallel to each other and parallel to debt funding. No re-financing re-leveraging is taken into account at this stage.
9. **Dividend policy:** No dividends shall be paid in the first year of operations and dividends will only be paid when there is profit and cash. Dividends are paid in the same ratio as shareholding (60/20/20).
10. **PDMC funding requirements:** based on his investments in the initial phase of the project (2015-18). Any additional funding requirement from financing activities (interest roll-ups, debt servicing) is added to this in each case.



Bankability PDMC & Government Funding Support – No GFS Case

With only regular funding, the PDMC shows problematic DSCR-levels and RoE output. Bankability is not expected. GFS seems required.

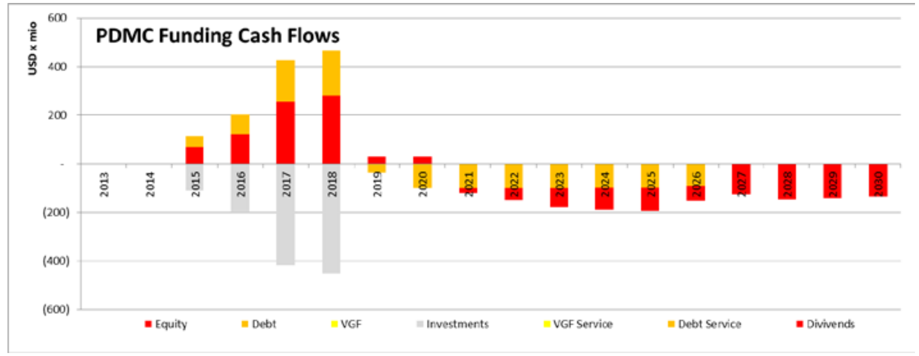
Total initial PDMC funding requirement: USD 1,250 M. Also funding requirement during first 2 years of operations due to debt-servicing covered by additional equity injections by private investor.

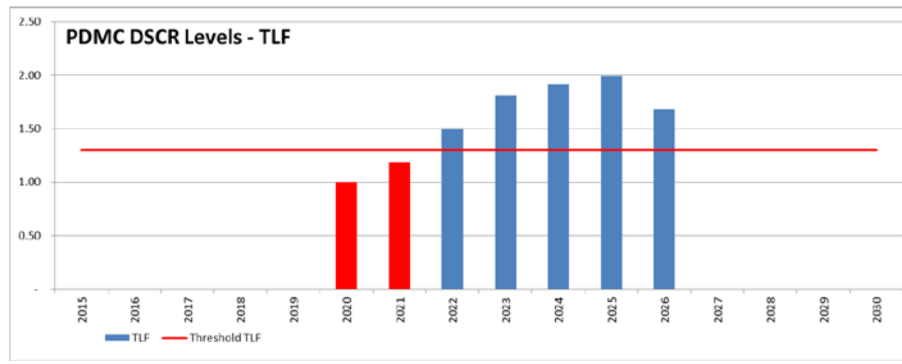
Debt: USD 500 M: full commercial loan (Term Loan Facility, TLF)

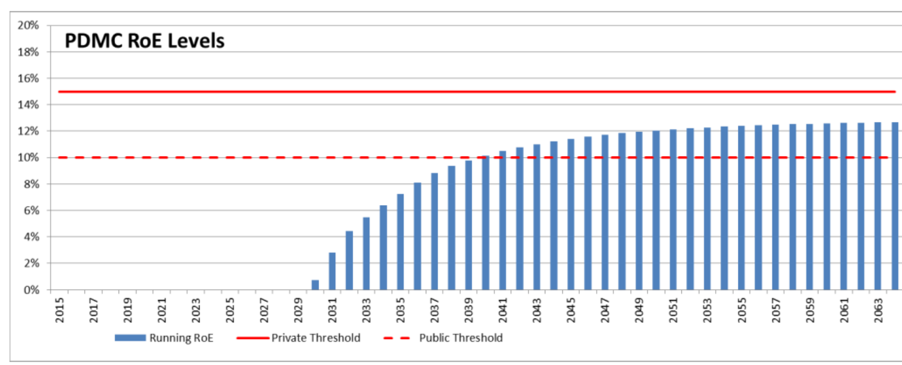
Equity: Initial : USD 750 M: 150 + 150 + 450 (20/20/60); Additional for Debt Service: USD 60 M (assumed responsibility: private investor)

Public funding contribution on total project investments: 150/1,750 = 8.5% (only equity; below 20% commitment)

Debt	TLF	GFS
Amount	USD 500 M (40% debt gearing)	n/a
Availability	4 years (construction)	n/a
Upfront Fee	1%	n/a
Commitment Fee	1%	n/a
Interest – Base Rate	1%	n/a
Interest – Margin	5%	n/a
Repayment	Annuity	n/a
Grace Period	1 year	n/a
Repayment Period	7 years	n/a
Interest Rolled-Up	During construction	n/a
DSCR Threshold	1.3	n/a
Subordination	None	n/a







Bankability PDMC & Government Funding Support – GFS Case

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With Government Funding Support target DSCR and RoE levels are reached and project is bankable

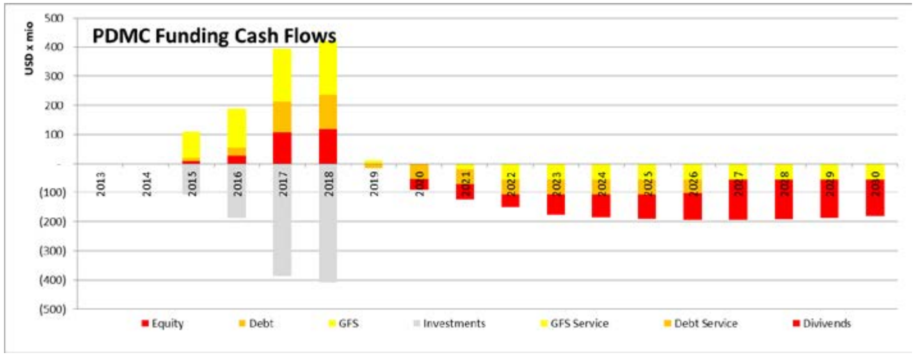
Total initial PDMC funding requirement: USD 1,225 M. Also funding requirement during first year of operations due to debt-servicing covered by last part of GFS.

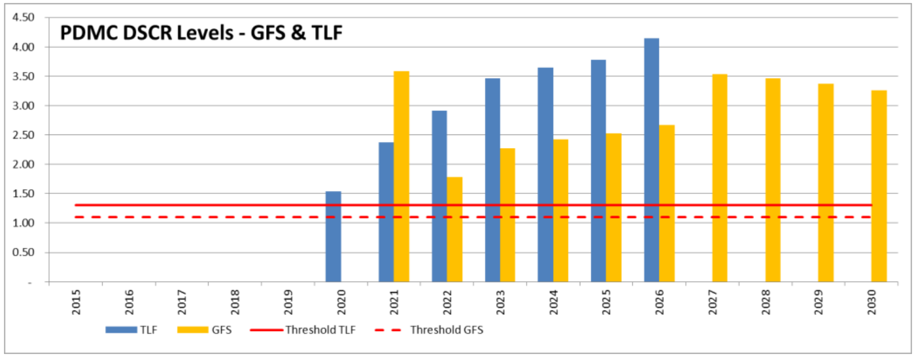
Debt: 1) USD 600 M: soft loan (GFS); 2) USD 285 M: full commercial loan (Term Loan Facility, TLF; 236 M in 2013 terms)

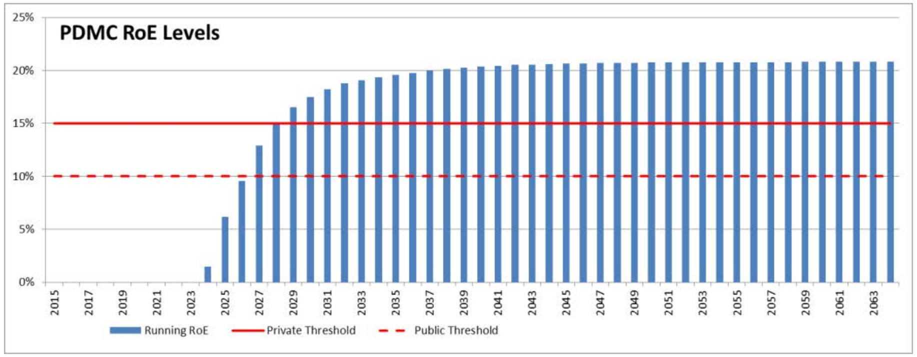
Equity: USD 285 M: 57 + 57 + 171 (20/20/0) (=47/47/142 in 2013 terms)

Public funding contribution on total project investments: (94+600)/1,742 = 40% (equity + GFS)

Debt	TLF	GFS
Amount	USD 290 M (50% debt gearing after GFS)	MoF: USD 600 M
Availability	4 years (construction)	5 years (construction+1)
Upfront Fee	1%	0%
Commitment Fee	1%	0%
Interest – Base Rate	1%	1%
Interest – Margin	4%	2%
Repayment	Annuity	Annuity
Grace Period	1 year	1 year
Repayment Period	7 years	15 years
Interest Rolled-Up	During construction	During construction First year of operations
DSCR Threshold	1.3	1.1
Subordination	None	To TLF







Bankability PDMC & Government Funding Support – Conclusions

Government Funding Support is required to ensure bankability.

Funding of capital intensive infrastructure projects exposed to market risks remains challenging. There is a limit to what extend private sector can absorb project risks and secure sufficient funding at proper terms. Government Funding Support provides the public sector with a tool to improve funding perspective and strengthen the financial outlook for private investors.

In this analysis a comparison between a GFS and a non-GFS case is presented. It showed that GFS would indeed required for the project. GFS also allows the public sector to comply to its committed funding contribution of 40% without absorbing too much equity in the private venture (PDMC). Besides , it allows the Government to mitigate risks by providing a blend of equity and debt, rather than a highly exposed full-equity involvement in the PDMC.

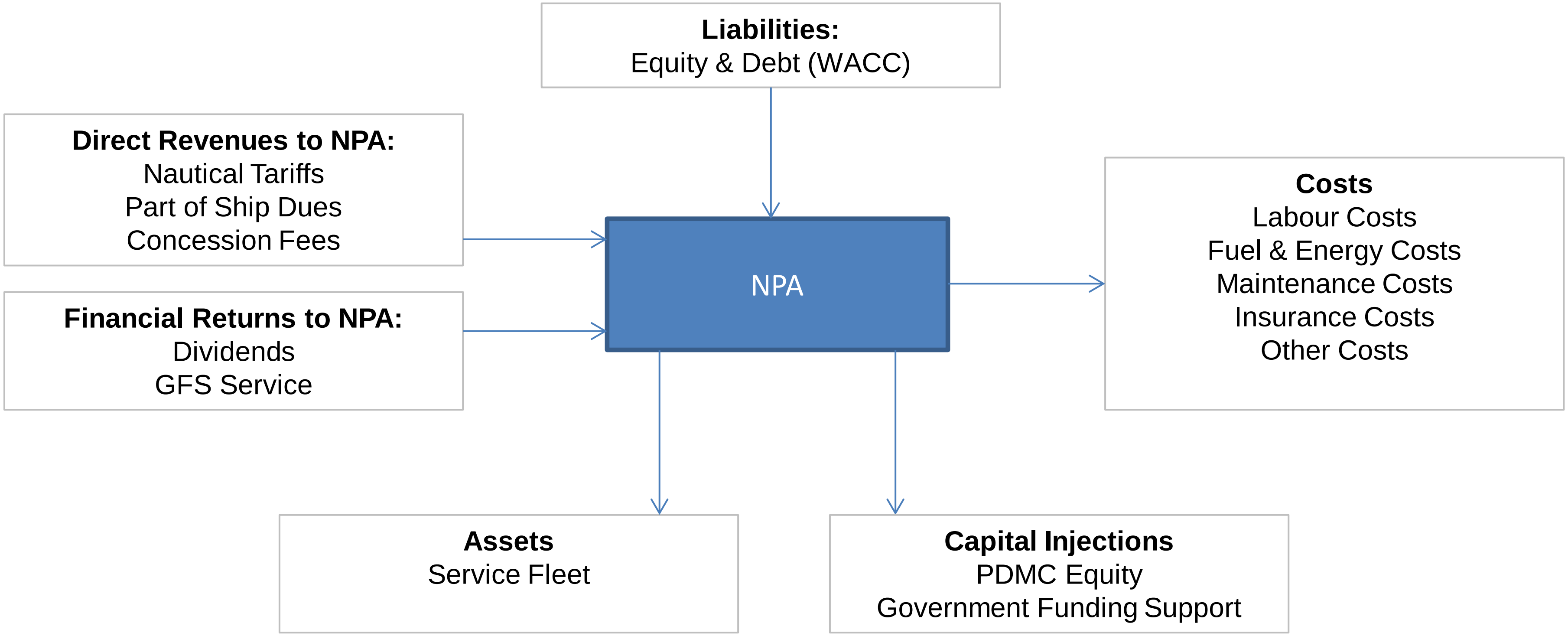
In this comparison many characteristics of the commercial loan have been held constant. It may however be expected that in the case without GFS, some of these terms are less favourable compared to a case where the public sector provides part of the funds through GFS. This would, amongst others, apply to grace periods and DSCR thresholds.

During the FBC phase, funding needs to be arranged. In case commercial funding remains problematic, GFS provides the public sector with a tool to mitigate these risks: it may be decided to further soften the terms for the GFS part of the funding. This can be done since negative financial implications for the lenders (public sector) of softening the terms would be offset by the economic value created by the project (see section E: Economic Cost-Benefit Analysis). During the market consultation in the FBC phase, the exact type of GFS shall be determined. For purposes of analysis, the current structure of the GFS is a soft loan.

Contents

Business Model – Concession Grantor (NPA)

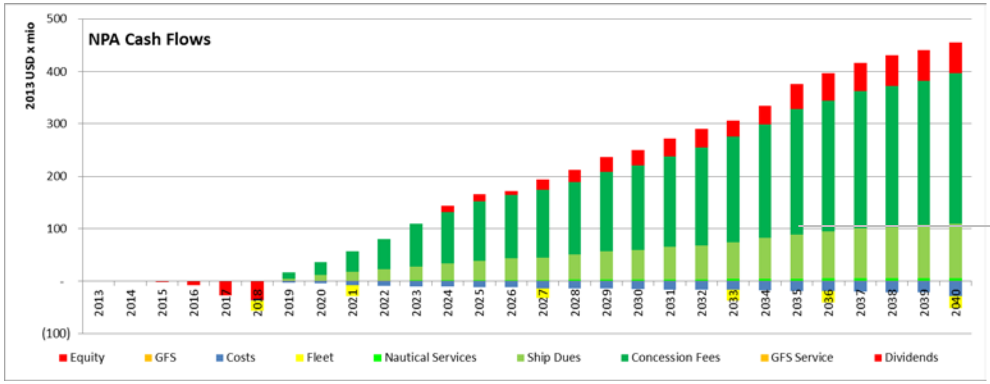
The NPA is the Concession Grantor and according to the Concession Agreement it shall retain responsibility for the Harbour Master and the Nautical Services, including associated fleet investments and costs. NPA may sub-concession these responsibilities to third-parties. In this section it is not assumed the NPA shall sub-concession these activities. Besides operational activities, the NPA shall act as Concession Grantor and receive Concession Fees from the PDMC and the NPA, together with Akwa Ibom State, shall act as public co-financier to the PDMC (equity and GFS) and earn the respective financial returns.

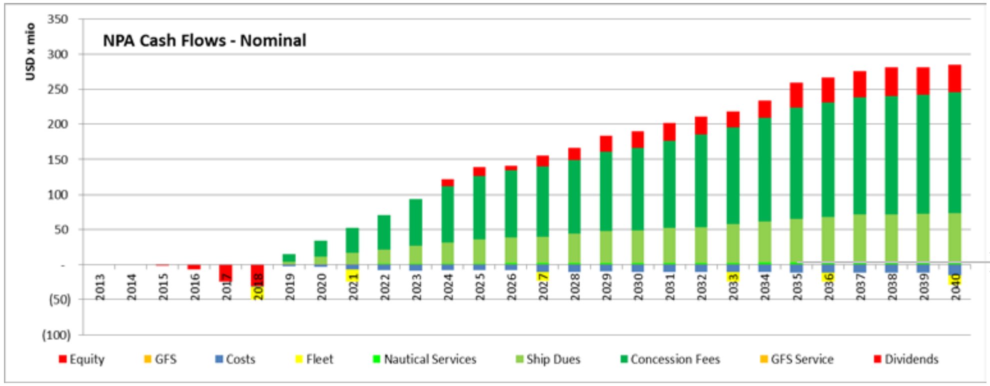


Concession Grantor (NPA) – Cash Flows

With all project cash flows defined for the public sector PPP partners, their overall returns can be established. The following cash flows have been taken into account for the NPA:

1. **Equity Injections + Dividends**: Both NPA and the State shall inject equity in the PDMC (20% each; parallel to the 60% of the private investor) and each shall receive their share of the dividends, once available.
2. **GFS Injections + GFS Service**: The Federal Ministry of Finance shall provide part of the Government Funding Support (GFS) to the PDMC to ensure bankability. Consequently, GFS Injections by the Federal Ministry of Finance are not present in the NPA cash flow graphs. It is assumed that GFS for this project is structured as a soft loan, so GFS Service shall constitute of repayments and interest.
3. **Fleet Investments**: NPA shall not cede the responsibilities for nautical services and shall therefore invest in the nautical fleet. Over time, the fleet shall be expanded and replaced by the NPA
4. **Operational Costs**: NPA incurs costs for provision of nautical services, including the Harbour Master tasks
5. **Ship Dues**: NPA receives ship dues for towage and mooring (fixed component of the ship dues) and for pilotage and the Harbour Master tasks (share of the variable component of the ship dues (other share for PDMC for channel development/maintenance and waste management) .
6. **Concession Fees**: As Concession Grantor, the NPA shall receive Concession Payments, which are structured as fixed landlease payments and variable royalty payments (revenue share)



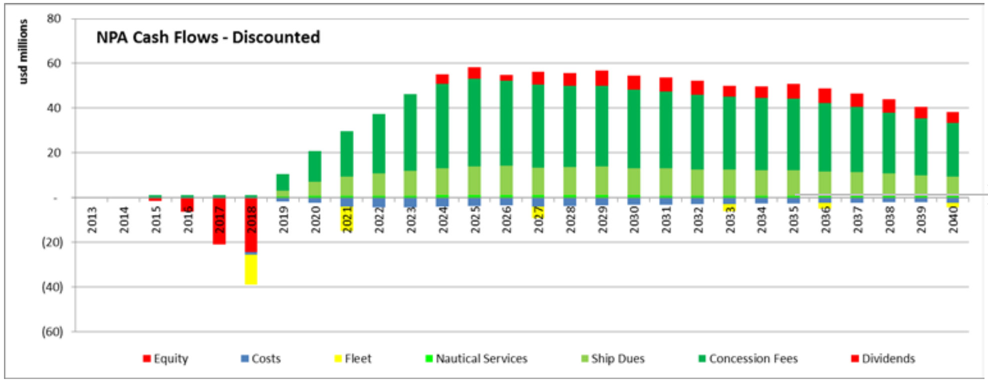


Concession Grantor (NPA) – Viability

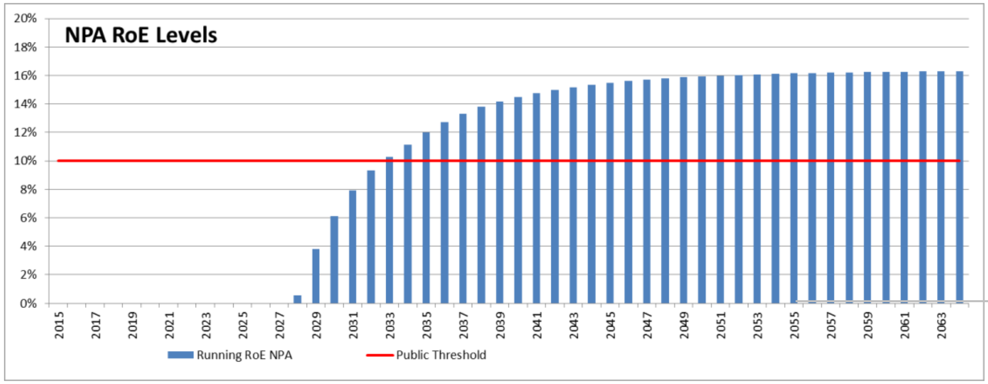
The NPA, covering its limited responsibilities as stipulated in the Concession Agreement, is financially feasible.

Business Case - NPA - Total NPA Cash Flows			
Project IRR	**15.16%**		**%**
Project NPV	**1,260,463,077**		**USD**
WACC	**10.00%**		**%**
	NPA	Private Investor	
Equity IRR	**16.30%**	**19.14%**	**%**

The NPA case of the Ibom DSP Project is feasible with an NPV of USD 1.3bn and an IRR of 15.2%

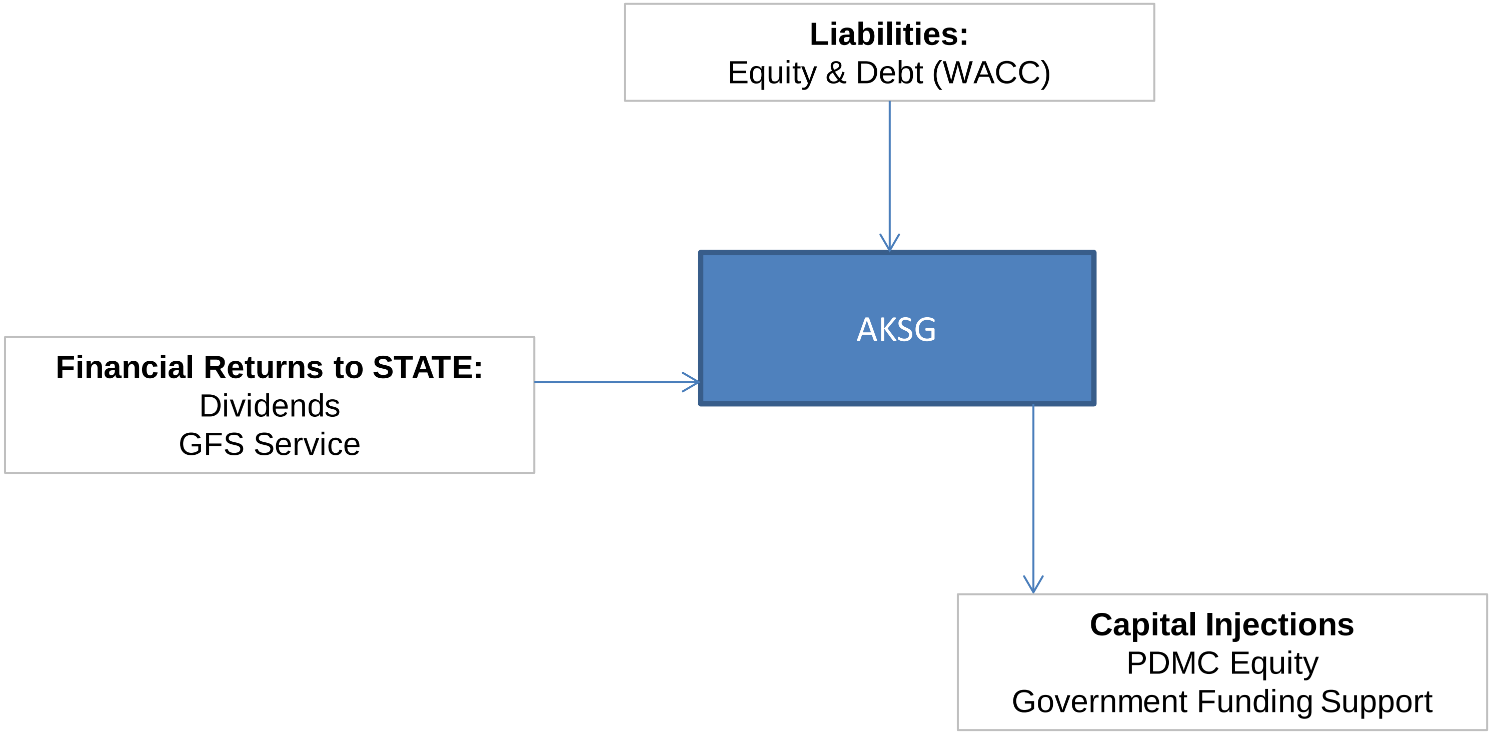


From equity-perspective, NPA can expect a 16.3% equity return on its 20% participation in the PDMC. This level is in excess to the assumed public threshold of 10%. The public RoE is slightly lower than the private returns since it is expected that additional equity injections which may be needed for early expansions are fully covered by the private investor (no additional public capital needed). As a consequence, this would slightly dilute the public positions in the PDMC over time.



Business Model – Akwa Ibom State Government

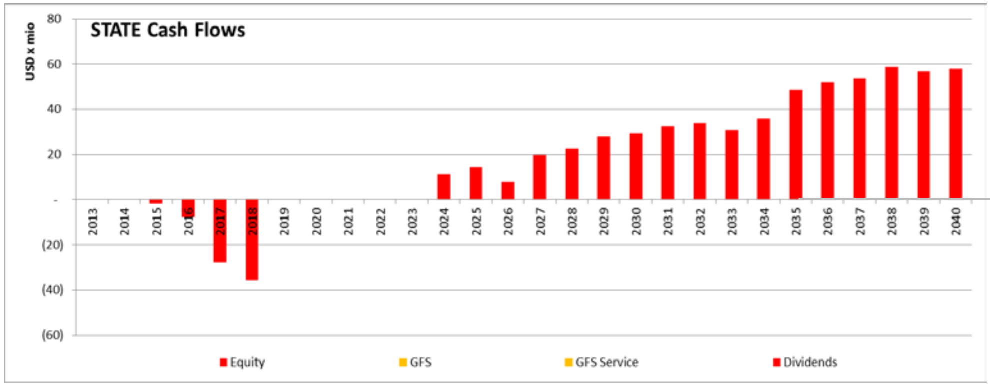
The State shall not be actively engaged with operating or managing the Project. It will however provide critical seed funding to the project: Together with the NPA, the State shall act as public co-financier to the PDMC (equity and GFS) and earn the respective financial returns.

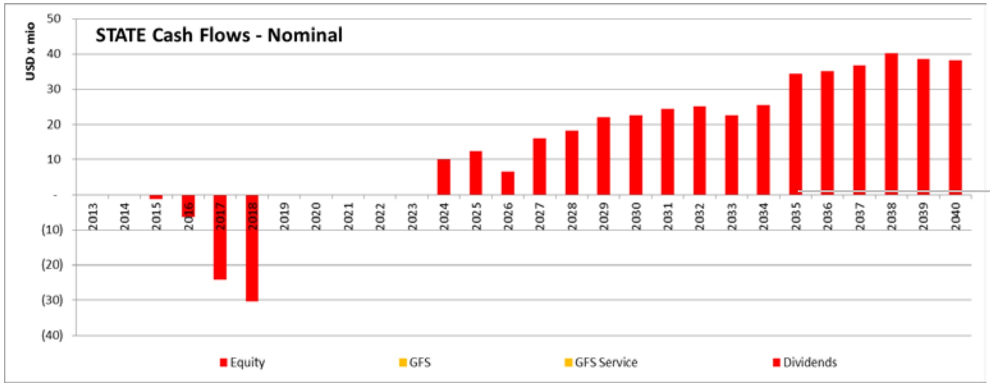


Akwa Ibom State Government – Cash Flows

With all project cash flows defined for the public sector PPP partners, their overall returns can be established. The following cash flows have been taken into account for the Akwa Ibom State Government:

1. **Equity Injections + Dividends**: Both NPA and the State shall inject equity in the PDMC (20% each; parallel to the 60% of the private investor) and each shall receive their share of the dividends, once available.
2. **GFS Injections + GFS Service**: The Federal Ministry of Finance shall provide part of the Government Funding Support (GFS) to the PDMC to ensure bankability. Consequently, GFS Injections by the Federal Ministry of Finance are not present in the State government cash flow graphs. It is assumed that GFS for this project is structured as a soft loan, so GFS Service shall constitute of repayments and interest.

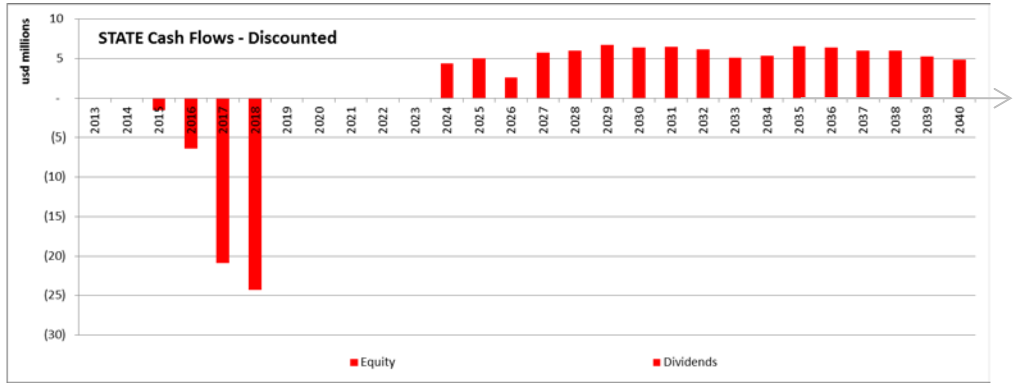




Akwa Ibom State Government – Viability

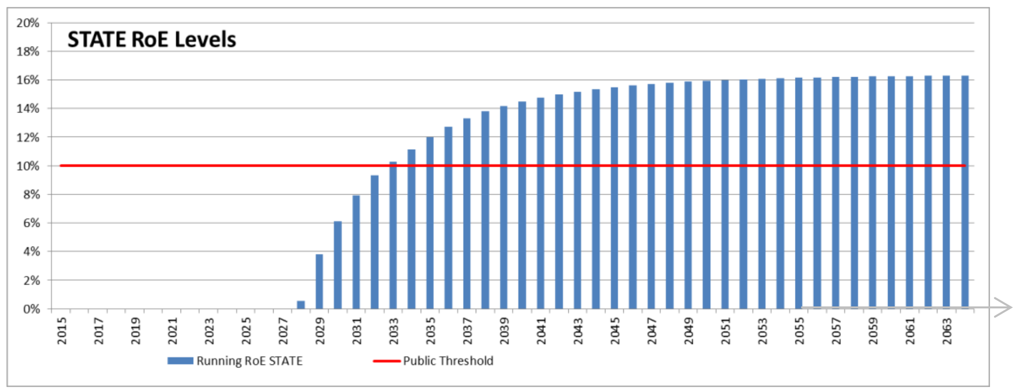
The State, covering its limited responsibilities as stipulated in the Concession Agreement, is financially feasible.

Business Case - STATE - Total STATE Cash Flows			
Project IRR	11.78%		%
Project NPV	100,224,708		USD
WACC	10.00%		%
	NPA	Private Investor	
Equity IRR	16.30%	19.14%	%



The AKSG case of the Ibom DSP Project is feasible with an NPV of USD 100 M and an IRR of 11.8%

From equity-perspective, the State can expect a 16.3% equity return on its 10% participation in the PDMC. This level is in excess to the assumed public threshold of 10%. The public RoE is slightly lower than the private returns since it is expected that additional equity injections which may be needed for early expansions are fully covered by the private investor (no additional public capital needed). As a consequence, this would slightly dilute the public positions in the PDMC over time.



Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs

maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

FINANCIAL MODELLING

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Financial Modelling
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

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Introduction

Source: ICRC PPP Manual for Nigeria

The basic inputs for the financial model include:

- Risk-adjusted (using either optimism bias or probability analysis methodologies) project costs as derived from the detailed project report on capital costs and the Risk Matrix, pre-operational expenses (to be capitalised), cost of legal approvals, etc.
- Risk-adjusted operations and maintenance costs as derived from the demand projections and the estimated operating expenses
- Financing costs, including the costs of hedging interest rate or exchange rate fluctuations, expected costs of debt and returns on equity, financing fees, and other financial requirements such as cover ratios and reserve accounts
- Project revenues include the revenues which have been identified from all the sources, and also income from grants which may accrue to a specific project
- Assumptions for projecting the cash flows in the future, for instance, long-term inflation rates, long-term interest rates, tax rates, etc.

Based on the PPP Manual for Nigeria, this Financial Modelling Report describes the structure, inputs and assumptions of the Financial Modelling exercise. A detailed overview of the outcomes of this exercise can be obtained from the Financial Feasibility report.

Introduction – Modelling Approach

FAST Modelling allows for **f**lexible, **a**ccurate, **s**tructured and **t**ransparent financial models.

The transaction advisors use a standard approach to financial modelling in order to obtain optimal results in Excel models.

The approach is based on the FAST Modelling Language, allowing for financial modelling that is:

- **F**lexible
- **A**ccurate
- **S**tructured
- **T**ransparent

The FAST approach is based on the use of common language and rules when developing a financial model (http://www.fast-standard.org/).

The characteristics of the approach are:

- Use of calculation blocks
  All inputs to a formula in line of sight
- Use of colors (fond & cell shading)
  Quick reference to background of line items (import/export/input/…)
- Use of headers and sub-headers
  For swift maneuvering through worksheets
- Use of the “Rule-of-thumb”
  Formulas remain understandable
- Use of flags
  To limit the use of if-statements
- No use of names
  Improving transparency, traceability and copy ability
- Use of (special) shortcuts
  Improve modeling speed and prevent RSI (no mouse)
- Use of prefabricated sheets
  To improve input management, scenario control, output/error tracking

Introduction – **Modelling Approach**

Financial model structure based on FAST approach; allows for use by non-experienced modellers

The financial modelling exercise for the Ibom Project is based on the structured FAST modelling approach (http://www.fast-standard.org/). This allows for flexible modelling, accurate outputs, whilst working in a structured and transparent manner. The FAST properties of the financial model are regarded as a necessity due to the:

- Large number of terminals
- Large number of tariffs used
- Large number of CAPEX components
- Large number of OPEX components

The main outputs of the financial model are the various cockpits for all entities in the model:

- Full project cockpit
- PDMC, NPA & State cockpits
- Operational cockpits: port terminals, free trade zone, project road

These cockpits provide details of the financial viability of the entities and primary benchmarking outputs, including the revenues per cargo unit, OPEX per cargo unit, employment figures, throughput figures and modal split figures. By changing assumptions in the cockpit(s), the model-users can use the model without requiring significant financial modelling skills.

Introduction – Structure – **Analysis**

Project viability is explored on various levels: Business Unit-level; Total Project-level, Concessionaire-level, and Concession Grantor-level

The business case model for Ibom DSP is structured in 6levels:

1. The various **Private Operational Business Units** within the PDMC. These individual operational business units cover the individual operational responsibilities which are ceded to the PDMC as stipulated in the Concession Agreement. This includes the port terminals; the FTZ management organisation and the toll road management organisation. These private operational business units operate under the mandate of the PDMC and as such, they may be structured as sub-concessions under the PDMC. This level of analysis shows the viability and performance of individual operational activities.

2. The **Port Management Business Unit** within the PDMC. This covers the non-operational responsibilities of the PDMC and relates to the development of the common-user infrastructure; the management of the project and the port dues which accrue to the PDMC to cover these responsibilities.

3. The **Public Operational Business Unit**. This covers the operational responsibilities which are retained by the NPA as stipulated in the Concession Agreement. This relates to the Nautical Services and the Ship Dues which (partly) relate to these activities.

4. The **Ibom DSP Project**, covering all business units of the project, including the Private Operational Business Units, the Port Management Business Unit, and the Public Operational Business Unit. This level shows the overall viability of the Ibom DSP Project, but it does not cover the concession payments between the Concessionaire (PDMC) and the Concession Grantor (NPA)

5. The **Concessionaire (PDMC)**, covering all project responsibilities which are ceded to the PDMC as stipulated in the Concession Agreement. This level shows the overall viability of the Concessionaire. On this level the possibilities for establishing concession payments to the Concession Grantor (NPA) can be explored. At a later stage in this Financial Feasibility Report, this level is also used to test PDMC bankability and to explore the need for Government Funding Support for the PDMC.

6. The **Concession Grantor (NPA)**, covering all public project responsibilities including the Public Operational Business Unit and any concession payments from the Concessionaire (PDMC) to the Concession Grantor (NPA).

Introduction – Structure – **Analysis**

Figure 1.1 – Structure of the Business Case Analysis

Each underlying business unit is separately investigated since each business unit has an individual impact on the overall project feasibility and, where it concerns responsibilities ceded to the Concessionaire (PDMC), on the feasibility of the PDMC. Following this rationale, each individual business unit provides (or absorbs) a certain part of the value (NPV) of the Project, of the Concessionaire and/or of the Concession Grantor.

Variations in value (NPV) amongst business units are caused by variations in cash flows due to differences in operational drivers amongst business units (traffic, investments, tariffs and operational expenses) and by variations in discount factors (WACCs) due to differences in risk profiles.

Introduction – Structure – **Business Case Model**

The components of the financial model are:

- Model inputs:
  - Assumptions: CAPEX, OPEX, NPA Tariffs, concession payments, indexation, exchange rates, taxation, etc.
  - Traffic forecasts: for cargo handling, cargo storage, vessel calls, FTZ land use, OSB land use, Road use, etc.

- Calculation blocks:
  - CAPEX: establishing the required investments over time based on traffic forecasts and unit prices
  - OPEX: establishing the expected operational expenses over time based on traffic forecasts, investments, wages and OPEX percentages for maintenance and insurance
  - Revenues: calculating the expected revenues based on traffic forecasts and applicable tariffs and tariff policy

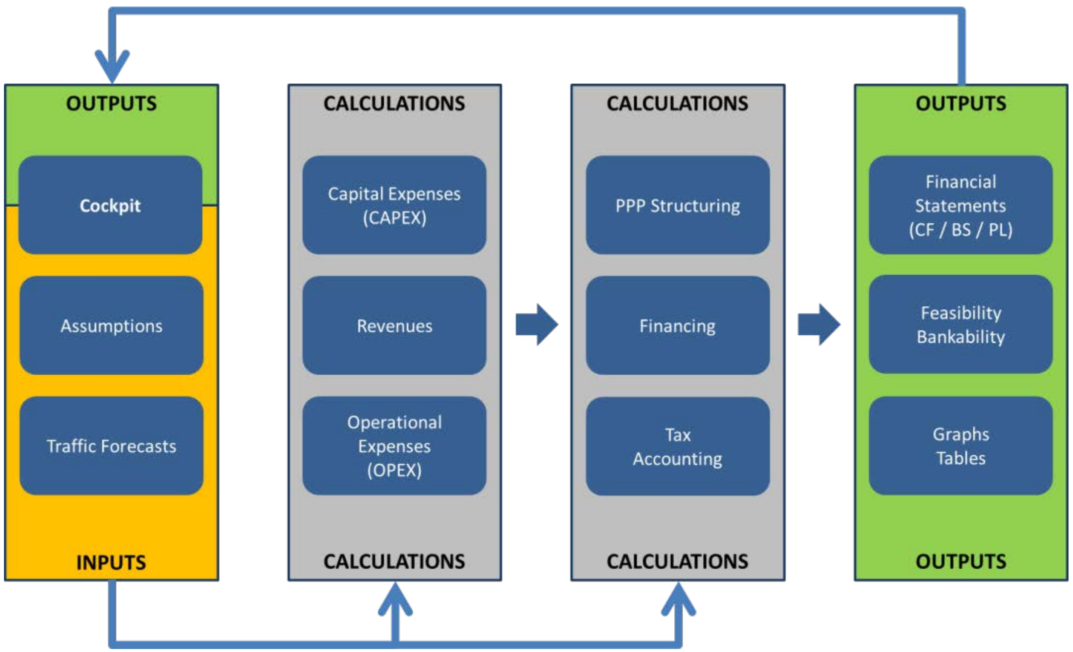

Figure 1.2 – Structure of the Business Case Model

- Model outputs:
  - Financial Statements:
    - Cash Flow Statements for Operational Business Units, Project, PDMC and NPA;
    - Balance Sheets and Profit & Loss for PDMC
  - Feasibility: assessing the project's primary financial output
  - Bankability: assessing the PDMC's secondary financial output
  - Graphs & Tables: present the model's outcomes in a structured and clear manner
  - Benchmarking: provide financial & operational outputs for reference and monitoring
  - Cockpits that use a customer-friendly for non-expert modellers to work with access to primary inputs and outputs.

Introduction – Methodology – **Indicators for Financial Feasibility**

Net Present Value, Internal Rate of Return & Payback Period

The objective of this report is to assess the financial viability of the Ibom DSP Project through a Financial Feasibility Study with respect to the expected cash flows for the operational business units, for the entire project; and for the PDMC itself.

The key figures that represent the project's financial viability are:

- Net Present Value

  The Net Present Value (NPV) of the various components of the Ibom DSP Project is considered as the main indicator that stipulates the financial feasiblity of the project: this value should be positive to label the project as being 'financially feasible'. The NPV consists of the sum of the present values of all the cash flows in the project. These present values are based on a discount rate that corrects the cash flows for the time period that the project is analysed: the Weighted Average Cost of Capital (WACC). In case the NPV is negative, measures could be taken to improve the value of the investment, e.g. through phasing of investments, improvement of revenue generation or through external financial support in the investments (i.e. Government Funding Support). NPV is calculated per 2015 as Financial Close for the project is expected in this period.

- Internal Rate of Return

  The Internal Rate of Return (IRR) is the rate at which the net present value of costs or negative cash-flows is equal to the net present value of positive cash-flows or benefits; the higher the IRR, the more desirable it is to undertake the project. The internal rate of return is a rate quantity which indicates the efficiency, quality or yield of an investment. This is contrary to the NPV, which is an indicator of the value or magnitude of an investment.

- Payback Period

  The payback period for the terminal operators and the PDMC provides insight in the time that is required to recover the cost of an investment. It is an important determinant for investors on their investment decision: longer pay-back periods are less desirable for investors.

These key figures are established in the financial model based on the free cash flow calculations that follow from business cases of the individual operational business un, the entire project; and the PDMC. .

Introduction – Methodology – **Other Indicators**

Financial indicators per unit of cargo, free cash flows in first years of operation & initial CAPEX estimates

Besides the three major financial indicators, secondary indicators are used to assess the project's financial feasibility and to enable comparisons to international port benchmark figures.

- Initial CAPEX estimates

The initial CAPEX estimates for the project provide insight in the required funding for the initial phase of the project until operations start.

- Free cash flows in the first years of operation

The free cash flows in the first years of a terminal's operation provide insight in the terminal's ability to recover from the (generally) high investments that are made prior to its operations.

- Revenue and OPEX per unit of cargo

Revenues and OPEX' per unit of cargo are calculated for the terminal operators for benchmarking purposes.

Introduction – Methodology – **Financial Modelling**

Business case modelling based on primary project cash flows in order to calculate free cash flows

The business case model that is used to determine the financial feasibility of the project is based on the following elements:

- CAPEX, or capital expenses that are investments in assets in the project.
- OPEX, or operational expenses that are costs for running the project.
- Revenues that are the incomes received from the business activities in the project.
- Concession Payment as established between Concessionaire (PDMC) and Concession Grantor (NPA)

These elements form the foundation of the financial feasibility of the Ibom Deep Sea Port and Free Trade Zone. Following financial feasibility, bankability of the project is explored on the same basis. The financial model that is constructed is based on these elements renders project cash flows, internal rates of return, net present values and payback periods for the following components of the project:

- Business Units:
  - Containers
  - RoRo & Breakbulk
  - Petroleum Products
  - Dry Bulk
  - Offshore Supply Base
  - FTZ Land Management
  - Toll Road Management
  - Port Management
  - Nautical Services (NPA)
- Ibom Deep Sea Port Project
- Concessionaire (PDMC)
- Concession Grantor (NPA)

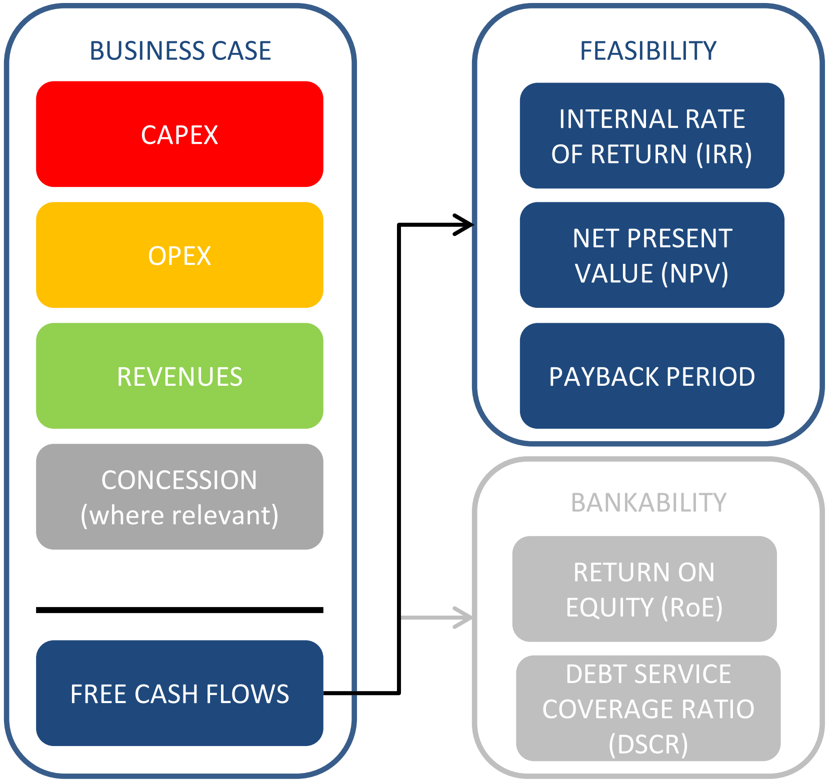

Figure 1.3 – Modelling: Inputs to Outputs

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Traffic Forecast

Traffic forecast is a major input to the business model. The forecasts are derived from the Traffic Forecast which is an appendix to this OBC

The traffic forecast for Ibom serves as one of the major inputs for the financial model and thus, for the financial viability of the project. The main assumptions and methodology used for the development of the traffic forecast can be obtained from the Traffic Forecast Appendix of this Outline Business Case document.

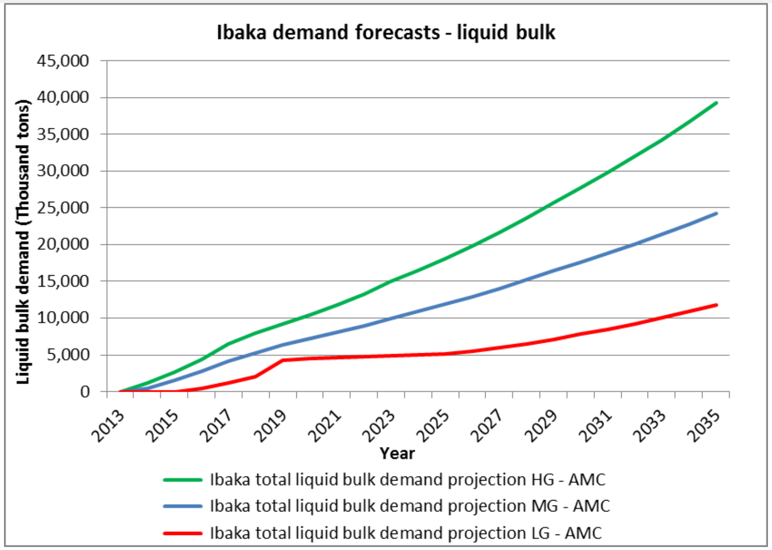
A clear distinction should be made between the traffic lines inserted in the model (Demand Forecast) and the traffic lines used to calculate the project's revenues (Project Forecast). The traffic lines inserted in the model are regarded as 'demand' lines, i.e. these lines project the demand of throughput at Ibom. These demand lines however, can be influenced by the actual terminal capacities that restrict the throughput of a terminal. Furthermore, the project might become more feasible if certain terminals are not opened at all, or at a later stage of the port's development.

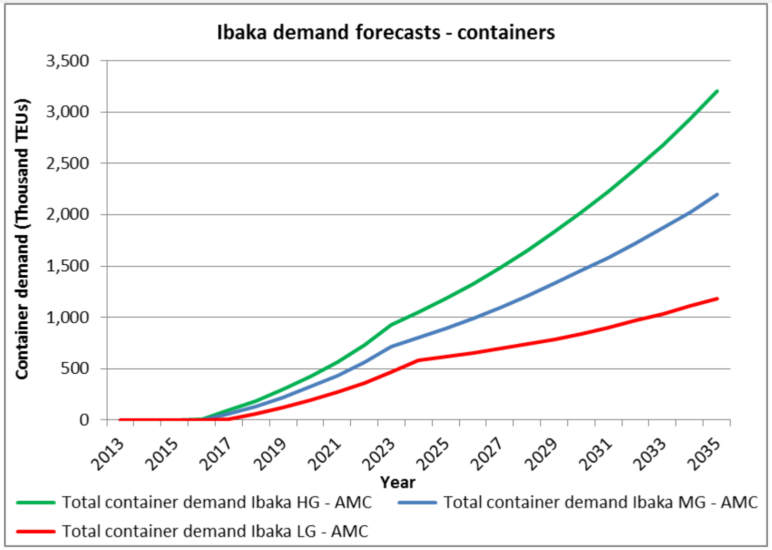
For these reasons, the imported demand forecast lines are altered into traffic forecast lines under the following assumptions:

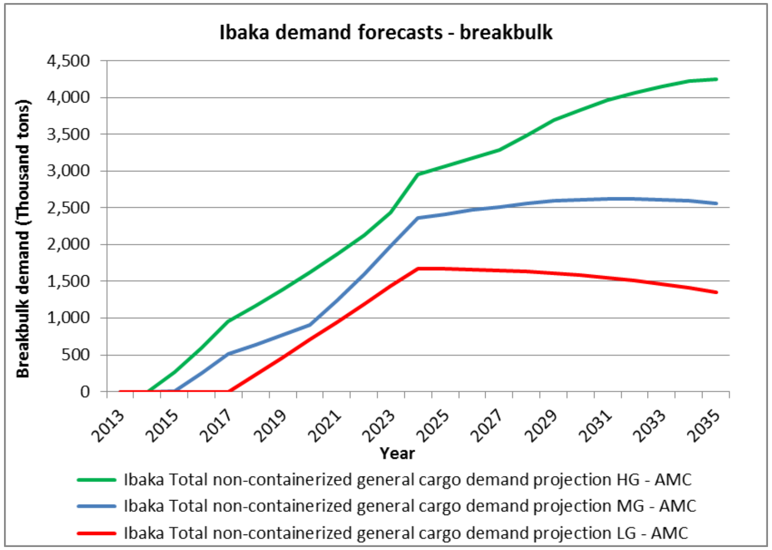
- After the demand forecast horizon of 2035, annual traffic growth is fixed at 2% for all cargoes, except for Petroleum Products which is expected to grow at a higher pace of 1%, due to expected increase in domestic production in Nigeria
- The 'medium case' traffic forecast is selected for the model; traffic sensitivity testing remains possible in the model
- The demand forecasts are capped by the terminal capacities in place by 2035, in accordance to the proposed Masterplan. Further expansions are however expected post-2035.

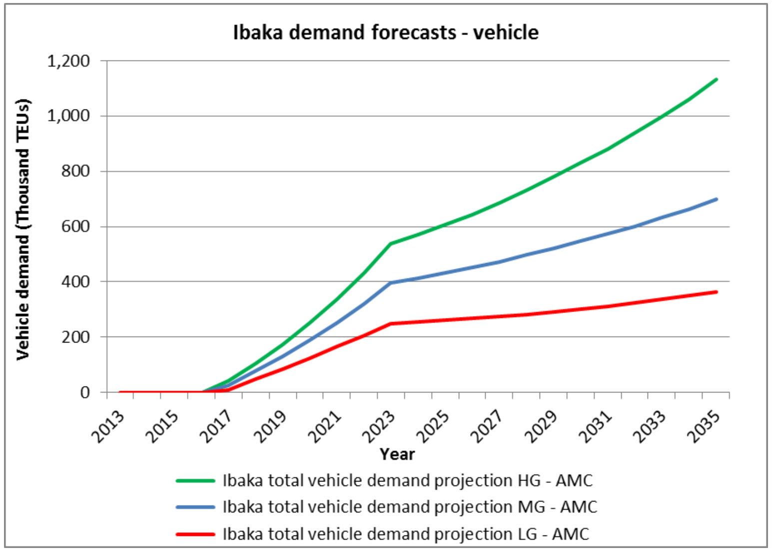
Traffic Forecast

Traffic Forecasts for Business Units derived from Demand Forecast







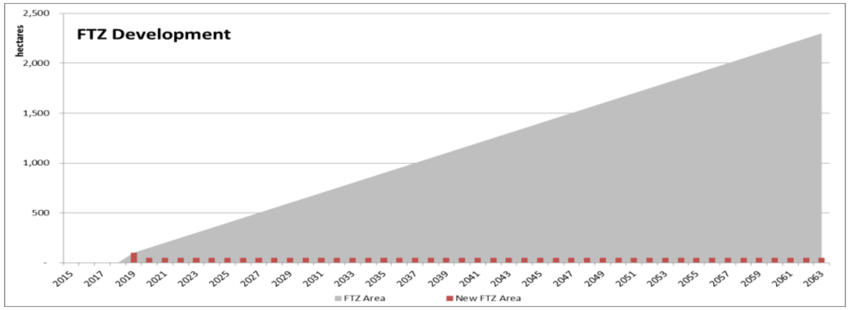


Traffic Forecast

Other Forecasts are supply-driven

Free Trade Zone

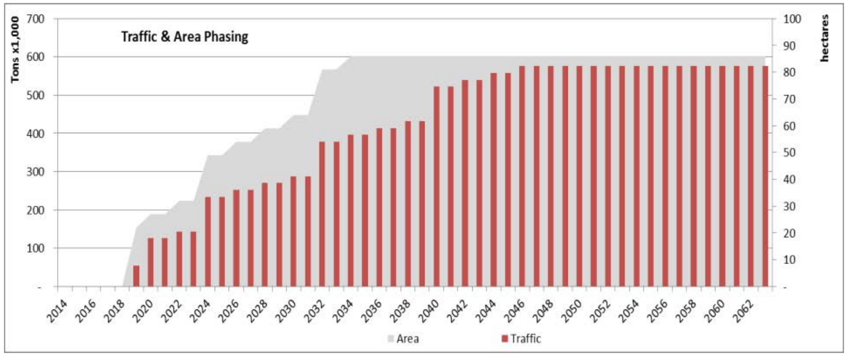
FTZ development expected to kick-start with 100 hectares and grow by 50 hectares per annum due to new tenants and expansions of existing tenants.



Offshore Supply Base

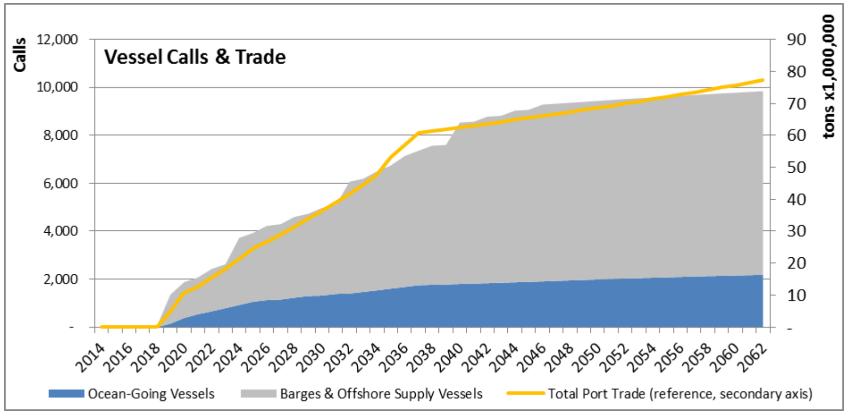
OSB land development driven by tenants of dedicated berths: 1 new dedicated tenant attracted every 5 years with a max of 4. Common-user berth development parallel with dedicated berths: 4 new common-user clients attracted during each 5 year period. Tenants at start: 1 dedicated and 2 common-user tenants.

OSB volume development based on assumed average call-size of 100 tons per vessel call, combined with an assumed 2 calls per day for dedicated berths and 1 call per 2 days for common-user berths.



Nautical Services

Nautical services (pilotage, towage, mooring) and associated port dues are connected to expected vessels calls. Number of vessel calls is established based on per-trade type assumptions for call size development, combined with the associated traffic forecast

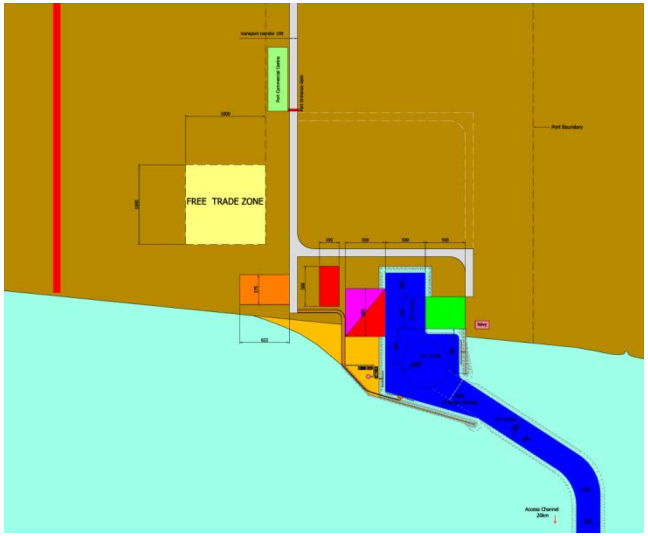


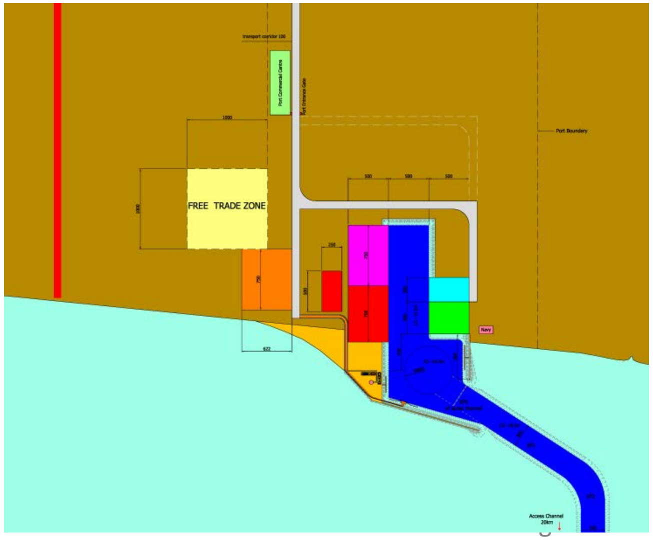
Contents

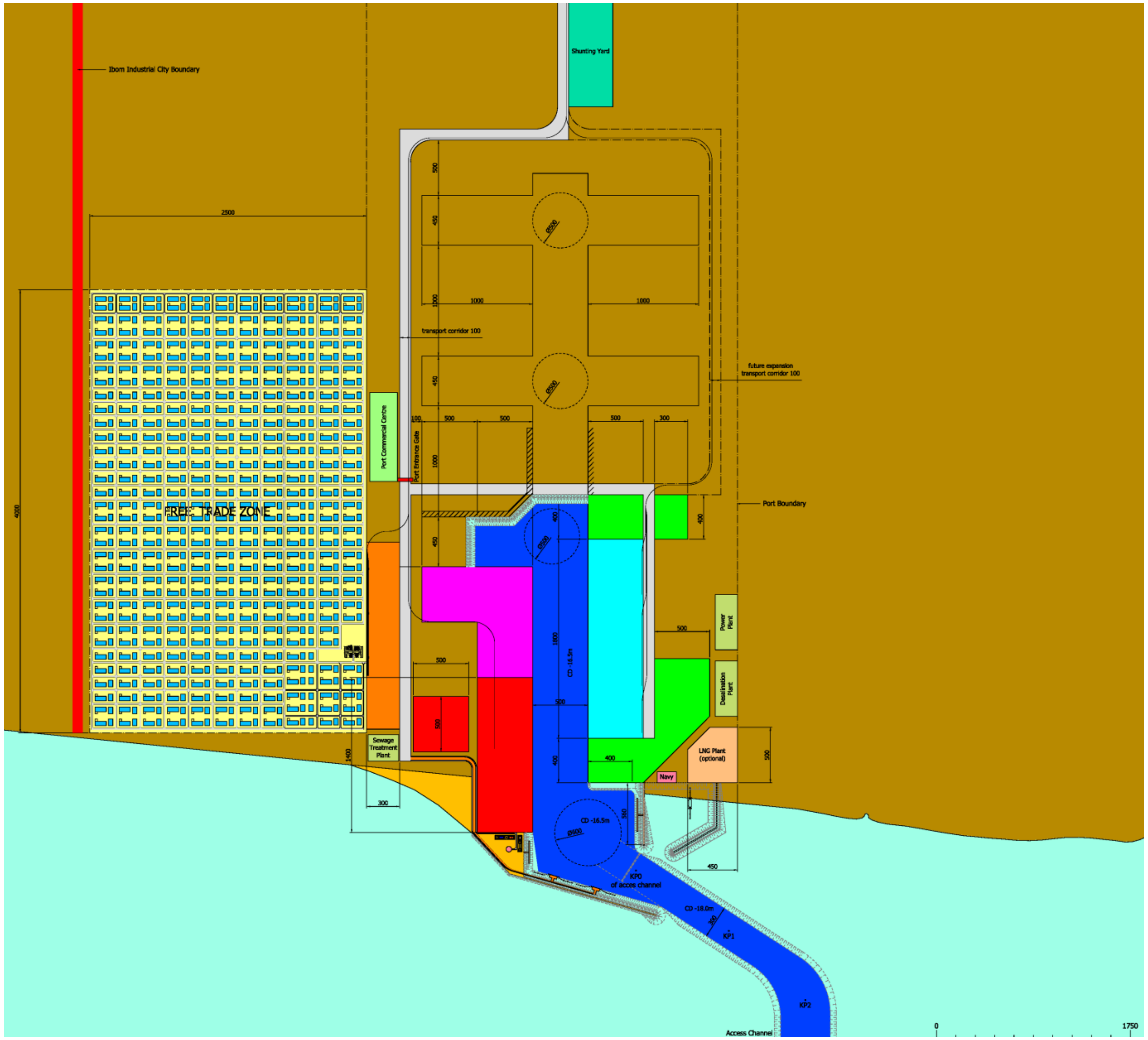
CAPEX – **Investments**

The Ibom DSP Project Covers the phased development of a Deep Sea Port and adjacent Free Trade Zone in Akwa Ibom State, Nigeria.

Reference designs for Minimal First Phase Development (top left); Maximum First Phase (bottom left); and Master Plan 2035 (right)







CAPEX – Components – **Identification** 1/2

CAPEX components for port infrastructure, superstructure & equipment

The investments or capital expenditures (CAPEX) for this project consist of all investments required for the port's infrastructure, superstructure and equipment, as well as the basic infrastructure for the free trade zone.

The following CAPEX items are considered to constitute the project's assets (1/2):

CAPEX item	Description
Breakwaters	Breakwaters that protect the port from flooding
Dredging - Access Channel Phase 1 & Inner Harbour	Initial dredging of channel and inner harbour
Dredging - Access Channel & Inner Harbour (deepening)	Deepening of channel and inner harbour
Dredging - Access Channel (2 lane)	Widening of channel to a 2-lane channel
Dredging & Reclamation - Port Basin (per berth)	Per berth CAPEX component for dredging
Aids to Navigation	Buoys, light houses, VTMS and other aids to navigation
Connecting Road	Road connecting the port to the hinterland
Connecting Rail	Rail connecting the port to the hinterland
Port Utilities	Power plant, desalination plant, waste water treatment and other utilities required in the first phase of the port's development.
Port Superstructure	Central gate, port fencing
Nautical Base	Port control tower and tug/pilot boat mooring area
Nautical Fleet	Tugs and pilot boats
PPT Jetties	Jetties for (un)loading petroleum products
PPT Tanks & Installations	Tanks and installations for storing and handling petroleum products

CAPEX – Components – **Identification** 2/2

The following CAPEX items are considered to constitute the project's assets (2/2):

CAPEX item	Description
Quay Wall - Offshore Supplies Terminal	Quay wall for the offshore supplies terminal
OST Terminal Superstructure	Superstructure for the offshore supplies terminal
OST Terminal Equipment	Equipment for the offshore supplies terminal
Quay Wall - Container Terminal	Quay wall for the container terminal
CT Terminal Superstructure	Superstructure for the container terminal
CT Terminal Equipment	Equipment for the container terminal (STSs, RTGs, reachstackers, trailers)
Quay Wall - RoRo & Breakbulk Terminal	Quay wall for the RoRo & Breakbulk terminal
RBT Terminal Superstructure	Superstructure for the RoRo & Breakbulk terminal
RBT Terminal Equipment	Equipment for the for the RoRo & Breakbulk terminal (cranes, forklifts)
Quay Wall - Dry Bulk Terminal	Quay wall for the dry bulk terminal
DBT Terminal Superstructure	Superstructure for the dry bulk terminal
DBT Terminal Equipment	Equipment for the dry bulk terminal (cranes, forklifts)
FTZ Site Preparation	Land reclamation, soil improvement, inner-FTZ roads

CAPEX – Components – **Construction Period** 1/2

The asset's construction period determines the expected cash outflows for these investments and the required timing of expansions (which is its construction period before the asset is needed from traffic point of view)

The CAPEX items have a construction period as displayed in the following table (1/2):

CAPEX item	Construction Period	Timing
Breakwaters	4*	years
Dredging - Access Channel Phase 1 & Inner Harbour	4*	years
Dredging - Access Channel & Inner Harbour (deepening)	2	years
Dredging - Access Channel (2 lane)	2	years
Dredging & Reclamation - Port Basin (per berth)	3*	years
Aids to Navigation	1	years
Connecting Road	4	years
Connecting Rail	2	years
Port Utilities	2	years
Port Superstructure	2	years
Nautical Base	1	years
Nautical Fleet	1	years
PPT Jetties	2	years
PPT Terminal Superstructure	2	years
PPT Tanks & Installations	2	years

* Longer than expected construction period is assumed in the model to simulate sequential investments and initial cash-out in 2015 and 2016

CAPEX – Components – **Construction Period** 2/2

The CAPEX items have a construction period as displayed in the following table (2/2):

CAPEX item	Construction Period	Timing
Quay Wall - Offshore Supplies Terminal	2	years
OST Terminal Superstructure	1	years
OST Terminal Equipment	1	years
Quay Wall - Container Terminal	2	years
CT Terminal Superstructure	2	years
CT Terminal Equipment	1	years
Quay Wall - RoRo & Breakbulk Terminal	2	years
RBT Terminal Superstructure	2	years
RBT Terminal Equipment	1	years
Quay Wall - Bulk Cement Terminal	2	years
BCT Terminal Superstructure	2	years
BCT Terminal Equipment	1	years
FTZ Site Preparation	2	years

CAPEX – Components – **Economic Life** 1/2

The economic lifetime provides an input for the re-investments in the assets (Cash Flows) and depreciation (Profit & Loss).

The CAPEX items have an economic lifetime as displayed in the following table (1/2):

CAPEX Item	Economic Lifetime	Timing	Reinvestments	Depreciation
Breakwaters	100	years	No*	Yes
Dredging - Access Channel Phase 1 & Inner Harbour	50	years	No**	Yes
Dredging - Access Channel & Inner Harbour (deepening)	50	years	No**	Yes
Dredging - Access Channel (2 lane)	50	years	No**	Yes
Dredging & Reclamation - Port Basin (per berth)	50	years	No**	Yes
Aids to Navigation	25	years	Yes	Yes
Connecting Road	50	years	No**	Yes
Connecting Rail	50	years	No**	Yes
Port Utilities	25	years	Yes	Yes
Port Superstructure	50	years	Yes	Yes
Nautical Base	50	years	Yes	Yes
Nautical Fleet	15	years	Yes	Yes
PPT Jetties	50	years	Yes	Yes
PPT Terminal Superstructure	50	years	Yes	Yes
PPT Tanks & Installations	25	years	Yes	Yes

Items consisting of multiple types of assets are assumed to have an ‘average’ economic life.

* due to long economic life

** due to continuous maintenance dredging and/or maintenance works

CAPEX – Components – **Economic Life** 2/2

The CAPEX items have an economic lifetime as displayed in the following table (2/2):

CAPEX Item	Economic Lifetime	Timing	Reinvestments	Depreciation
Quay Wall - Offshore Supplies Terminal	50	years	Yes	Yes
OST Terminal Superstructure	50	years	Yes	Yes
OST Terminal Equipment	15	years	Yes	Yes
Quay Wall - Container Terminal	50	years	Yes	Yes
CT Terminal Superstructure	25	years	Yes	Yes
CT Terminal Equipment	15	years	Yes	Yes
Quay Wall - RoRo & Breakbulk Terminal	50	years	Yes	Yes
RBT Terminal Superstructure	25	years	Yes	Yes
RBT Terminal Equipment	15	years	Yes	Yes
Quay Wall - Bulk Cement Terminal	50	years	Yes	Yes
BCT Terminal Superstructure	50	years	Yes	Yes
BCT Terminal Equipment	15	years	Yes	Yes
FTZ Site Preparation	50	years	No**	Yes

Items consisting of multiple types of assets are assumed to have an ‘average’ economic life.

* due to long economic life
** due to continuous maintenance dredging and/or maintenance works

CAPEX – Components – **Investment Allocation (PPP)** 1/2

In the financial model, the investments can be allocated to various entities within the project, allowing to simulate PPP Structuring and Sub-Concessioning. Most of the 'common user assets' are currently allocated to the PDMC, whilst the rail connection is allocated to the federal government. All specific terminals assets (Superstructure and Equipment) are currently allocated to the 'SubCon' entity, the PDMC's sub-concessionaires, but remain the formal responsibility of the PDMC. NPA shall retain responsibility for development of the nautical fleet.

The CAPEX items are allocated to the following entities in the model (1/2):

CAPEX item	Allocation
Breakwaters	PDMC
Dredging - Access Channel Phase 1 & Inner Harbour	PDMC
Dredging - Access Channel & Inner Harbour (deepening)	PDMC
Dredging - Access Channel (2 lane)	PDMC
Dredging & Reclamation - Port Basin (per berth)	PDMC
Aids to Navigation	PDMC
Connecting Road	PDMC /Sub-Concessionaire
Connecting Rail	3rd parties*
Port Utilities	PDMC
Port Superstructure	PDMC
Nautical Base	PDMC
Nautical Fleet	NPA
PPT Jetties	PDMC
PPT Terminal Superstructure	PDMC /Sub-Concessionaire
PPT Tanks & Installations	PDMC /Sub-Concessionaire

* This implies that the item is not taken into account in the model

CAPEX – Components – **Investment Allocation (PPP)** 2/2

The CAPEX items are allocated to the following entities in the model (2/2):

CAPEX item	Allocation
Quay Wall - Offshore Supplies Terminal	PDMC
OST Terminal Superstructure	PDMC /Sub-Concessionaire
OST Terminal Equipment	PDMC /Sub-Concessionaire
Quay Wall - Container Terminal	PDMC
CT Terminal Superstructure	PDMC /Sub-Concessionaire
CT Terminal Equipment	PDMC /Sub-Concessionaire
Quay Wall - RoRo & Breakbulk Terminal	PDMC
RBT Terminal Superstructure	PDMC /Sub-Concessionaire
RBT Terminal Equipment	PDMC /Sub-Concessionaire
Quay Wall - Dry Bulk Terminal	PDMC
DBT Terminal Superstructure	PDMC /Sub-Concessionaire
DBT Terminal Equipment	PDMC /Sub-Concessionaire
FTZ Site Preparation	PDMC /Sub-Concessionaire

CAPEX – Components – **Price Levels** 1/2

The price level for the CAPEX items is provided below and based on direct costs with mark-ups for contractor costs, employer costs and risks & uncertainties:

CAPEX item	Unit	Unit Rate excl. Mark-ups	Contractor Costs	Employer Costs	Risks & Uncertainties	Unit Rate incl. Mark-ups
Breakwaters	USD / phase	91,938,125	45%	14%	30%	197,565,837
Dredging - Access Channel Phase 1 & Inner Harbour	USD / phase	106,724,667	45%	14%	30%	229,340,636
Dredging - Access Channel & Inner Harbour (deepening)	USD / phase	46,847,776	45%	14%	30%	100,671,186
Dredging - Access Channel (2 lane)	USD / phase	36,495,800	45%	14%	30%	78,425,825
Dredging & Reclamation - Port Basin (per berth)	USD / phase	27,692,394	45%	14%	30%	59,508,185
Aids to Navigation	USD / phase	1,550,000	38%	14%	25%	3,048,075
Connecting Road	USD / route	89,000,000	38%	14%	25%	175,018,500
Connecting Rail	USD / route	50,000,000	38%	14%	25%	98,325,000
Port Utilities	USD / phase	15,000,000	38%	14%	25%	29,497,500
Port Superstructure	USD / phase	44,111,333	38%	14%	25%	86,744,937
Nautical Base	USD / phase	10,200,000	38%	14%	25%	20,058,300
Nautical Fleet	USD / set	11,500,000	10%	14%	25%	18,026,250

CAPEX – Components – **Price Levels** 2/2

CAPEX item	Unit	Unit Rate excl. Mark-ups	Contractor Costs	Employer Costs	Risks & Uncertainties	Unit Rate incl. Mark-ups
PPT Jetties	USD / phase	16,800,000	39%	14%	30%	34,607,664
PPT Terminal Superstructure	USD / phase	2,900,000	38%	10%	20%	5,282,640
PPT Tanks & Installations	USD / set	120,100,000	38%	10%	20%	218,774,160
Quay Wall - Offshore Supplies Terminal	USD / phase	24,166,667	39%	14%	30%	49,782,850
OST Terminal Superstructure	USD / phase	12,800,000	38%	10%	20%	23,316,480
OST Terminal Equipment	USD / set	6,400,000	10%	10%	20%	9,292,800
Quay Wall - Container Terminal	USD / berth	27,450,000	39%	14%	30%	56,546,451
CT Terminal Superstructure	USD / phase	40,200,000	38%	10%	20%	73,228,320
CT Terminal Equipment	USD / set	35,900,000	10%	10%	20%	52,126,800
Quay Wall - RoRo & Breakbulk Terminal	USD / berth	21,350,000	39%	14%	30%	43,980,573
RBT Terminal Superstructure	USD / phase	13,900,000	38%	10%	20%	25,320,240
RBT Terminal Equipment	USD / set	16,400,000	10%	10%	20%	23,812,800
Quay Wall - Dry Bulk Terminal	USD / berth	19,333,333	39%	14%	30%	39,826,280
DBT Terminal Superstructure	USD / phase	13,600,000	38%	10%	20%	24,773,760
DBT Terminal Equipment	USD / set	16,400,000	10%	10%	20%	23,812,800
FTZ Site Preparation	USD / m2	24	38%	14%	25%	46

CAPEX – Phasing – **Terminal Capacities**

Based on the Traffic Forecast, a Masterplan is created which covers the period up to 2035. This Masterplan stipulates the following maximum capacities by 2035:

Terminal	Capacity	Measurement
Petroleum Products Terminal – Maximum Capacity	35,000,000	MT / annum
Offshore Supplies Terminal – Maximum Capacity	128*	hectares
Container Terminal – Maximum Capacity	2,100,000	TEU / annum
RoRo & Breakbulk Terminal – Maximum Capacity	29,376 **	hours/annum
Dry Bulk Terminal – Cement – Maximum Capacity	8,000,000	MT / annum
Dry Bulk Terminal – Grain & Wheat – Maximum Capacity	8,000,000	MT / annum
Dry Bulk Terminal – Other Dry Bulk – Maximum Capacity	6,000,000	MT / annum

* The Offshore Supplies Terminal capacity is assumed to be land-driven. This is caused by the notion that this terminal will be operated by users that do not require large capacity in terminal throughput, but rather on the availability of the terminal with access to berths. In the base case. The indicated area (çapacity) shall be reached in 2038. This topic has been covered in the Traffic Forecast section of this report

** The RoRo & Breakbulk terminal's capacity is based on berth utilization rather than on terminal throughput. This is required in the financial model due to the different cargoes handled at the terminal: cars, iron & steel and general cargoes. When calculating the terminal capacity based on utilization in hours, the traffic forecasts of the different cargo types is coupled to this capacity. This is achieved based on an average required utilization per vehicle (150 vehicles/hour), per ton of iron & steel cargo (500 ton/hour) and per ton of other general cargo (100 ton/hour). The utilization rates for the RoRo & Breakbulk Terminal are based on the assumption that a terminal is open for 360 days per year and 24 hours per day. This is adjusted for efficiency losses when a limited number of berths are available (based on "Port development - A handbook for planners in developing countries", by the United Nations).

CAPEX – Phasing – **Investment Phasing** 1/4

The development of capacity of the various terminals in the port is based on a phased approach. Phases shall be developed once they are required from traffic forecast point of view. The phases of a specific terminal consist of building blocks with a specific quay length, surface area, superstructure and number of equipment.

Although each building block for a specific terminal is the same. However, the capacity of each added block will increase the overall capacity of the terminal with more than its preceding phase: In subsequent phases it is assumed that the terminals gain additional efficiency. This is caused by the increased size of the terminal: average (vessel) waiting time reduces when additional quay is available (queuing theory). Furthermore efficiency gains are made based on assumed performance increase of equipment over time (technological developments).

The following development phases are distinguished per terminal, with the associated capacities displayed in the tables below (1/3):

Container Terminal	Capacity	Measurement
Container Terminal – Phase 1	300,000	TEU / annum
Container Terminal – Phase 2	400,000	TEU / annum
Container Terminal – Phase 3	600,000	TEU / annum
Container Terminal – Phase 4	800,000	TEU / annum
Container Terminal – Maximum Capacity	**2,100,000**	**TEU / annum**

RoRo & Break-bulk Terminal	Capacity	Measurement
RoRo & Breakbulk Terminal – Phase 1	3,456	hours/annum
RoRo & Breakbulk Terminal – Phase 2	4,320	hours/annum
RoRo & Breakbulk Terminal – Phase 3	4,752	hours/annum
RoRo & Breakbulk Terminal – Phase 4	5,184	hours/annum
RoRo & Breakbulk Terminal – Phase 5	5,616	hours/annum
RoRo & Breakbulk Terminal – Phase 6	6,048	hours/annum
RoRo & Breakbulk Terminal – Maximum Capacity	29,376	**hours/annum**

The RoRo & break-bulk terminal's forecast is based on berth utilization. More information on this topic on the final page of this Phasing section

CAPEX – Phasing – **Investment Phasing** 2/4

The following development phases are distinguished per terminal, with the associated capacities displayed in the tables below (2/3):

Petroleum Products Terminal	Capacity	Measurement
Petroleum Products Terminal – Jetty - Phase 1	13,500,000	MT / annum
Petroleum Products Terminal – Jetty - Phase 2	21,500,000	MT / annum
Petroleum Products Terminal – Maximum Jetty Capacity	**35,000,000**	**MT / annum**
Petroleum Products Terminal - Tank Farm – Capacity per Phase	5,500,000	MT / annum
Petroleum Products Terminal – Maximum Tank Farm Capacity	**38,500,000**	**MT / annum**

Offshore Supplies Terminal	Capacity	Measurement
Offshore Supplies Terminal – Phase 1	32	hectares
Offshore Supplies Terminal – Phase 2	32	hectares
Offshore Supplies Terminal – Phase 3	32	hectares
Offshore Supplies Terminal – Phase 4	32	hectares
Offshore Supplies Terminal – Maximum Capacity	**128**	**hectares**

The Offshore Supplies Terminal capacity is assumed to be land-driven. This is caused by the notion that this terminal will be operated by users that do not require large capacity in terminal throughput, but rather on the availability of the terminal with access to berths. In the base case. The indicated area (çapacity’) shall be reached in 2038.

CAPEX – Phasing – **Investment Phasing** 3/4

The following development phases are distinguished per terminal, with the associated capacities displayed in the tables below (3/3):

Dry Bulk Terminal	Capacity	Measurement
Dry Bulk Terminal – Cement – Phase 1	3,000,000	MT / annum
Dry Bulk Terminal – Cement – Phase 2	5,000,000	MT / annum
Dry Bulk Terminal – Cement – Maximum Capacity	**8,000,000**	**MT / annum**
Dry Bulk Terminal – Grain & Wheat – Phase 1	3,000,000	MT / annum
Dry Bulk Terminal – Grain & Wheat – Phase 2	5,000,000	MT / annum
Dry Bulk Terminal – Grain & Wheat – Maximum Capacity	**8,000,000**	**MT / annum**
Dry Bulk Terminal – Other Dry Bulk – Phase 1	2,000,000	MT / annum
Dry Bulk Terminal – Other Dry Bulk – Phase 2	3,000,000	MT / annum
Dry Bulk Terminal – Other Dry Bulk – Maximum Capacity	**5,000,000**	**MT / annum**

CAPEX – Phasing – **Investment Phasing** 4/4

Combined RoRo & Break-Bulk terminal uses berth utilization for investment phasing

The RoRo & break-bulk terminal's forecast is based on berth utilization. This implies that the capacity phasing of the terminal is depicted by the number of available working hours and the required number of working hours to handle all cargo. The reason for using this approach is based on the notion that multiple cargo types are handled at this terminal: cars, iron & steel and regular break-bulk. As such, the capacity of the terminal differs from regular terminal capacity in TEUs or tons per annum: none of the cargoes are handled in the same manner.

In order to enable a phasing of the terminal similar to that of other terminals, the separate traffic forecasts for vehicles, iron & steel and break-bulk are transformed to berth utilization forecasts, based on the following assumptions:

Subject	Value	Unit
RoRo Utilization	135	Vehicles/hour
Iron & Steel Utilization	170	Tons/hour
Non-Iron & Steel break-bulk Utilization	105	Tons/hour

Total required berth utilization in hours is used as an input for the phasing of terminal capacity. This is based on the assumption that the terminal is operational for 24 hours per day and 360 operational days per year. Based on the U.N. Port Development Handbook, the following utilization rates per berth are applicable:

Number of Berths	Recommended maximum occupancy
1	40 %
2	50%
3	55%
4	60%
5	65%
6 – 10	70%

CAPEX – **Initial Investment Estimates**

Total capex requirements for the initial phase of the Ibom DSP project is between 1.76 and 2.64 bn USD, depending on the size of the scope of the initial phase. Between 2.60 and 1,09 bn USD needs to be financed by the PDMC, depending on the scope of the initial phase and the PDMCs ability to sub-concession the terminals.

The basis for the Ibom DSP project and financial structuring of the PDMC is the total capex requirements for Phase 1. The total investments required for Ibom Phase 1 are presented in the table below (described in more detail in Section C1 of the OBC):

Item	Amount (Phase 1 Mini)	Amount (Phase 1 Max)	
Land	0 M USD	0 M USD	
Port Infrastructure	766 M USD	945 M USD	Dredging, breakwater, land reclamation
Port Superstructure	139 M USD	139 M USD	Utilities, aids to navigation, offices, nautical base
Terminal Infrastructure	185 M USD	370 M USD	Quay walls, jetties
Terminal Superstructure	127 M USD	282 M USD	Paving, roads, fences, offices, warehouses, IT
Terminal Equipment	304 M USD	647 M USD	Cranes, trucks, forklifts, tanks
Free Trade Zone	46 M USD	46 M USD	Land development, internal roads, utility connections
Road connection	175 M USD	175 M USD	20km dual-carriage way
Total Capex PDMC	**1,742 M USD**	**2,604 M USD**	
Nautical Fleet (NPA)	18 M USD	36 M USD	Tug boats, pilot boats, mooring craft
Total Capex Project	**1,760 M USD**	**2,640 M USD**	

As the PDMC is likely to sub-concession the terminal operations to private terminal operators, part of the investments (terminal superstructure, terminal equipment) will be transferred to sub-concessionaires. The envisaged investment allocation between the PDMC and sub-concessionaires is summarized in the table below:

Item	Total Amount (Phase 1)		PDMC (ph1 min)	Sub-concessionaires (ph1 min)	PDMC (ph1 max)	Sub-concessionaires (ph1 max)
Land	0M USD		0M USD		0M USD	
Port Infrastructure	766 M USD		766 M USD		945 M USD	
Port Superstructure	139 M USD		139 M USD		139 M USD	
Terminal Infrastructure*	185 M USD		185 M USD		370 M USD	
Terminal Superstructure	127 M USD			127 M USD		282 M USD
Terminal Equipment	304 M USD			304 M USD		647 M USD
Free Trade Zone	46 M USD			46 M USD		46 M USD
Road connection	175 M USD			175 M USD		175 M USD
Total Capex	**1,742 M USD**		**1,090 M USD**	**652 M USD**	**1,454 M USD**	**1,150 M USD**

Contents

OPEX

Five categories of project OPEX allow for detailed simulation of operational costs in the financial model

The operational expenditures (OPEX) for this project consist of all operational expenditures in the port and in the free trade zone (excluding FTZ tenants). OPEX are incurred once the project is operational.

In the Initial Due Diligence, a simplified version of the OPEX has been used, based on percentages of the terminal revenues. In this phase of the project the OPEX is calculated in more detail, comprising of components such as:

OPEX item	Description
Maintenance	All costs associated with maintaining the project's infrastructure, superstructure and equipment. Costs include man hours, spare parts, lubricants, tires, etc.
Insurance	All costs associated with the proper insurance of assets and operations of the project
Fuel & Energy	All costs associated with the use of fuels and electricity to operate the project.
Labour Costs	All costs associated with the staffing of the project
Other Costs	All costs which have not been taken into account in the aforementioned sections. *Assumed at 20% of the sub-total OPEX every year.*

OPEX – Maintenance 1/2

OPEX maintenance for port infrastructure, superstructure & equipment

Maintenance OPEX include all costs associated with maintaining the project's infrastructure, superstructure and equipment. The maintenance rates for the various port assets are based on their initial investment price (including mark-up rates). The rates are a percentage of these initial values and are calculated from a non-escalated (real) asset balance that depicts the available assets in the project requiring maintenance. The maintenance rate is an all-inclusive rate, comprising of spare parts, man hours, lubricants, tyres et cetera.

The following CAPEX items are subject to the following maintenance rates (1/2):

CAPEX item	Maintenance Rate	Unit
Breakwaters	0.50%	% / USD / annum
Dredging - Access Channel Phase 1 & Inner Harbour	3.50%	% / USD / annum
Dredging - Access Channel & Inner Harbour (deepening)	3.50%	% / USD / annum
Dredging - Access Channel (2 lane)	3.50%	% / USD / annum
Dredging & Reclamation - Port Basin (per berth)	2.00%	% / USD / annum
Aids to Navigation	2.00%	% / USD / annum
Connecting Road	2.00%	% / USD / annum
Connecting Rail	1.50%	% / USD / annum
Port Utilities	1.50%	% / USD / annum
Port Superstructure	2.00%	% / USD / annum
Nautical Base	1.50%	% / USD / annum
Nautical Fleet	5.00%	% / USD / annum

OPEX – **Maintenance** 2/2

The following CAPEX items are subject to the following maintenance rates (2/2):

CAPEX item	Maintenance Rate	Unit
PPT Jetties	1.50%	% / USD / annum
PPT Terminal Superstructure	1.50%	% / USD / annum
PPT Tanks & Installations	1.50%	% / USD / annum
Quay Wall - Offshore Supplies Terminal	1.50%	% / USD / annum
OST Terminal Superstructure	1.50%	% / USD / annum
OST Terminal Equipment	3.00%	% / USD / annum
Quay Wall - Container Terminal	1.50%	% / USD / annum
CT Terminal Superstructure	1.50%	% / USD / annum
CT Terminal Equipment	3.00%	% / USD / annum
Quay Wall - RoRo & Breakbulk Terminal	1.50%	% / USD / annum
RBT Terminal Superstructure	1.50%	% / USD / annum
RBT Terminal Equipment	3.00%	% / USD / annum
Quay Wall - Dry Bulk Terminal	1.50%	% / USD / annum
DBT Terminal Superstructure	1.50%	% / USD / annum
DBT Terminal Equipment	3.00%	% / USD / annum
FTZ Site Preparation	0.50%	% / USD / annum

OPEX – Insurance 1/2

OPEX insurance for assets & operations

Maintenance OPEX include all costs associated with insuring the project's assets and operations. The insurance rates for the various port assets are based on their initial investment values (including mark-up rates). The rates are a percentage of these initial values and are credited from the same non-escalated depreciable balance that is used for establishing the maintenance rate of the assets.

The following CAPEX items are subject to the following insurance rates (1/2):

CAPEX item	Insurance Rate	Unit Rate
Breakwaters	0.50%	% / USD / annum
Dredging - Access Channel Phase 1 & Inner Harbour	0.50%	% / USD / annum
Dredging - Access Channel & Inner Harbour (deepening)	- *	% / USD / annum
Dredging - Access Channel (2 lane)	- *	% / USD / annum
Dredging & Reclamation - Port Basin (per berth)	0.50%	% / USD / annum
Aids to Navigation	0.50%	% / USD / annum
Connecting Road	0.50%	% / USD / annum
Connecting Rail	0.50%	% / USD / annum
Port Utilities	0.50%	% / USD / annum
Port Superstructure	0.50%	% / USD / annum
Nautical Base	0.50%	% / USD / annum
Nautical Fleet	0.50%	% / USD / annum

* It is assumed that deepening and widening the dredged area shall not increase the insurance costs

OPEX – Insurance 2/2

The following CAPEX items are subject to the following insurance rates (2/2):

CAPEX item	Insurance Rate	Unit Rate
PPT Jetties	0.50%	% / USD / annum
PPT Terminal Superstructure	0.50%	% / USD / annum
PPT Tanks & Installations	0.50%	% / USD / annum
Quay Wall - Offshore Supplies Terminal	0.50%	% / USD / annum
OST Terminal Superstructure	0.50%	% / USD / annum
OST Terminal Equipment	0.50%	% / USD / annum
Quay Wall - Container Terminal	0.50%	% / USD / annum
CT Terminal Superstructure	0.50%	% / USD / annum
CT Terminal Equipment	0.50%	% / USD / annum
Quay Wall - RoRo & Breakbulk Terminal	0.50%	% / USD / annum
RBT Terminal Superstructure	0.50%	% / USD / annum
RBT Terminal Equipment	0.50%	% / USD / annum
Quay Wall - Bulk Cement Terminal	0.50%	% / USD / annum
BCT Terminal Superstructure	0.50%	% / USD / annum
BCT Terminal Equipment	0.50%	% / USD / annum
FTZ Site Preparation	0.50%	% / USD / annum

OPEX – Fuel & Electricity

OPEX fuel & electricity for port operations

Use of fuel & electricity in the port terminals is largely connected to the activities in the port.

- The terminal operators use a fixed fuel & electricity rate per unit of throughput (MT, unit or TEU);
- Nautical Services use a fixed fuel & electricity rate per Deep Sea ship call;
- The Port Management has a fixed annual fuel & electricity rate.

The following fuel & electricity rates are used :

Item	Fuel & Electricity Rate	Unit Rate
Port Management – Annual Fuel & Electricity Consumption	50,000	USD / annum
Nautical Services - Fuel & Electricity Consumption - per Call	1,000	USD / call
Petroleum Products Terminal - Fuel & Energy Consumption - per MT	0.20	USD / MT
Offshore Supply Terminal - Fuel & Energy Consumption - per MT	2.00	USD / MT
Container Terminal - Fuel & Energy Consumption - per TEU	5.00	USD / TEU
RoRo & Breakbulk Terminal - Fuel & Energy Consumption - per MT	1.50	USD / MT
Bulk Terminal - Fuel & Energy Consumption - per MT	0.50	USD / MT
Free Trade Zone - Fuel & Energy Consumption - per m2	0.20	USD / m2

OPEX – **Labour** – Employment

OPEX labour: employment levels for port operations, nautical services and port management

The following number of FTE per terminal per phase are :

Item	FTE	Unit Rate
Port Management - Management & Expat Staff - Fixed	10	FTE
Port Management - Local Operational Staff - Variable	70	FTE/phase
Port Management - Local Operational Staff - Fixed	16	FTE
Nautical Services - Management & Expat Staff - Fixed	3	FTE
Nautical Services - Local Operational Staff - Variable	70	FTE /phase
Petroleum Products Terminal - Management & Expat Staff - Fixed	7	FTE
Petroleum Products Terminal - Local Staff - Variable	30	FTE / phase
Offshore Supply Terminal - Management & Expat Staff - Fixed	10	FTE
Offshore Supply Terminal - Local Staff - Variable	50	FTE /phase
Container Terminal - Management & Expat Staff - Fixed	16	FTE
Container Terminal - Local Operational Staff - Variable	380	FTE /phase
RoRo & Breakbulk Terminal - Management & Expat Staff - Fixed	21	FTE
RoRo & Breakbulk Terminal - Local Operational Staff – Variable	160	FTE /phase
Dry Bulk Terminal - Management & Expat Staff – Fixed	3	FTE
Dry Bulk Terminal - Local Operational Staff – Variable	70	FTE /phase
Free Trade Zone - Management & Expat Staff – Fixed	10	FTE
Free Trade Zone - Local Staff – Fixed	40	FTE
Project Road - Management & Expat Staff – Fixed	10	FTE
Project Road - Local Staff – Fixed	190	FTE

OPEX – **Labour** – Wages

OPEX labour: wage levels for managers, expats and locals

Opex for wages in the port is based on the all-inclusive costs to employer, including any social security costs and insurance that has to be paid by employer.

The following wage levels apply for port's management & expat staff and local staff:

Opex item	Wage Rate	Unit Rate
Labor - Wage Level - Management & Expat Staff	1,000,000	NGN/FTE /month
Labor - Wage Level - Local Operational Staff	100,000	NGN/FTE /month

OPEX – Adjustments

In the initial period of the project Opex are adjusted for inefficiencies and for ramp-up:

OPEX item	Description
All Opex items	Inefficiency Factor: 150% at start of operations Increasing Efficiency: return to 100% in 10 years (-5% every year)
Maintenance	Infrastructure + Superstructure: Starts after 5 years; ramped up in 5 years Equipment: Starts after 1 year; ramped up in 5 years
Insurance	n/a
Fuel & Energy	n/a
Labour Costs	Fixed Staff Ramp-Up: 3 years Variable Staff Ramp-Up: 1 year Hiring: 1 year before required (FTZ Management: 2 years)
Other Costs	n/a

Contents

Revenues

Revenues for the project vary per business case. The main inputs for project revenues are the NPA tariff book and tariff books published by terminal operators in Lagos.

The NPA tariff book's assumptions are based on the notion that foreign ships pay higher dues than ships sailing in Tropical West-Africa (TWA) and within Nigeria.

A distinction is made between vessel related dues and cargo related dues. Vessel related dues are paid based on the vessel's characteristics: GRT, vessel length, or number of days required for loading/unloading the vessel. The cargo related dues are paid based on the cargo characteristics: number of TEUs, weight of a Box, class of a vehicle or the weight of the cargo (in case of bulk cargoes).

On the next page the overall structure of revenues is provided, taking into account the following assumptions:

1. The PDMC (or its sub-concessionaires) receive all Terminal Tariffs and Port Dues, besides a share of the Ship Dues, which are allocated to the NPA (fixed component for towage and mooring and variable component for pilotage and Harbor Master). NPA also receives indirect income through concession fees (Land Lease and Revenue Share) and dividends from the PDMC)
2. Specific tariffs and dues which are received by the PDMC are part of the Defined Revenue Base, which is used to calculate the Revenue Share concession payment from the PDMC to the NPA
3. To protect the port users, all revenues in the Defined Revenue Base are established and managed by the NPA; either through its public Tariff Book (for "Port Dues") or through a direct agreement with the PDMC (for "Terminal Tariffs", similar to other terminal operators in Nigeria)
4. PDMC and its sub-concessionaires are allowed to provide discounts, but no price increases (dues and tariffs are caps)
5. It is assumed that discounts are applied on the published tariffs from the start of operations and that further tariff erosion shall apply (elaborated separately)

Revenues – **Structure & Allocation**

Main project related revenues accrue to the PDMC (and its sub-concessionaires)

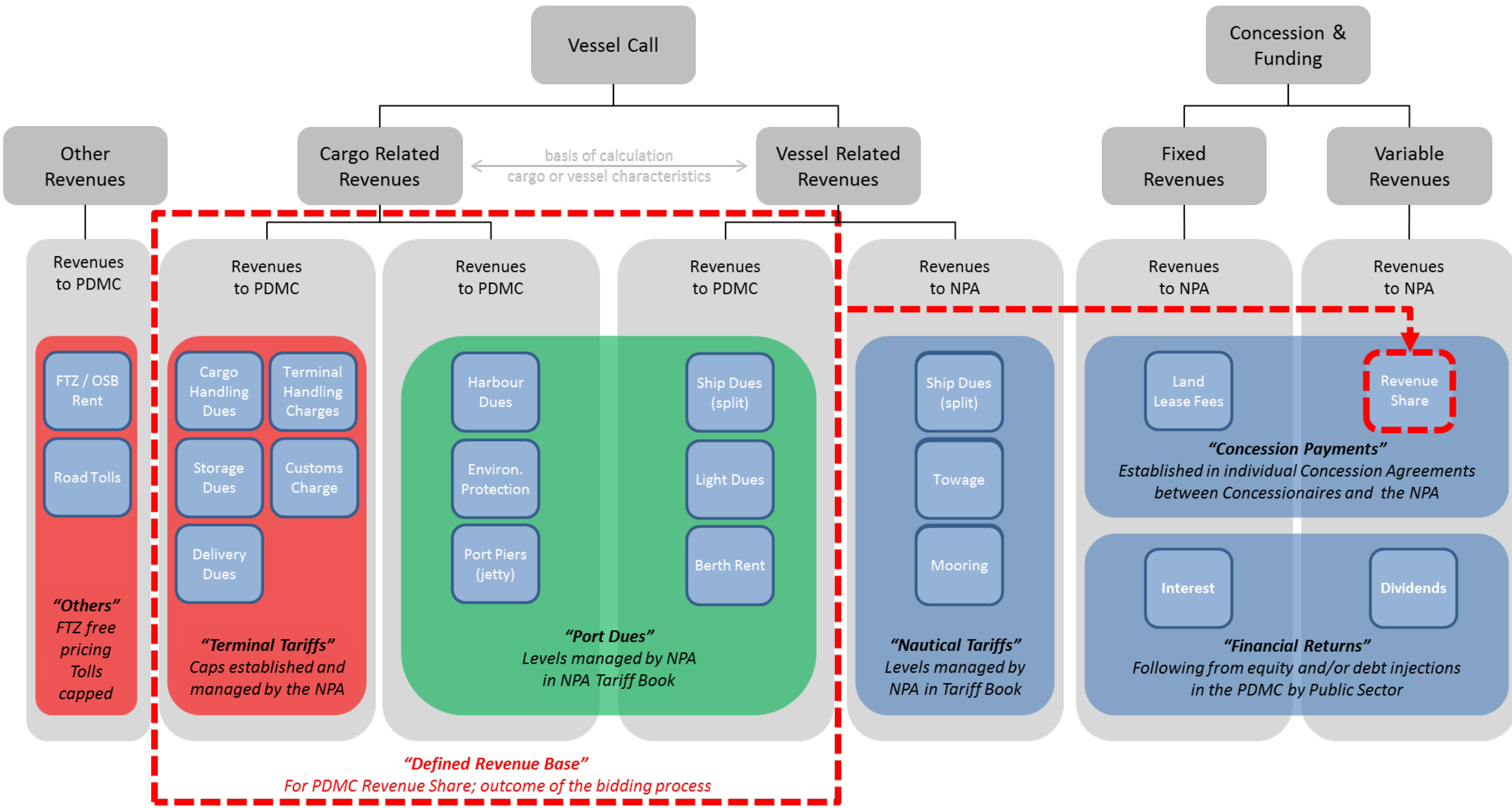


Figure 5.1 – Tariff Structure & Allocation

Revenues – **Discounts & Indexation**

Subject	Assumption
Terminal Tariffs	Base level based on tariffs at existing terminals 15% discount at start of operations (25% for petroleum products; 0% for Offshore Supplies) 2% annual price erosion from start operations until 20% has eroded (30% for petroleum products; 0% for Offshore Supplies) Regular annual inflation indexation
Nautical Tariffs	Base level based on NPA Tariff Book No discounts No erosion Regular annual inflation indexation
Port Dues	Base level based on NPA Tariff Book No discounts 2% erosion per annum starting in 2023 until 30% has eroded (0% for ship dues & berth rent) Annual inflation, indexation starting in 2020
Revenue Share (where applied)	Base level based on Business Case 10 year ramp-up period (+10% per annum)
Land Lease (where applied)	Base level based on Consultant's Estimate 50% discount during construction No erosion Regular annual inflation indexation

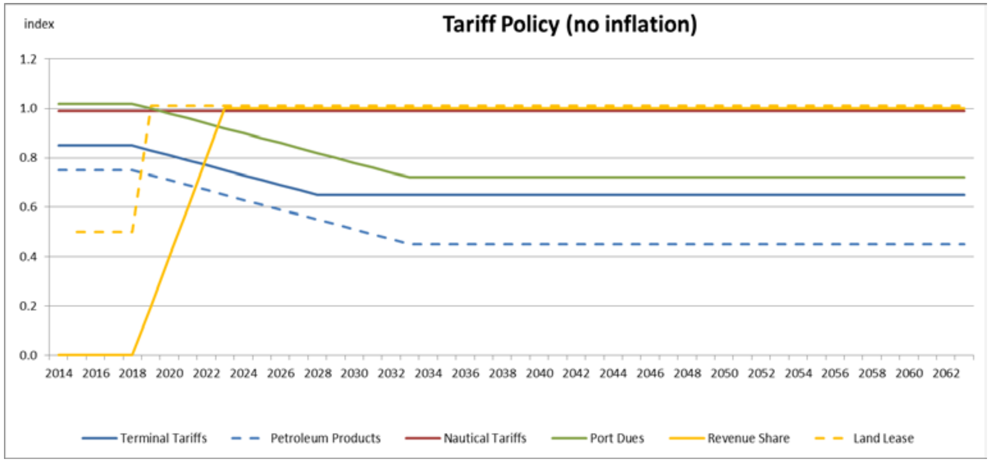


Figure 5.2 – Tariff Policy (no inflation)

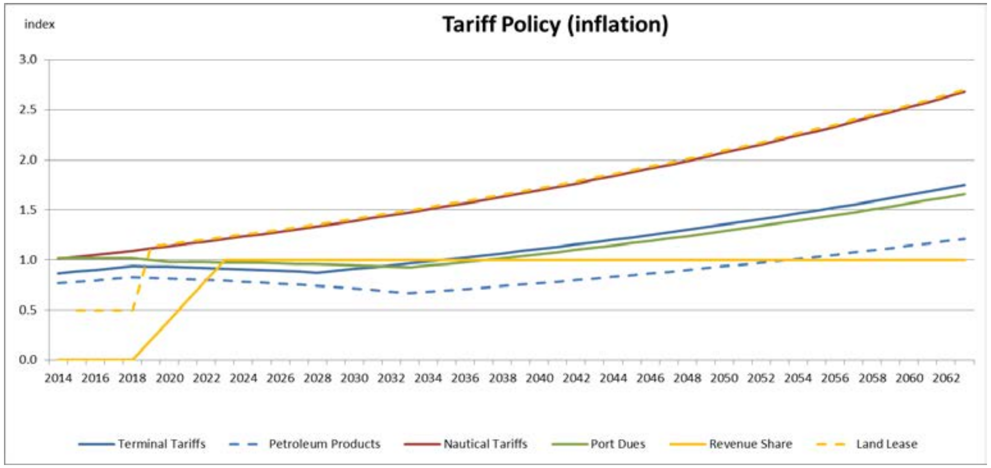


Figure 5.3 – Tariff Policy (with assumed inflation)

The following pages contain the base level tariffs and dues as assumed in the Business Model. These exclude the discounts, erosion, indexation and ramp-ups (taken into account in the model)

Revenues – Vessel Related Port Dues

The following tariffs apply for the Vessel Related Port Dues

Item	Cost	Unit Rate
Ship Dues		
Tariff - Ship dues - Fixed fee - Foreign (see Marine Services)	n/a	$/Vessel
Tariff - Ship dues - GRT fee - Foreign	1.28	$/GRT
Tariff - Ship dues - Fixed fee - TWA (see Marine Services)	n/a	$/Vessel
Tariff - Ship dues - GRT fee - TWA	0.62	$/GRT
Tariff - Ship dues - Fixed fee - Coastal (see Marine Services)	n/a	$/Vessel
Tariff - Ship dues - GRT fee - Coastal	0.44	$/GRT
Tariff - Ship dues - Fixed fee - Offshore Supply Vessels	-	$/Vessel
Tariff - Ship dues - GRT fee - Offshore Supply Vessels	-	$/GRT
Tariff - Ship dues – Share allocated to NPA	50%	%
Light Dues		
Tariff - Light dues - GRT fee - Foreign	0.95	$/GRT
Tariff - Light dues - GRT fee - TWA	0.95	$/GRT
Tariff - Light dues - GRT fee - Coastal	0.85	$/GRT
Tariff - Light dues - GRT fee - Offshore Supply Vessels	-	$/GRT
Berth Rent		
Tariff - Berth Rent - Daily fee	1.00	$/Vessel length
No of days - Berth Rent - Container Vessel	1	Days
No of days - Berth Rent - Vehicles Vessel	1	Days
No of days - Berth Rent - Petroleum Products Vessel	1	Days
No of days - Berth Rent - Dry Bulk Vessel	2	Days
No of days - Berth Rent - General Cargo Vessel	3	Days
No of days - Berth Rent - Offshore Supply Vessel	-	Days
Marine Services		
Tariff - Marine Services - Towage Services - Towage to berth	925.6	$/Vessel Call
Tariff - Marine Services - Mooring Services - Mooring to quay	250	$/Vessel Call

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Petroleum Products –** Cargo Related Port Dues

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The following tariffs apply for the Cargo Related Port Dues for the Petroleum Products Terminal

Item	Cost	Unit Rate
Harbour Dues		
Tariff - Harbour Dues - Petroleum Products - Import - Foreign	1.89	$/Ton
Tariff - Harbour Dues - Petroleum Products - Import - TWA & Coastal	1.66	$/Ton
Tariff - Harbour Dues - Petroleum Products - Export - Foreign	1.46	$/Ton
Tariff - Harbour Dues - Petroleum Products - Export - TWA & Coastal	1.46	$/Ton
Environmental Protection		
Tariff - Environmental Protection – All Petroleum Products	0.10	$/Ton
Port Piers		
Tariff - Port Piers - Petroleum Products – Import	22.00	₦/Ton
Tariff - Port Piers - Petroleum Products - Export	14.00	₦/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Petroleum Products Terminal** – Terminal Tariffs

The following tariffs apply for the Terminal Operator's cargo related revenues for the Petroleum Products Terminal

Item	Cost	Unit Rate
Cargo Dues		
Tariff - Terminal Operators - Cargo Dues – All Petroleum Products	0.80	₦/Litre
Storage Dues		
Tariff - Terminal Operators - Storage Dues – All Petroleum Products	0.10	₦/Litre/Day
Delivery Dues		
Tariff - Terminal Operators - Delivery Dues – All Petroleum Products	59.00	₦/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Container Terminal** – Cargo Related Port Dues

The following tariffs apply for the Cargo Related Port Dues for the Container Terminal

Item	Cost	Unit Rate
Harbour Dues		
Tariff - Harbour Dues - Containers 20' - Import - Foreign	80.00	$/Box
Tariff - Harbour Dues - Containers 20' - Import - TWA & Coastal	47.00	$/Box
Tariff - Harbour Dues - Containers 20' - Export - Foreign	47.00	$/Box
Tariff - Harbour Dues - Containers 20' - Export - TWA & Coastal	47.00	$/Box
Tariff - Harbour Dues - Containers 40' - Import - Foreign	160.00	$/Box
Tariff - Harbour Dues - Containers 40' - Import - TWA & Coastal	93.00	$/Box
Tariff - Harbour Dues - Containers 40' - Export - Foreign	93.00	$/Box
Tariff - Harbour Dues - Containers 40' - Export - TWA & Coastal	93.00	$/Box
Environmental Protection		
Tariff - Environmental Protection - All Containers 20'	3.63	$/Box
Tariff - Environmental Protection - All Containers 40'	7.68	$/Box

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Container Terminal** – Terminal Tariffs 1/2

The following tariffs apply for the Terminal Operator's cargo related revenues for the Container Terminal (part 1)

Item	Cost	Unit Rate
Cargo Dues		
Tariff - Terminal Operators - Cargo Dues - Containers 20' Laden - Import - Foreign	105.00	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 20' Laden - Import - TWA & Coastal	84.00	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 20' Laden - Export - Foreign	80.00	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 20' Laden - Export - TWA & Coastal	80.00	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 40' Laden - Import - Foreign	152.25	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 40' Laden - Import - TWA & Coastal	121.80	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 40' Laden - Export - Foreign	116.00	$/Box
Tariff - Terminal Operators - Cargo Dues - Containers 40' Laden - Export - TWA & Coastal	116.00	$/Box
Tariff - Terminal Operators - Cargo Dues – All Containers 20' Empty	27.50	$/Box
Tariff - Terminal Operators - Cargo Dues – All Containers 40' Empty	55.00	$/Box
Storage Dues		
Tariff - Terminal Operators - Storage Dues – All Containers 20'	750	₦/Box/Day
Tariff - Terminal Operators - Storage Dues – All Containers 40'	1500	₦/Box/Day

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Container Terminal –** Terminal Tariffs 2/2

The following tariffs apply for the Terminal Operator's cargo related revenues for the Container Terminal (part 2)

Item	Cost	Unit Rate
Delivery Dues		
Tariff - Terminal Operators - Delivery Dues - Containers 20' Laden – Import	5500	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 20' Laden – Export	4000	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 40' Laden – Import	6900	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 40' Laden – Export	6100	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 20' Empty – Import	5500	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 20' Empty – Export	1500	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 40' Empty – Import	6900	₦/Box
Tariff - Terminal Operators - Delivery Dues - Containers 40' Empty – Export	2200	₦/Box
Terminal Handling Dues		
Tariff - Terminal Operators - Terminal THC – All Containers 20'	45000	₦/Box
Tariff - Terminal Operators - Terminal THC – All Containers 40'	67500	₦/Box
Customs Charge		
Tariff - Terminal Operators - Customs Charge - Containers 20'	7000	₦/Box
Tariff - Terminal Operators - Customs Charge - Containers 40'	11000	₦/Box

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **RoRo & Break-Bulk Terminal** – Cargo Related Port Dues

The following tariffs apply for the Cargo Related Port Dues for the RoRo & Break-Bulk Terminal (RoRo part)

Item	Cost	Unit Rate
Harbour Dues		
Tariff - Harbour Dues - Vehicles - up to 15 cbm	27.50	$/Vehicle
Tariff - Harbour Dues - Vehicles - 16-25 cbm	45.00	$/Vehicle
Tariff - Harbour Dues - Vehicles - over 25 cbm	187.00	$/Vehicle
Tariff - Harbour Dues - Vehicles – trailers	300.00	$/Vehicle
Environmental Protection		
Tariff - Environmental Protection – All Vehicles	2.25	$/Vehicle

The following tariffs apply for the Cargo Related Port Dues for the RoRo & Break-Bulk Terminal (Break-Bulk part)

Item	Cost	Unit Rate
Harbour Dues		
Tariff - Harbour Dues - General Cargo - Import - Foreign	2.50	$/Ton
Tariff - Harbour Dues - General Cargo - Import - TWA & Coastal	2.00	$/Ton
Tariff - Harbour Dues - General Cargo - Export - Foreign	1.70	$/Ton
Tariff - Harbour Dues - General Cargo - Export - TWA & Coastal	1.20	$/Ton
Environmental Protection		
Tariff - Environmental Protection – All General Cargo	0.10	$/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **RoRo & Break-Bulk Terminal** – Terminal Tariffs 1/2

The following tariffs apply for the Terminal Operator's cargo related dues for the RoRo related part of the RoRo & Break-Bulk Terminal

Item	Cost	Unit Rate
Cargo Dues		
Tariff - Terminal Operators - Cargo Dues - Vehicles - up to 15 cbm - Import	16.50	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - up to 15 cbm – Export	15.00	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - 16-25 cbm – Import	30.00	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - 16-25 cbm – Export	16.00	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - over 25 cbm – Import	65.00	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - over 25 cbm – Export	20.00	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - trailers – Import	125.00	$/Vehicle
Tariff - Terminal Operators - Cargo Dues - Vehicles - trailers – Export	50.00	$/Vehicle
Storage Dues		
Tariff - Terminal Operators - Storage Dues - Vehicles - up to 15 cbm	750	₦/Vehicle/Day
Tariff - Terminal Operators - Storage Dues - Vehicles - 16-25 cbm	900	₦/Vehicle/Day
Tariff - Terminal Operators - Storage Dues - Vehicles - over 25 cbm	1500	₦/Vehicle/Day
Tariff - Terminal Operators - Storage Dues - Vehicles – trailers	2625	₦/Vehicle/Day
Delivery Dues		
Tariff - Terminal Operators - Delivery Dues - Vehicles - up to 15 cbm	3100	₦/Vehicle
Tariff - Terminal Operators - Delivery Dues - Vehicles - 16-25 cbm	3500	₦/Vehicle
Tariff - Terminal Operators - Delivery Dues - Vehicles - over 25 cbm	4800	₦/Vehicle
Tariff - Terminal Operators - Delivery Dues - Vehicles – trailers	5300	₦/Vehicle
Terminal Handling Charge		
Tariff - Terminal Operators - Terminal THC - Vehicles - up to 15 cbm	11000	₦/Vehicle
Tariff - Terminal Operators - Terminal THC - Vehicles - 16-25 cbm	16500	₦/Vehicle
Tariff - Terminal Operators - Terminal THC - Vehicles - over 25 cbm	22500	₦/Vehicle
Tariff - Terminal Operators - Terminal THC - Vehicles - trailers	35000	₦/Vehicle

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **RoRo & Break-Bulk Terminal** – Terminal Tariffs 2/2

The following tariffs apply for the Terminal Operator's cargo related dues for the Break-Bulk related part of the RoRo & Break-Bulk Terminal

Item	Cost	Unit Rate
Cargo Dues		
Tariff - Terminal Operators - Cargo Dues - General Cargo - Import	6.93	$/Ton
Tariff - Terminal Operators - Cargo Dues - General Cargo - Export	4.55	$/Ton
Storage Dues		
Tariff - Terminal Operators - Storage Dues – All General Cargo	26	₦/Ton/Day
Delivery Dues		
Tariff - Terminal Operators - Delivery Dues - General Cargo - Import	107	₦/Ton
Tariff - Terminal Operators - Delivery Dues - General Cargo - Export	202	₦/Ton
Terminal Handling Charge		
Tariff - Terminal Operators - Terminal THC – All General Cargo	600	₦/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Dry Bulk Terminal** – Cargo Related Port Dues

The following tariffs apply for the Cargo Related Port Dues for the Dry Bulk Terminal

Item	Cost	Unit Rate
Harbour Dues		
Tariff - Harbour Dues - General Cargo - Import - Foreign	2.50	$/Ton
Tariff - Harbour Dues - General Cargo - Import - TWA & Coastal	2.00	$/Ton
Tariff - Harbour Dues - General Cargo - Export - Foreign	1.70	$/Ton
Tariff - Harbour Dues - General Cargo - Export - TWA & Coastal	1.20	$/Ton
Environmental Protection		
Tariff - Environmental Protection – All General Cargo	0.10	$/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Dry Bulk Terminal** – Terminal Tariffs

The following tariffs apply for the Terminal Operator's cargo related revenues for the Dry Bulk Terminal

Item	Cost	Unit Rate
Cargo Dues		
Tariff - Terminal Operators - Cargo Dues - Dry Bulk - Import	4.55	$/Ton
Tariff - Terminal Operators - Cargo Dues - Dry Bulk - Export	3.41	$/Ton
Storage Dues		
Tariff - Terminal Operators - Storage Dues – All Dry Bulk	26	₦/Ton/Day
Delivery Dues		
Tariff - Terminal Operators - Delivery Dues - Dry Bulk - Import	107	₦/Ton
Tariff - Terminal Operators - Delivery Dues - Dry Bulk - Export	202	₦/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Offshore Supply Terminal** – Cargo Related Port Dues

The following tariffs apply for the Cargo Related Port Dues for the Offshore Supply Terminal

Item	Cost	Unit Rate
Harbour Dues		
Tariff - Harbour Dues - Offshore Supply - Import - Foreign	2.50	$/Ton
Tariff - Harbour Dues - Offshore Supply - Import - TWA & Coastal	2.00	$/Ton
Tariff - Harbour Dues - Offshore Supply - Export - Foreign	1.70	$/Ton
Tariff - Harbour Dues - Offshore Supply - Export - TWA & Coastal	1.20	$/Ton
Environmental Protection		
Tariff - Environmental Protection – All Offshore Supply	0.10	$/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Offshore Supply Terminal** – Terminal Tariffs

The following tariffs apply for the Terminal Operator's cargo related revenues for the Offshore Supply Terminal

Item	Cost	Unit Rate
Cargo Dues		
Tariff - Terminal Operators - Cargo Dues - Offshore Supply - Import - Foreign	6.93	$/Ton
Tariff - Terminal Operators - Cargo Dues - Offshore Supply - Export - Foreign	4.55	$/Ton
Storage Dues		
Tariff - Terminal Operators - Storage Dues - Offshore Supply	39	₦/Ton/Day
Delivery Dues		
Tariff - Terminal Operators - Delivery Dues - Offshore Supply – Import	107	₦/Ton
Tariff - Terminal Operators - Delivery Dues - Offshore Supply - Export	202	₦/Ton

these base tariffs are exclusive of any discounts and indexation as stipulated earlier in this section

Revenues – **Project Road**

The business case for the project road is based on a toll road fee that has to be paid by all traffic that uses the road: both local traffic and port related traffic have to pay a fixed toll road fee for every single voyage. This level of the fee is minimised to a level whereby the NPV of the Project Road Business Unit (or Sub-Concessionaire) equals zero. In this way the costs for the road users are minimised, whilst ensuring a properly maintained and well constructed road from the port to the federal highway system and vice-versa.

The main assumptions for the project road are as follows:

Subject	Value	Unit
Passenger-Car-Equivalent per truck	3.5	PCE
Railway trigger – trucks	5,184,000	Annual truck moves
Pipeline trigger – trucks	800,000	Annual road tanker moves
FTZ &OSB traffic multiplier	+ 20%	Truck moves
Local traffic multiplier	+ 25%	Truck moves

Based on these assumptions and the modal split assumptions for every commodity, a traffic forecast for the project road has been developed. This traffic forecast includes triggers for the development of a pipeline for petroleum products and a railroad connection for other cargoes. These two triggers allow the project road to require no expansions.

The trigger for the pipeline development is based on a maximum number of (road tanker) truck moves for the petroleum terminal: if 800,000 annual road tanker moves are required for the transport of petroleum products, it is assumed that a pipeline is constructed which absorbs a significant share of the transport of petroleum products.

The trigger for railway developments is based on the maximum road capacity minus the pipeline throughput that replaces a number of truck moves: if this number is larger than 5,184,000 truck moves, the railway connection is required.

Revenues – **Free Trade Zone, Offshore Supply Base & Project Road**

Free Trade Zone

The business case for the Free Trade Zone is based on the assumption that a FTZ management company attract tenants for which it will provide basic infrastructure and basic FTZ services. Its revenue base is the annual landlease fees it can negotiate with its tenants. It is assumed that the FTZ will grow by 50 hectares annually. The main investments, and revenues for the FTZ are displayed by the table below:

Subject	Value	Unit
One-time Investments for FTZ tenants (capex)	$46 .00	Per m2 (capex)
Landlease revenues from FTZ tenants	$10.00	Per m2 per annum

Offshore Supply Base

The business case for the Offshore Supply Base is partly based on regular income from cargo handling and port dues. An other form of income is annual landlease fees the operator charges to tenants of the OSB. This concerns primary port land with (in)direct access to dedicated or common-user berths where specialised OSB services are provided. Tenants are charged a premium for this land.

Subject	Value	Unit
Landlease revenues from OSB tenants	$50.00	Per m2 per annum

Project Road

The Road shall be developed by the PDMC, who shall recover its costs by levying Road Tolls to users. The level of the toll is established based on an NPV of 0, so required returns are met.

Subject	Value	Unit
Road Toll	$10.00	Per truck ($5.00 per journey)

Contents

Economics –Exchange Rates, Inflation/Escalation & Taxation

Model primarily based on US Dollars; some figures are converted to Naira values in the model. NEPZA tax regime applies

Currency

Subject	Value	Source/Observation
Primary Currency	USD	Consultant
Secondary Currency	NGN (applicable to part of the operational expenses and a few revenues)	Consultant
Exchange Rate	1 USD is 157.62 NGN (average 2012), assumed constant	currency.me.uk
Indexation – US Dollar	2% annually from 2014, assumed constant (used for capex, revenues and part of the opex)	tradingeconomics.com
Indexation – Naira	8% annually from 2014, decreasing by 0.10% per annum until 2063 (used for port of the operational expenses)	tradingeconomics.com

Taxation

Subject	Assumption	Source
Taxation	30 % corporate tax paid after tax holiday of 10 years (2014 – 2023) Only applied in Bankability analysis. In Feasibility/Viability covered by WACC-adjustment	NEPZA & KPMG

Economics – **Inflation & Exchange Rates**

The dominant currency in the model is the UD Dollar. Only specific cash flows are Naira-based, including a few revenues and the local costs (especially labour). These flows are exchanged to USD amounts based on the fixed exchange rate (160).

When real terms are presented, USD 2013 amounts apply. In case nominal terms are presented, the Naira amounts have been indexed on an annual basis at their decreasing inflation rate (from 8% in 2013 to 3% in 2063) and exchanged to USD at the fixed rate (160). In the nominal case, USD price levels (including tariffs) are indexed on a n annual basis at the fixed USD inflation rate (2%).

Figure 6.1 – Nigerian Inflation Rate

Figure 6.2 – Naira/USD exchange rate

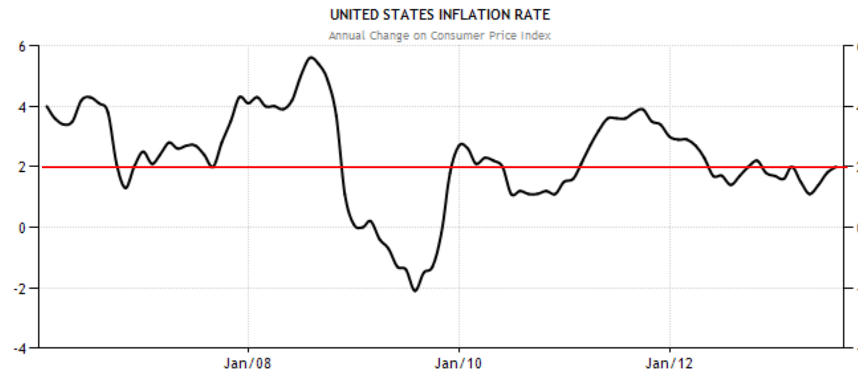

Figure 6.3 – US Inflation Rate

Economics – **Concession Payments**

Subject	Assumption	Source
Land Lease Fees	PDMC: $5.00/m2/annum for the port; $1.00/m2/annum for the FTZ; and $0.05/m2/annum for unused Concession Area (payable to NPA).	Consultant
Revenue Share	PDMC: % of Defined Revenues; output from Financial Bidding. Assumed at 10% in Viability analysis Concession Grantor and Bankability analysis PDMC	Consultant
ICRC Fee	Upfront payment of 0.1% of total concession value, payable by the PDMC to the ICRC (value assumed at USD 1B; ICRC fee established at USD 1M	ICRC

Economics – **WACC**

For the Business Case model, the weighted average cost of capital (WACC) is calculated for each entity in order to use it as a valuable and realistic input for the model. The underlying assumptions for these three WACC's are as follows.

Subject	Leverage	Shareholding	Cost of Equity	Cost of Debt	Taxation	WACC
WACC - Business Units 1 *Containers & Breakbulk/RoRo*	Equity: 50% Debt: 50%	Private: 100 %	22.5%	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**14.23%**
WACC - Business Units 2 *Liquid Bulk, Dry Bulk & Offshore Supplies*	Equity: 50% Debt: 50%	Private: 100 %	20.0%	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**12.98%**
WACC - Business Units 3 *FTZ & Project Road*	Equity: 50% Debt: 50%	Private: 100 %	17.5%	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**11.73%**
WACC – Business Unit 4 *Port Management, WITHOUT Government Funding Support*	Equity: 50% Debt: 50%	NPA: 20% State: 20% Private: 60%	NPA: 10.0% State: 10.0% Private: 23.3%*	Libor: 1.0% Margin: 5.0% Financing Costs: 1.0% + Total: 7.0%	15% Effective	**11.98%**
WACC – Business Units 5 *Nautical Services, NPA*						**10.00%**
WACC – Ibom DSP Project *Project*	Blended WACC based on underlying Business Units 1-5					**13.02%**
WACC – Concessionaire *PDMC*	Blended WACC based on underlying Business Units 1-4					**13.20%**
WACC – Concession Grantor, *NPA*						**10.00%**
WACC – State, *AKSG*						**10.00%**

** It is assumed that the private sector's cost of equity increases when shareholding by the NPA/State increases. This is based on the private sector's preference for a privately funded PDMC: the higher the public shareholding, the higher the cost of equity by the private sector.*

Economics – **WACC Background**

LEVERAGE has been established on a conservative funding structure positioned between on-balance sheet (corporate) funding and off-balance sheet (leveraged/project) funding

SHAREHOLDING has been established on the assumption that private business units are 100% privately held and that public organisations are 100% government owned. In accordance to the PPP Structure, the PDMC is a private/public joint-venture with the private sector as majority shareholder

COST OF EQUITY has been established taking into account the nature of the organisation (public (10%) or private (>10%)) and the risk exposure of the underlying activities:

- High risk profile (22.5%): uncommitted volumes, fully exposed to market risks and competition: containers & general cargo / RoRo; also entities with high upfront investments (PDMC)
- Medium risk profile (20.0%): committed volumes, limited exposure to market risks: dry & liquid bulk, offshore supplies
- Low risk profile: (17.5%): diversified clients/users combined with no/limited upfront investments (FTZ management); or combined with the ability to increase tariffs to compensate (toll road)

COST OF DEBT: *LIBOR* has been established at 1.0%, which relates to the current 1-year LIBOR rate (see below). *Margin* is sourced from the initial market consultation. *Financing Costs* cover initial fees and continuous debt-funding-related costs including reporting, monitoring, accounting, etc.

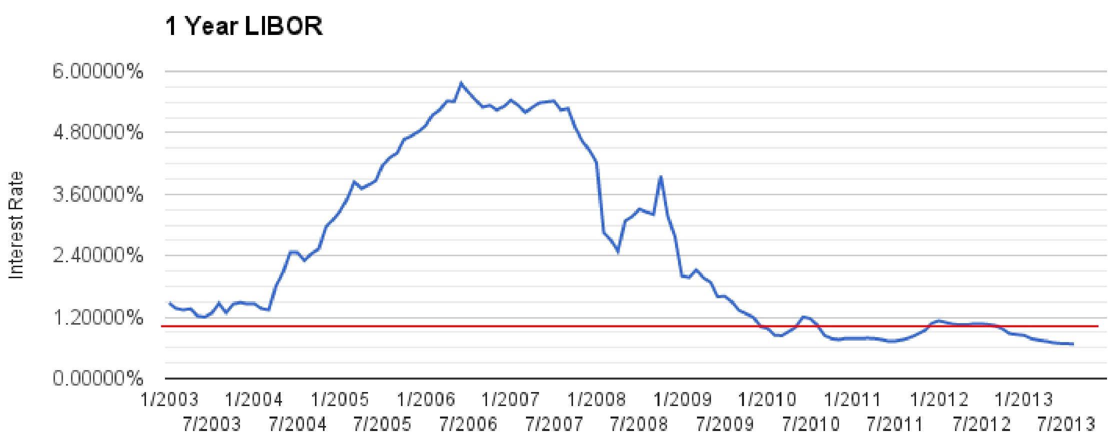

Figure 6.4 – 1 year LIBOR rate

Taxation: Corporate tax rate of 30% applies; however, due to FTZ status and associated tax holidays and fiscal incentives and due to other fiscal incentives and optimisations, the effective tax rate is assumed at 15%

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs
maritime & transport
business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

RISK ANALYSIS & FINANCIAL SENSITIVITY

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs maritime & transport business solutions

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Risk Analysis & Financial Sensitivity
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

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Risk Analysis - **Introduction**

Early identification of risks in PPP projects is essential, since it provides guidance to balancing the underlying PPP structure. Risks and their mitigation may find their way into the Concession Agreement and by means of this Agreement, these risks may be allocated to either the public sector or the private sector.

This risk assessment concisely addresses the risk type, its effect, its allocation amongst PPP partners and available mitigation measures.

The risks are structured in the following way:

A. Pre-Operative Task Risks
B. Construction Phase Risks
C. Operations Phase Risks
D. Hand-back Risk Events
E. Legal Risks
F. Other Risks

Risk Analysis – Pre-Operative Task Risks 1/1

	Risk Type	Effect	Allocation		Mitigation
A	**Pre Operative Task Risks**		NPA	PDMC	
A1	**Delays in Land Transfer**				
	No/late transfer of land to the Concession Grantor	Delays	X		Transfer of land area for port/FTZ concession by State to Grantor (NPA)prior to Signing Concession
	No/late transfer of land to the Concessionaire	Delays	X		Transfer of Concession Area is CP to to Concession Agreement
	Social: Land is occupied	Delays, Increased Capex	X		Base Line Site Conditions to be established in Detailed Survey of Concession Area and Right-of-Way Area (for road and channel) during Tender Government responsible for resettlement and removal of any claims on the area (CP)
	Environmental: Land is polluted	Delays, Increased Capex	X		Base Line Site Conditions to be established in Detailed Survey of Concession Area and Right-of-Way Area during Tender Government responsible for resettlement and removal of any claims on the area (CP)
A2	**External Linkages**				
	No/late right-of-way for road development/use	Delays	X		Right-of-Way is both a CP to to Concession Agreement (State) and a Continuing Obligation of the State after expiry
	No/late right-of-way for channel development/use	Delays	X		Right-of-Way is CP to to Concession Agreement (NPA)
A3	**Financing Risks**				
	No/late financing in place	Delays		X	Financial Close is CP to Concession Agreement, covered by CP Bond
	No/late injection of Private equity in PDMC	Delays		X	Private Guarantees through Parent(s)
	No/late injection of Federal equity in PDMC	Delays	X		Federal Guarantees through MoF
	No/late injection of State equity in PDMC	Delays	X		State Guarantees through MoF
	No/late injection of senior loan(s) in PDMC	Delays		X	Private Guarantees through Parent(s)
	No/late injection of Federal sub-ordinated loan in PDMC	Delays	X		Federal Guarantees through MoF
	No/late injection of State sub-ordinated loan in PDMC	Delays	X		State Guarantees through MoF
	Interest rate increases	Increased costs of funding		X	Use fixed rate loans, hedging
A4	**Planning**				
	Concession Agreement comes into force late, caused by Grantor	Delays	X		CP period with specified maximum duration covered by compensation scheme
	Concession Agreement comes into force late, caused by Concessionaire	Delays		X	CP period with specified maximum duration covered by CP Bond
	Critical licenses and approvals not in place	Delays	X	X	CP period to address all relevant topics

Risk Analysis – Construction Phase Risks 1/1

	Risk Type	Effect	Allocation		Mitigation
B	**Construction Phase Risks**		NPA	PDMC	
B1	**Design Risk**				
	Design not up to standards	Delays		X	Approved Detailed Design CP to Concession Agreement, covered by CP Bond Technical Program of Requirements issued in Tender Expansions: In accordance to NPA approved Master Plan which is regularly updated to cater for market and technological developments
	Unexpected adverse site conditions affecting design on Concession Area and Right-of-Way Area	Delays, Increased Capex	X		Detailed survey executed during tender; output available prior to bids (Base Line Site Conditions); site visits scheduled during tender
B2	**Construction Risk**				
	Project unaccessible due to lack of road connection	Delays		X	PDMC resonsible for road connection up to Federal Higheway System (incl construction road)
	Construction road unaccessible due to incidents or maintenance	Delays		X	PDMC resonsible for road connection up to Federal Higheway System (incl construction road)
	Construction road unaccessible due to incidents/maintence Federal road	Delays	X		Federal Government responsible for national road network; covered by compensation scheme in CA
	Construction road unaccessible due to incidents/maintence State road	Delays	X		State Government responsible for State road network; covered by compensation scheme in CA
	Change of design by Concession Grantor during construction	Delays, Increased Capex	X		Concessionaire responsible for design based on Technical Program of Requirement. Compensationfor direct costs to PDMC stipulated in CA
	Change of design by Concessionaire during construction	Delays, Increased Capex		X	PDMC to sign fixed-scope EPC contract(s), covered by Construction Performance Bond in Concession Agreement (KPI in CA)
	Delays in construction of the project	Delays		X	PDMC to sign fixed-date EPC contract(s), covered by Construction Performance Bond in Concession Agreement (KPI in CA)
	Cost overruns	Increased capital costs		X	PDMC to sign fixed-price EPC contract(s)
	Interface Risks (channel, quays)	Delays, Increased Capex		X	One EPC Contractor for all (nautical) construction works
	Interface Risks (Government/PDMC)	Delays, Increased Capex		X	PDMC responsible for utilities (and connections) and fencing; rights-of-way secured as CP to Concession Agreement
B3	**Approvals**				
	No/late approvals by Concession Grantor	Delays	X		All relevant approvals for initial construction are CP to Concession Agreement
	No/late approvals by other Authorities	Delays		X	All relevant approvals for initial construction are CP to Concession Agreement
B4	**Additional Site Risk**				
	Basic Security issues during construction	Delays, Increased Capex		X	Concessionaire to provide private security during construction
	Major Security issues during construction	Delays, Increased Capex	X		Government to provide base-line security in case of escalation (KPI in CA)

Risk Analysis – Operations Phase Risks 1/4

	Risk Type	Effect	Allocation		Mitigation
C	**Operations Phase Risks**		NPA	PDMC	
C1	**Technology Risk**				
	Project unable to provide services for clients due to outdated/substandard facilities	Reduced demand		X	Initial Design: In accordance to industry standards, designed for the future (Technical Program of Requirements) Expansions: In accordance to NPA approved Master Plan which is regularly updated to cater for market and technological developments
C2	**Port Access Risks (1/2)**				
	Access: Project road unaccessible due to incidents or maintenance	Delays		X	PDMC resonsible for road connection to Federal Highway network (KPI in CA)
	Access: Project unaccessible due incidents/maintence Federal road	Delays	X		Federal Government responsible for national road network
	Access: Project unaccessible due incidents/maintence State road	Delays	X		State Government responsible for State road network
	Access: Port unaccessible by ships due to incidents in Concession Area or Project Channel	Reduced demand Increased costs	X		NPA Harbour Master to manage Vessel Traffic and Nautical Services; covered by compensation scheme in CA (KPI in CA). Channel to be over-dimensioned to prevent escalation of incidents
	Access: Port unaccessible by ships due to maintenance in Concession Area or Project Channel	Reduced demand Increased costs		X	PDMC to manage maintenance dredging in accordance to Approved Maintenance Programme (KPI in CA). Channel to be over-dimensioned to allow simultaneous navigatoin and maintenance.
	Access: Port unaccessible by ships due to incidents outside Concession Area and/or outside Project Channel	Reduced demand Increased costs	X		NPA to manage deep-sea navigation (appoached) beyond project limits
	Access: Port unaccessible due to unavailability or actions by of Harbour Master	Reduced demand	X		NPA Harbour Master to manage Vessel Traffic and Nautical Services 24/7 in line with International Standards as stipulated in CA; covered by compensation scheme in CA

Risk Analysis – Operations Phase Risks 2/4

	Risk Type	Effect	Allocation		Mitigation
C2	**Port Access Risks (2/2)**				
	Access: Port unaccessible due to unavailability Maritime Services	Reduced demand	X		NPA to manage Maritime Services and fleet 24/7 in line with International Standards as stipulated in CA; covered by compensation scheme in CA (KPI in CA)
	Access: Port unaccessible due to lack of sufficient and suitable service fleet and/or staff	Reduced demand	X		NPA to ensure availabiltiy of of sufficient maritime service capacity (fleet & staff, 24/7), based on specifications in CA (design vessel, allowed waiting times); covered by compensation scheme
	Access: Port unaccessible due to lack of or failing aids to navigation	Reduced demand		X	PDMC to be responsible for develpoing, managing and expanding Aids to Navigation; based on technical program of requirements in CA (stipulating allowed down-time); covered by Operational Performance Bond Expansions in line with NPA approved Port Master Plan (updated periodically, based on market developments) (KPI in CA)
	Access: Port unaccessible due to lack of available depth	Reduced demand		X	PDMC to be responsible for developing, expanding and maintaining Channel and Basins; based on technical program of requirements in CA (stipulating design vessel and allowed down-time); covered by Operational Performance Bond Expansions in line with NPA approved Port Master Plan (updated periodically, based on market developments) (KPI in CA)
	Access: Port unaccessible due to lack of or failing berths or jetties	Reduced demand		X	PDMC to be responsible for developing, expanding and maintaining quays and jetties; based on technical program of requirements in CA (stipulating design vessel and allowed down-time); covered by Operational Performance Bond Expansions in line with NPA approved Port Master Plan (updated periodically, based on market developments) (KPI in CA)
	Access: Port unaccessible due to lack of terminal facilities	Reduced demand		X	PDMC to be responsible for developing, expanding and maintaining terminal superstructure and equipment; based on technical program of requirements in CA (stipulating cargo scope, design vessel and allowed down-time); covered by Operational Performance Bond Expansions in line with NPA approved Port Master Plan (updated periodically, based on market developments) (KPI in CA)
	Access: Port unaccessible due to adverse weather conditions	Reduced demand		X	PDMC to be responsible for developing, expanding and maintaining nautical access to based on technical program of requirements in CA (stipulating design vessel and allowed down-time); covered by Operational Performance Bond Expansions in line with NPA approved Port Master Plan (updated periodically, based on market developments)
	Access: Port unaccessible due to security threat	Reduced demand	X		Government to provide base-line security in case of escalation; covered by compensation scheme in CA
	Access: Port unaccessible due to unavailability of utilities	Reduced demand		X	Project to be self-supporting in the initial phase for power, fresh water, waste (water) treatment and communications

Risk Analysis – Operations Phase Risks 3/4

	Risk Type	Effect	Allocation		Mitigation
C3	**Operations & Maintenance Risk**				
	Tariffs: Tariff erosion	Reduced revenues		X	Concession Fees: Revenues share (variable) Operations need to be self-supportive
	Tariffs: Excessive pricing	Negative economic impact	X		Allowed services/tariffs stipulated in Concession Agreement Tariff caps managed by NPA Operations need to be self-supportive
	Costs: Increased operational costs	Increased costs		X	Long term contracts for fuel, electricity, maintenance, insurance
	Costs: Increased mainenance costs	Increased costs		X	Life-cycle asset management
	Security: Basic Security issues during operations	Reduced demand Increased costs		X	Concessionaire to provide private security during construction
	Security: Major Security issues during operations	Reduced demand Increased costs	X		Government to provide base-line security in case of escalation
	Performance: Low productivity of the Project	Reduced Revenues Increased Costs		X	Primary performance incentive: Private Sector to recover significant investmetns in infrastructure, superstructure & equipment. Secondary performance incentive: Banks to actively monitor performance to ensure revovery of loans Tertiary performance incentives: Key Performance Indicators in the Concession Agreement
	Performance: Unclear KPI			X	KPIs in Concession Agreement are Specific, Measurable, Attainable, Relevant and Time-bound (SMART)
	Competition: From other ports (inter port)	Reduced demand Tariff Erosion		X	Include - if required - exclusivity clauses in CA: Bound by geography, scope and time. Exclusivity (if any) should be reflected in NPA Port Master Plan and its updates during Concession Term
	Competition: From business units (terminals) within the Project (intra port)	Reduced demand Tariff Erosion		X	PDMC allowed to operate and/or sub-concession specific activities (terminals) on exlcusive base
	Insurance: No insurance cover	Increased costs		X	Insurance Package is CP in contract (e.g. damage to assets, cargo, vessels, etc)
	HR: Lack of skilled workers	Increased costs		X	Government to provide housing & education (Maritime Academy in Oron?)
	HR: Increased wage levels	Increased costs		X	PDMC to apply formal minimum wage and modern HR standards
	Environment: Social & Environmental issues	Increased Costs Strikes		X	PDMC to develop and execute Corporate Social Repsonsiblity plan PDMC to monitor, mitigate and respond to environment incidents Harbour Master to monitor environmental performance

Risk Analysis – Operations Phase Risks 4/4

	Risk Type	Effect	Allocation		Mitigation
C4	**Traffic Risk**				
	Competition from other ports	Reduced/delayed revenues		X	Exclusivity: NPA to not develop/support additional commercial deep-sea port capacity in 100km radius from Project location Exclusivity: NPA to formally secure the status and exclusive position of the Project in the Natoinal Ports Masterplan Level Playing Filed: Project to be treated in same manner as other ports. No preferrential treatment of other ports
	Low demand for allowed PDMC services	Reduced/delayed revenues		X	Pricing: Liberty to provide discounts on tariffs Expansions: Master plan for future expansions connected to demand development (only build what is needed, when needed) PDMC may consider establshing volume guarantees with its clients
	Low demand for NPA services (maritime services)	Reduced/delayed revenues	X		Nautical services: demand depending on performance PDMC (no mitigation; NPA costs are however largely covered through fixed land lease payments)
C5	**Payment Risk**				
	No/late payments by Clients (for allowed PDMC services)	Reduced/delayed revenues		X	Commercial contracts with clients including specified payment terms
	No/late payments by Clients (for NPA services)	Reduced/delayed revenues	X		Commercial contracts with clients including specified payment terms
	No/late payments by PDMC (concession fees)	Reduced/delayed revenues	X		Concession Agreement includes specified payment terms, covered by Performance Guarantee
C6	**Financial Risk**				
	Debt Service on senior loan not covered	PDMC bankrupt		X	Financial monitoring thorugh public shareholders in PDMC Step-in rights by Commercial Banks to continue the Project
	Debt Service on sub-ordinated Federal loan not covered	Repayments delayed	X		Repayments stipulated in SubLoan Agreement; however, loan is sub-ordinated to senior loan
	Debt Service on sub-ordinated State loan not covered	Repayments delayed			Repayments stipulated in SubLoan Agreement; however, loan is sub-ordinated to senior loan (risk for State)
C7	**Risks in relation to Exchange Rate & Inflation**				
	Exchange rate Risks	Increased costs of funding		X	Use fixed rate loans, hedging
	Inflation Risks	Increased costs of funding		X	Hedging

Risk Analysis – Hand-Back Risks 1/1

	Risk Type	Effect	Allocation		Mitigation
D	**Hand-back Risk Events**		NPA	PDMC	
D1	**Hand-back Risk**				
	Assets in poor state	Limited/no services after handover		X	Hand-back criteria in Concession Agreement stipulates state of assets to be transferred; covered by Hand-back Guarantee (KPI in CA)
	Critical assets removed by Concessionaire	Limited/no services after handover		X	All infrastructure, superstructure and vital equiment included in hand-back list in Concession Agreement
	Operations to seize after PDMC expiry	Limited/no services after handover		X	NPA may extent terms of sub-concession agreements and step in as public landlord
D2	**Terminal Value Risk**				
	Project infrastructure not up to technical standards upon transfer	Reduced applicability for future use after hand-back	X		Initial infrastructure design aimed at long term use, beyond concession period Expansions and major re-developments during term in accordance to approved Master Plan

Risk Analysis – Legal Risks 1/2

	Risk Type	Effect	Allocation		Mitigation
E	**Legal Risks**		NPA	PDMC	
E1	**General Legal Risks**				
	Function/responsibility/mandate unclear of Federal Government	No market appetite	X		Federal Government to approve Concession Agreement and to provide Guarantees on NPA and State Co-Funding
	Function/responsibility/mandate unclear of NPA	No market appetite	X		Concession Agreement to clearly specify roles, mandates, rights, obligations. NPA responsibility vested in NPA Act and allocated/specified in Concession Agreement
	Function/responsibility/mandate unclear of State Government	No market appetite	X		Concession Agreement to clearly specify roles, mandates, rights, obligations. State as Co-signer of the CA, with clear responsibilities and obligations
	Function/responsibility/mandate unclear of PDMC	No market appetite	X		Concession Agreement to clearly specify roles, mandates, rights, obligations. Define clear relations (SHA) with Parent of the PDMC, including responsibilities/mandate within Private Bidding Consortium
	Function/responsibility/mandate unclear of Lenders	No market appetite		X	Define clear relations (SHA) with Lenders to the PDMC, including pre-defined Step-in Rights
	Unclear legal status of the Concession Area	No market appetite	X		Declaration of the Port by the Government is a CP to the Concession Agreement
	Unclear Object of the Concession agreement	No market appetite		X	Precisely define the rights and obligations under the CA, including the degrees of freedom within the Technical Program of Requirement
	Unclear legal status of the CA	No market appetite	X		Obtain all consents and approvals from relevant Ministerial Agencies for approval of the proposed PDMC structure (first time in Nigeria as Lekki is not fully implemented yet)
	Legal Possibilities for Sub-Concessioning (part or all of the activities)	No market appetite	X		Obtain all legal consents evidencing legal possibilities for sub-concessioning
	Public Procurement applicable to the PDMC	No market appetite	X		Public shareholding in PDMC limited to 20% only (10% NPA; 10% State)
	Unclear owership of Non-Moveable Assets	Funding issues (no pledge possible)		X	CA should include precise classification of type of assets and corresponding ownersip (Right, Title, Pledge)
	Unclear owership of Moveable Assets	Funding issues (no pledge possible)		X	CA should include precise classification of type of assets and corresponding ownersip (Right, Title, Pledge)
	Requirements for re-tendering (in case of change in scope, renegotiations)	Delays, increased transaction costs		X	Precisely define legal requirements in case of re-tendering
	Change in Law	Various adverse effects	X		Compensation Scheme stipulated in Concession Agreement

Risk Analysis – Legal Risks 2/2

	Risk Type	Effect	Allocation		Mitigation
E2	**Risks during Conditions Precedent Phase**				
	CP conflicts with existing legislation	Delays, no market appetite	X		Legal review of CPs during tender phase; outcome to be provided to Bidders prior to Final Bid
	CP not workable/applicable	Delays, no market appetite	X	X	NPA has right to waive certain CPs during CP period; Concessionaire may apply for waiver
	Delays in meeting CPs	Delays	X	X	CP period is limited in time; Grantor allowed to waive; covered by CP Bond
E3	**Risks in relation to Default & Termination**				
	Unclear process Default - Termination	Increased legal costs, delays, no market appetite	X	X	Clear description for Default and Termination mechanisms in CA, as this represent a major risk for PDMC (high investments)
	Unclear Termination Compensation Schemes	Increased legal costs, no market appetite			Balances Compensation schemes in CA, avoid windfall profits for Government while retaining sufficient level of commitment of PDMC
	Lack of enforcability for Termination compensation	Increased legal costs, no market appetite		X	MoF Guarantee to guarantee the Termination Compensation to PDMC
E4	**Risks in relation to Shareholding structure NPA/State/Sponsor**				
	Conflict of Interest	Sub-optimal decision making, delays	X	X	Specifcy clear rights and obligations of the three parties in the SHA
	Unclear entry/exit of PDMC	Reduced market interest	X	X	Specifcy clear sections of sale of equity

Risk Analysis – Other Risk 1/1

	Risk Type	Effect	Allocation		Mitigation
F	**Other Risks**		NPA	PDMC	
F1	Political Risks	Various adverse effects	X		Compensation scheme (strikes, new elections, etc)
F2	Social & Environmental Risks	Various adverse effects	X	X	Execution of Detailed Social & Environmental Impact Assessment during PPP tender Compensation schemes for both populatoin & environmental aspects Corporate Social Repsonsibility (CSR) Plan to be taken into account in PPP tender
F3	Force Majeure	Various adverse effects	X	X	Force Majeur Compensation Procedure stipulated in Concession Agreement
F4	Concessionaire Event of Default	Early Contract Termination		X	Dispute Resolution Procedure stipulated in Concession Agreement Termination-Compensation principles stipulated in Concession Agreement Performance Bond to be drawn by Grantor, reduced Termination Compensation to Concesstionaire
F5	Government's Event of Default	Early Contract Termination	X		Dispute Resolution Procedure stipulated in Concession Agreement Termination-Compensation principles stipulated in Concession Agreement Termination Compensation for Concessionaire

Contents

Sensitivity – Introduction

Source: ICRC PPP Manual for Nigeria

A sensitivity analysis is conducted to gauge the financial robustness of the project (i.e. to see how changes in key assumptions impact the financials of the project). Some variables to be considered are:

- Changes in construction period, phasing and project duration
- Changes in inflation rate, interest rates
- Changes in construction costs
- Changes in operating costs
- Changes in market demand
- Changes in the discount rate used in the Value for Money analysis

In cases where the project returns are not found to be sufficient or where the sensitivity shows the project to be too risky, the possibility of re-balancing the net cash flows (increasing revenues or decreasing costs) or obtaining government financial support (e.g. subsidies, guarantees, Viability Gap Funding, etc.) are explored.

Sensitivity – Methodology

The sensitivity analysis revolves around input variations with respect to the Business Case Model which his used to determine Financial Feasibility and which is used in the Value for Money Analysis

The financial model's structure allows for an iterative approach in optimizing the model's outcomes. The components of the financial model are:

- Model inputs:
  - Assumptions : NPA Tariffs, concession payments, indexation, exchange rates and taxation
  - Traffic forecasts: based on GDP forecasts, NPA statistics and Nigerian production forecasts
- Calculation blocks:
  - CAPEX: calculating the required investments over time based on traffic forecasts and unit prices
  - OPEX: calculating the expected operational expenses over time based on traffic forecasts, investments, wages and OPEX percentages for maintenance and insurance
  - Revenues: calculating the expected revenues based on traffic forecasts and NPA Tariffs

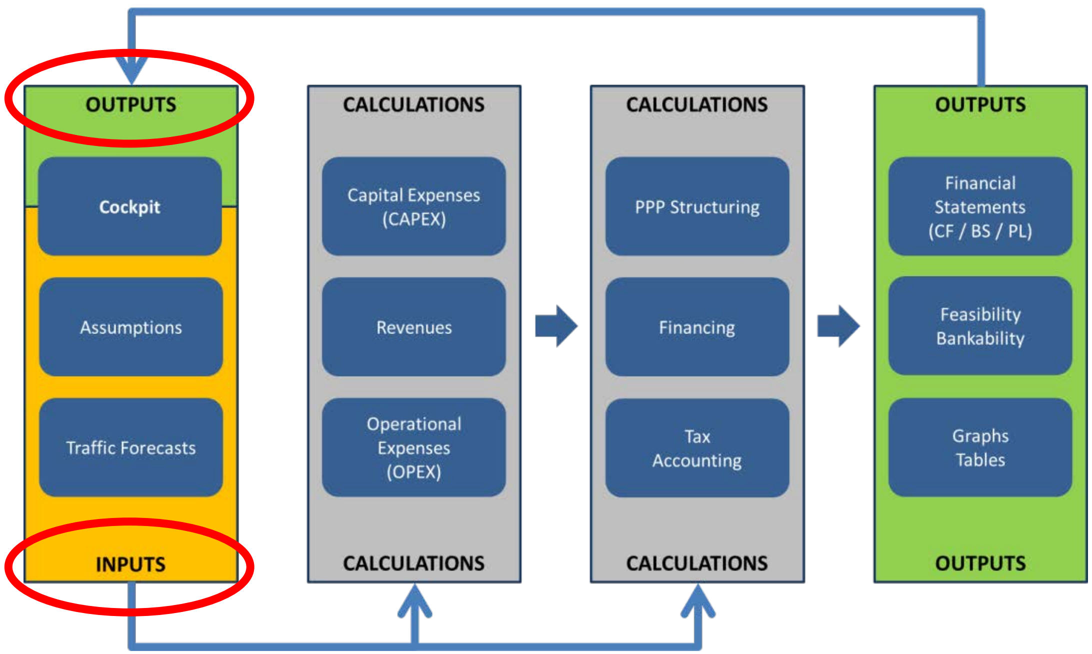


Figure 2.1 – Model structure facilitating sensitivity analyses

- Model outputs:
  - Financial Statements: Cash Flow Statements, Balance Sheets and Profit & Loss
  - Feasibility & Bankability: assessing the project's
  - Graphs & Tables: present the model's outcomes in a structured and clear manner
  - The financial model cockpit that uses a customer-friendly lay-out in order to have the ability to hand over the financial model to non-expert modellers.

Sensitivity – Construction Period, Phasing and Project Duration

#	Topic	Rationale	Input Change for Sensitivity Analysis	Project NPV Output
	Project Base Case			**NPV: USD 1,255 M**
S.1	Construction Period	The Ibom Project revolves around significant infrastructure investments. These investments are time consuming and in many cases around the world, delays in construction and subsequent delays in build-up of revenues have caused challenges many of such projects	Increase of overall construction period by 12 months (1 year)	NPV: USD 1,145 M - USD 110 M
S.2	Phasing	Smart phasing of terminal infrastructure and superstructure investments has already reduced initial capex and optimized project NPV. With respect to the dredging works, further phasing may be possible in case the maximum draft of vessels is reduced from -15m to -13.5m in the first phase (deepening to -15m only by 2025). Since the depth of the port is one of the main value drivers of the project, this phasing would however negatively impact the revenue build-up of the project (not taken into account here)	Dredging Costs split for Initial Phase (vessel @ -13.5m) and Deepening (vessel @ -15m)	NPV: USD 1,297 M + USD 42 M
S.3	Project Duration	In de Base Case, a Concession Term of 50 years is assumed. This period allows the investors to recover their investments and connects well to the economic life of specific fixed assets (e.g. quay walls). Reducing the Concession Term would accelerate Transfer-Back of the project, but it would also limit the PDMC's ability to recover it's investments (resulting in less market appetite for the project amongst investors). Besides the 50 year term is comparable to other concessions covering entire Greenfield port developments	Reduction of Concession Period until by 50% (from 50 years to 25 years)	NPV: USD 454 M - USD 799 M

Sensitivity – Inflation Rate, Interest Rates

#	Topic	Rationale	Input Change for Sensitivity Analysis	Project NPV Output
	Project Base Case			**NPV: USD 1,255 M**
S.4	USD Inflation Rate	The majority of project cash flows are denominated in US Dollars. To this extent, USD inflation rate is dominant in the model. In the base case a flat rate of 2% is assumed throughout the project life. Since the inflation rate is integrated in the WACC, NPVs would not change when inflation changes. WACC is therefore held constant on base case inflation (2%).	USD Inflation Rate is reduced from 2% to 1%	NPV: USD 812 M - USD 443 M
S.5	Interest Rates	Financing costs are integrated in the weighted average costs of capital (WACC). Increased interest rates would increase the WACC and therefore reduce the expected net present value of the project. In the Base Case, the cost of debt is based on a conservative Libor + Margin + Costs (1% + 5% + 1%) = 7%	Increase of Margin from 5% to 7%	NPV: USD 896 M - USD 359 M

Sensitivity – Construction Costs

#	Topic	Rationale	Input Change for Sensitivity Analysis	Project NPV Output
	Project Base Case			**NPV: USD 1,255 M**
S.6	Overall Capex Levels	The Ibom Project revolves around significant infrastructure investments. These investments are capital intensive and in many cases around the world, budget overruns have caused financial challenges many of such projects.	Increase of overall capex levels by 20%	NPV: USD 546 M - USD 709 M
S.7	Dredging Costs	Dredging works for the project are part of the overall investments, but deserve special attention since its costs (price and/or quantities) may be subject to strong variations. Variations may occur due to unexpected soil conditions, incidents during construction, alternative channel routing and developments of international market prices for dredging works.	Increase of dredging capex levels by 20%	NPV: USD 1,053 M - USD 202 M

Sensitivity – Operating Costs

#	Topic	Rationale	Input Change for Sensitivity Analysis	Project NPV Output
	Project Base Case			**NPV: USD 1,255 M**
S.8	Labour	The Ibom Project is expected to render significant employment in the region. Total labour costs therefore has a significant impact on financial returns. Variations to these costs need to be made to simulate higher-than-expected employment levels and/or wage levels.	Increase of overall labour costs by 20%	NPV: USD 1,149 M - USD 106 M
S.9	Fuel & Energy	The Ibom Project is expected to require significant fuel and energy to ensure operational performance. Total fuel & energy costs therefore have a significant impact on financial returns. Variations to these costs need to be made to simulate higher-than-expected fuel/energy prices and/or inefficient use of these resources.	Increase of overall fuel & energy costs by 20%	NPV: USD 1,224 M - USD 31 M
S.10	Maintenance	Maintenance of infrastructure, superstructure and equipment is needed to ensure their availability and their proper workings during the concession term. Costs in relation to maintenance are considered a significant part of the operational expenses.	Increase of overall maintenance costs by 20%	NPV: USD 1,149 M - USD 106 M

Sensitivity – Market Demand

#	Topic	Rationale	Input Change for Sensitivity Analysis	Project NPV Output
	Project Base Case			**NPV: USD 1,255 M**
S.11	Overall Demand	Revenues in the Ibom Project are generated by vessels carrying trade to/from the port. In case traffic levels (market demand) is less than expected, financial returns are expected to suffer.	Decrease of overall demand by 20%	NPV: USD 710 M - USD 545 M
	Scope Changes	The Ibom Project comprises of various businesses and terminals in the port. Postponing (or accelerating) development of specific segments in the port are expected to impact financial returns. It is assumed that Containers & General Cargo operations cannot be postponed (in light of Ibom Industrial City and Ibom Free Trade Zone developments)		
S.12	Scope: Liquid Bulk	Postponed Liquid Bulk	Postponing Liquid Bulk by 10 years	NPV: USD 977 M - USD 278 M
S.13	Scope: Offshore Supply	Postponed Offshore Supply	Postponing Offshore Supply by 10 years	NPV: USD 1,169 M - USD 86 M
S.14	Scope: Dry Bulk	Accelerated Dry Bulk	Accelerating Dry Bulk to Start of Concession	NPV: USD 1,107 M - USD 148 M

Sensitivity – Discount Rate

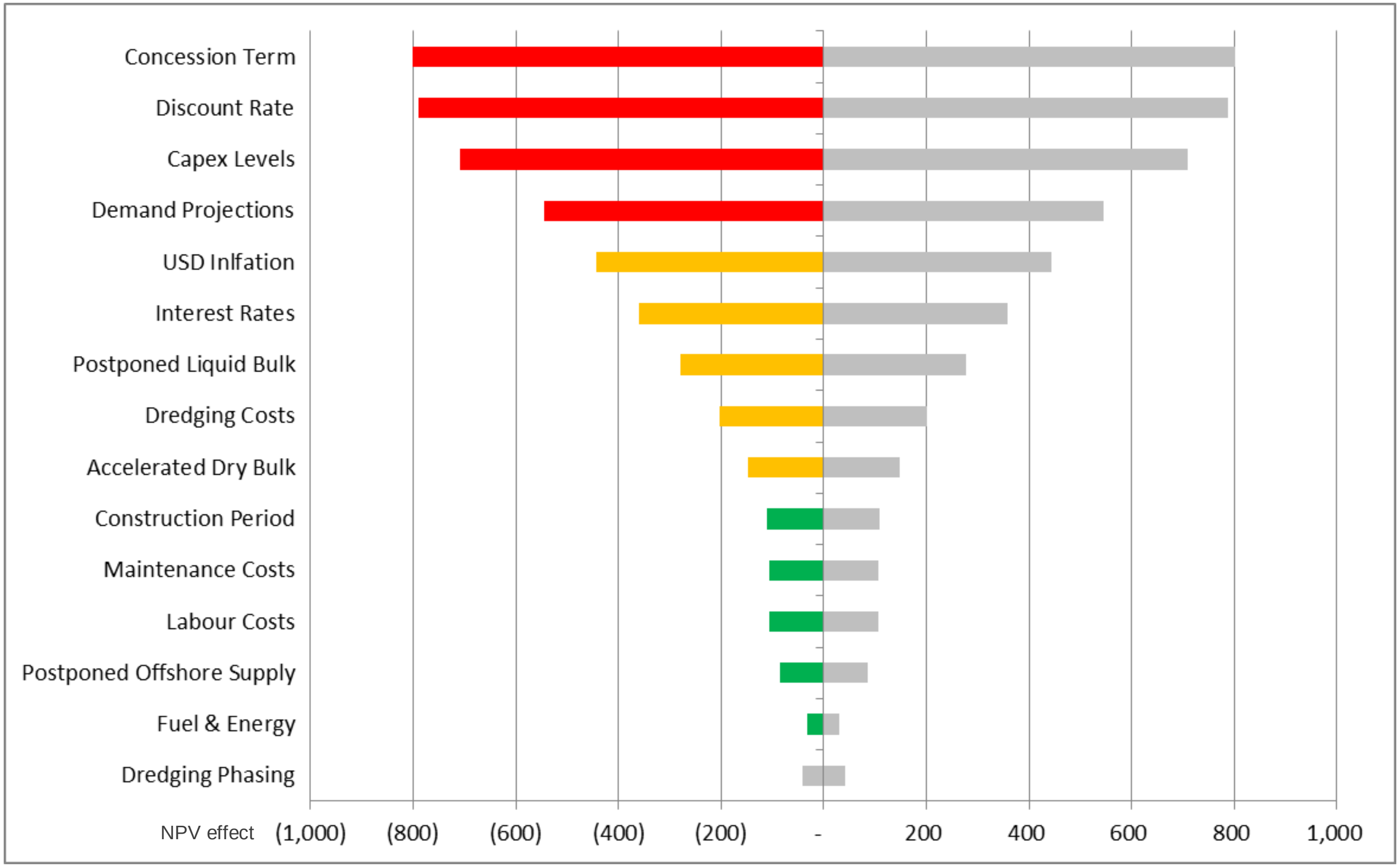
#	Topic	Rationale	Input Change for Sensitivity Analysis	Project NPV Output
	Project Base Case			**NPV: USD 1,255 M**
S.15	Discount Rate 1	The overall project value is established by discounting the net cash flows with the appropriate discount factor. The level of this discount factor (WACC) is a major driver for the overall feasibility of the project.	Increase of discount rate by 2%	NPV: USD 466 M - USD 789 M
S.16	Discount Rate 2	The maximum allowed increase in discount facto can be established by increasing the discount rate until the net present value of the project becomes "0". The level shall be equal to the Internal Rate of Return (IRR)	Increase of discount rate until NPV of PDMC is "0"	NPV: USD 0 WACC: 16.9 %

Contents

Conclusions – Project Sensitivity

As with many Greenfield developments, the project is sensitive for earning period, capex level variations, traffic build-up and changes in relation to the discount factors and their underlying inputs (e.g. interest rates and inflation).

Figure 3.1 – Sensitivity Analyses: Primary Output



Conclusions – Risk Mitigation

Basic risk mitigation measures for the 3 most sensitive topics are provided

Table 3.1 – Sensitivity Analyses: General Risk Mitigation

#	Risk	Mitigation
1	Investment Cost-Overrun	Fixed price contracting Conservative capex estimation
2	Reduced Traffic Build-Up	Fixed delivery date contracting (no delays in start) Volume guarantees from clients/parents Attracting investors with captive cargoes (e.g. bulk operators and container shipping lines)
3	Increased Cost of Finance	Parent Guarantees private partner in PDMC Guarantees public partners in PDMC Sovereign Guarantees Financing through Development Banks

Project Initiators:

Transaction Advisors:

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

VALUE FOR MONEY AND AFFORDABILITY

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case
	Value for Money and Affordability Analysis Report
Document Status	Draft
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Executive Summary 1/2

Source: ICRC PPP Manual for Nigeria

The discounted Net Present Values derived from the Public Sector Comparator and shadow bid models are compared at the public sector test discount rate to demonstrate the preferred procurement methodology – PPP or conventional procurement – and the expected annual payments for Viability Gap Funding or any Availability Payments are compared to the expected future budgets. Payments for the service by users are assessed against Willingness to Pay data to ensure that the project revenues are realistic and affordable.

Nigeria, together with the larger part of the world, has embraced and adopted the PPP model for port development and port management. To this extent, the NPA was restructured in 2004/05 transforming the former public port operator to a full-fledged Landlord Port Authority, with the (terminal) operations and its risks moved to the private sector under modern PPP concession contracts. From an institutional point of view, the PPP model therefore always prevails for the Ibom DSP Project, just as it does for all other port projects in the country. Conventional procurement (in this case the government fully responsible for the project) is a method which is no longer applicable for this sector. This VfM exercise is executed to complete the OBC and to show that that policy decision still holds.

Value-for-Money – Value Creation

PSC: Value created by lower costs of public funding. PPP: Value created by private efficiency gains

In the PSC Case, public sector takes full responsibility over the development and operation of the project. This would result in a Net Present Value (NPV) of the Project of approximately USD 384 million (IRR 9.9%; Blended Project WACC: 9.2%). The positive value is foremost a result from the relatively low cost of public funds, which has resulted in a relatively low WACC (discount factor)

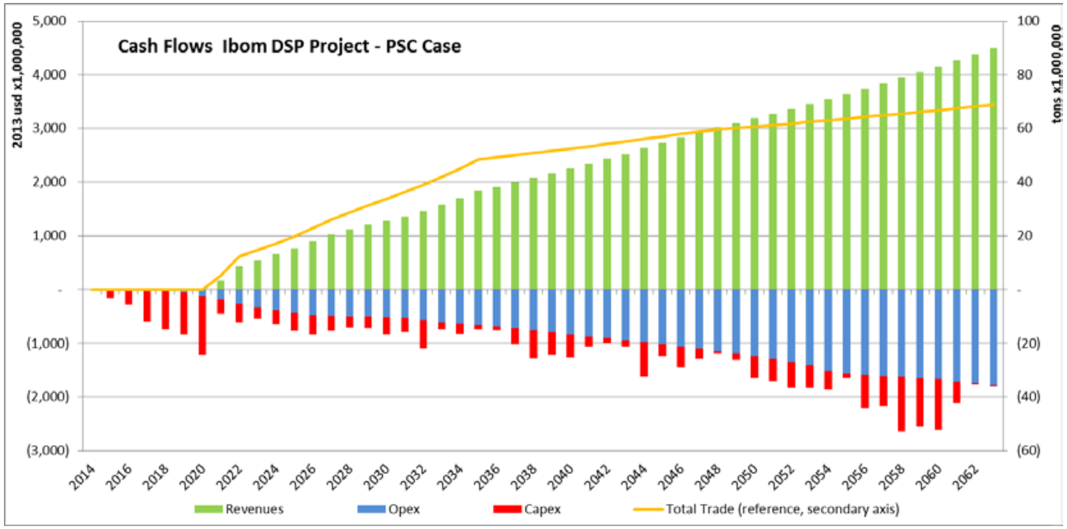


Figure 1 – Cash flows of the Ibom DSP Case: PSC Case

In the PPP Case, public sector develops the project together with the private sector. In the envisaged PDMC model, a substantial part of project responsibilities and risks are transferred to the private sector (PDMC and its sub-concessionaires take full responsibility over the development and operation of the project, except for the nautical fleet (NPA)). This PPP would result in a Net Present Value (NPV) of the Project of approximately USD 1,255 million (IRR 16.9%; Blended Project WACC: 13.0%). The positive value is foremost a result from efficiency gains due to private involvement, party offset by the higher costs of private funds.

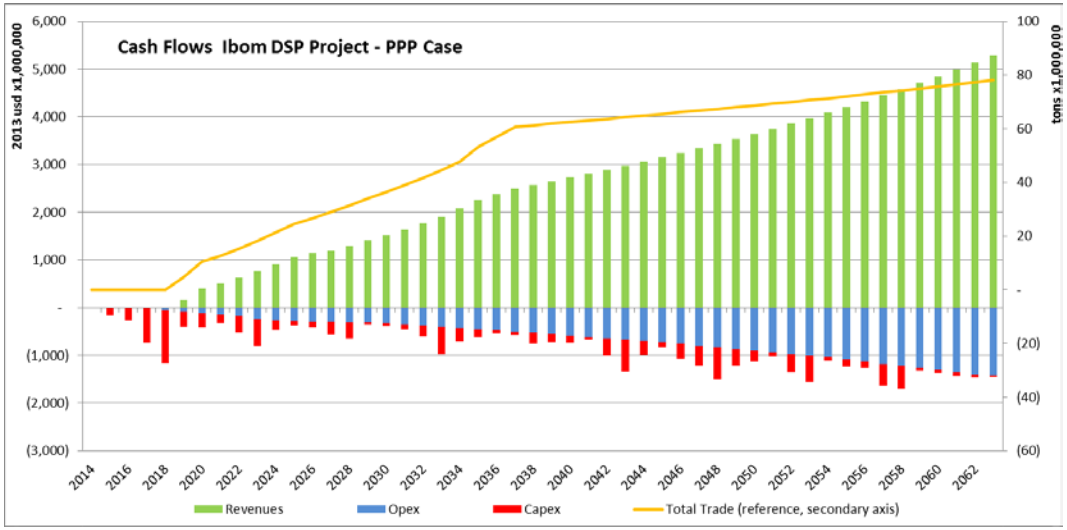


Figure 2 – Cash flows of the Ibom DSP Case: PPP Case

Value-for-Money – Preferred Procurement Methodology

With a PPP Project case rendering an NPV of USD 1.255 billion and the PSC case USD 0.384 billion. Total Value-for-Money established at USD 871 M, which is considerable. This underlines PPP as the Preferred Procurement Methodology, in line with the existing policies in the Nigerian port sector and industry best-practices.

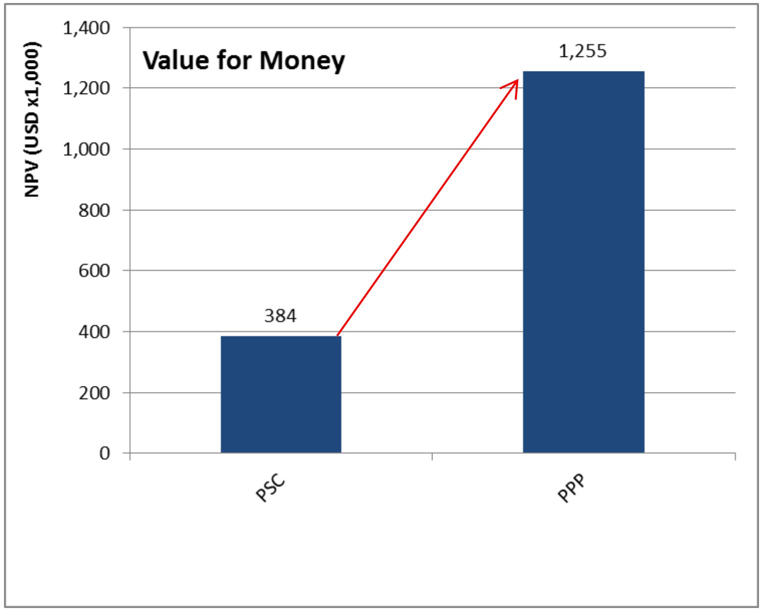


Figure 3 – Value for Money: difference between PSC and PPP case

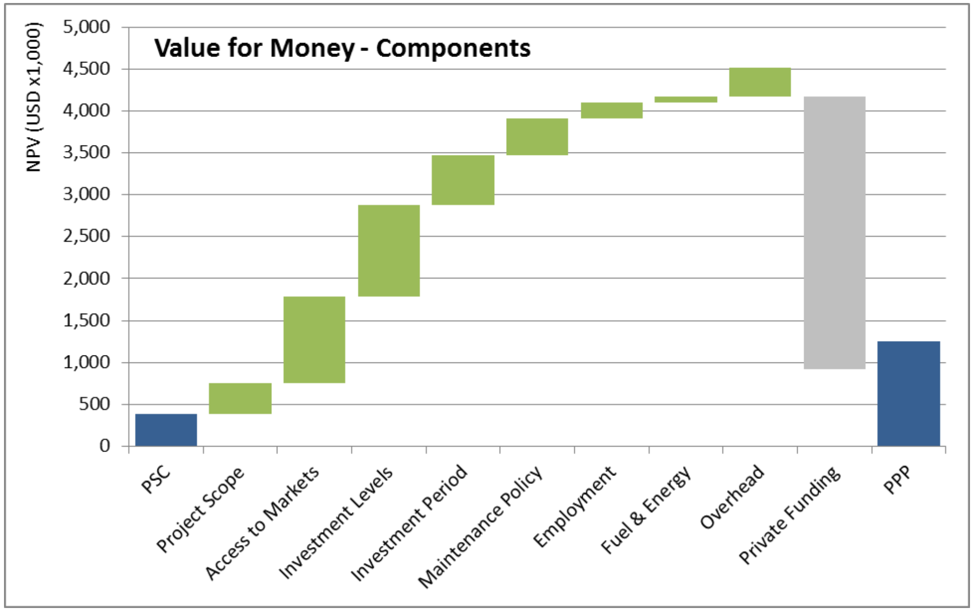


Figure 4 – Value for Money: from PSC to PPP case

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Introduction – Overview

Source: ICRC PPP Manual for Nigeria

The discounted Net Present Values derived from the Public Sector Comparator and shadow bid models are compared at the public sector test discount rate to demonstrate the preferred procurement methodology – PPP or conventional procurement – and the expected annual payments for Viability Gap Funding or any Availability Payments are compared to the expected future budgets. Payments for the service by users are assessed against Willingness to Pay survey data to ensure that the project revenues are realistic and affordable.

Based on the PPP Manual for Nigeria (Infrastructure Concession Regulatory Commission, 21 September 2012), this section of the Outline Business Case for the Ibom Deep Sea Port and Free Trade Zone Project consists of the Value for Money and Affordability analysis. The main element of this analysis is the Public Sector Comparator (PSC), which is used by governmental decision-making on whether a private investment proposal offers value for money in comparison with the most efficient form of public procurement. Thereby the goal is to estimate the hypothetical risk-adjusted cost if a project were to be financed, owned and implemented by government.

The PPP Manual for Nigeria provides the following input for conducting the Value for Money and Affordability Analysis:

The discounted Net Present Values derived from the Public Sector Comparator and shadow bid models are compared at the public sector test discount rate to demonstrate the preferred procurement methodology – PPP or conventional procurement – and the expected annual payments for Viability Gap Funding or any Availability Payments are compared to the expected future budgets. Payments for the service by users are assessed against Willingness to Pay survey data to ensure that the project revenues are realistic and affordable.

This section firstly describes the background and methodology regarding Value for Money analysis. Afterwards, the actual analysis is carried out, developing conclusions on the preferred procurement method for the Ibom DSP Project: PPP versus conventional procurement. This analysis comprises of estimating the financial differences between the two procurement methods in the financial model. This will result in two possible business cases: a conventional procurement and a PPP business case. The so-called Public-Sector-Comparator is aimed to enable decision-making based on the comparison between value-for-money in a PPP and in public procurement.

Introduction – Overview

Source: ICRC PPP Manual for Nigeria

The discounted Net Present Values derived from the Public Sector Comparator and shadow bid models are compared at the public sector test discount rate to demonstrate the preferred procurement methodology – PPP or conventional procurement – and the expected annual payments for Viability Gap Funding or any Availability Payments are compared to the expected future budgets. Payments for the service by users are assessed against Willingness to Pay survey data to ensure that the project revenues are realistic and affordable.

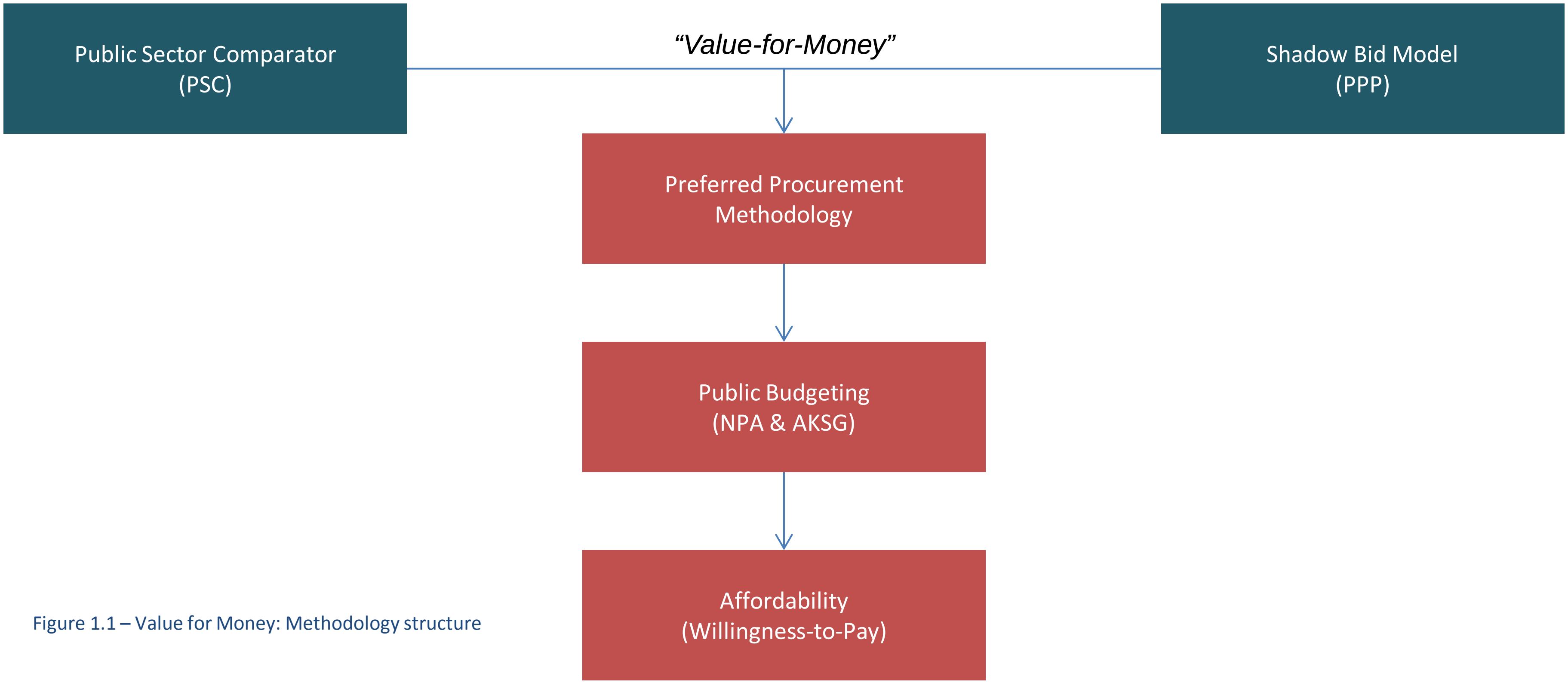


Figure 1.1 – Value for Money: Methodology structure

Introduction – Methodology – Meanings & Concepts

Summarizing, the VfM can be interpreted in two different manners: technically, as the difference between the public sector comparator and the adjusted shadow bid models, or conceptually, as the optimum value that a good or service can have, based on the user's requirement.

In order to clarify the concept, multiple international meanings and concepts on Value for Money are provided below:

Australia - Queensland

Value for money is a determination of the outcomes of an individual reconstruction project assessed against how it has contributed to the advancement of Government priorities, as well as cost and non-cost factors that include, but are not limited to, whole-of-life and transaction costs and fitness for purpose

Canada - Ontario

A value for money (VfM) analysis refers to the process of developing and comparing the total project costs, expressed in dollars measured at the same point in time, related to the following:

1. Traditional Project Delivery: Estimated costs to the public sector of delivering an infrastructure project using traditional procurement processes (under which total estimated costs are known as the public sector comparator, or PSC), and
2. Alternative Financing and Procurement: Estimated costs to the public sector of delivering the same project to the identical specifications using [Alternative Financing Procurement] (under which total estimated costs are known as the adjusted shadow bid, or ASB).

The difference between the public sector comparator and the adjusted shadow bid is referred to as the value for money. If the adjusted shadow bid is less than the public sector comparator, there is positive value for money by procuring a project using AFP.

United Kingdom

PFI (private sector involvement) should only be pursued where it represents VfM in procurement. VfM is defined as the optimum combination of whole-of-life costs and quality (or fitness for purpose) of the good or service to meet the user's requirement. VfM is not the choice of goods and services based on the lowest cost bid. To undertake a well-managed procurement, it is necessary to consider upfront, and at the earliest stage of procurement, what the key drivers of VfM in the procurement process will be

Introduction – Methodology – Public Sector Comparator

The main reason for carrying out the Value-for-Money and Affordability analysis is to compare between developing the Ibom DSP Project as a PPP or through conventional procurement. This is achieved by conducting a Public Sector Comparator (PSC), which is a "hypothetical constructed benchmark to assess the value-for-money of conventionally financed procurement in comparison with a privately financed scheme for delivering a publicly funded service" (Grimsey, 2004). The role of the PSC is thus to be a benchmark measure for public procurement that can be compared to the project costs in a PPP. As such, the VfM of the PSC is based on the net present value (NPV) of the life cycle costs of a project, including the costs and/or benefits associated with the risk allocation to the public sector.

The PSC is calculated using competitive neutrality: this implies that government provision of the project should not have an advantage over the public sector in terms of access to capital via tax revenues. Advantages that should be considered are those that are market driven: e.g. differences in interest rates and regulatory costs. On the other hand, government should also include any costs associated with their role in carrying out the project: e.g. management costs and costs associated with the transfer/salvage of the assets at the conclusion of the project.

Elements to be included when calculating the initial raw PSC are:

- Inflation
- Construction costs
- Capital and maintenance costs
- Operating costs
- Consultancy costs
- Residual values
- Contingencies
- Indirect costs (corporate overhead)
- Third party project revenues

The main method used to arrive at the actual VfM is based on the discounted cash flows for the PSC and the PPP. Therefore, the discount rates for the two procurement methods are required to calculate the NPV of the PSC and the PPP. These rates take into account the time value of money and the systematic risks transferred to the private side under PPP.

Introduction – Applicability & Relevance

Nigeria, together with the larger part of the world, has embraced and adopted the PPP model for port development and port management. To this extent, the NPA was restructured in 2004/05 transforming the former public port operator to a full-fledged Landlord Port Authority, with the (terminal) operations and its risks moved to the private sector under modern PPP concession contracts. From an institutional point of view, the PPP model therefore always prevails for the Ibom DSP Project, just as it does for all other port projects in the country. Conventional procurement (in this case the government fully responsible for the project) is a method which is no longer applicable for this sector. This VfM exercise is executed to complete the OBC and to show that that policy decision still holds.

According to the World Bank (2008), the Nigeria the Port Reform in 2004/05 was fuelled by the need to improve the efficiency and productivity of the Nigerian seaports, which at that time were facing the following issues:

- Long turnaround time for cargo and ships
- Insecurity of cargo
- Unproductive labour force
- Multiple government agencies in the port
- Corrupt practices
- Excessive charges

The Reform resulted in the concessioning of 25 terminals from the NPA to private sector and all subsequent terminal developments since 2004 being implemented as concession PPP as well. The Reform has fuelled significant investments in port assets by the new concessionaires and significant improvements in efficiency and productivity. According to the World Bank, the Reform was the “biggest successful reform endeavour in Nigerian history”.

From a financial perspective, the Reform entailed that

- No more governmental subsidies for the NPA were needed
- Private operators would execute all terminal operations at no costs to the government
- Overall transport costs have reduced due to competition and efficiency improvements
- Private operators invested several billion dollars in port assets
- Private operators are paying several billion dollars in concession fees to the Government

Contents

Comparison – Revenues

Revenue related drivers describe how private sector deals with markets, compared to traditional procurement

#	Topic	Rationale	Input Change from PSC to PPP	Output Change (NPV)
	TRAFFIC RELATED	**Private sector involvement has allowed ports to better connect to the markets they serve. Attraction of cargo to the terminals is a key driver in attracting private finance (debt/equity) to fund these capital intensive projects.**		
T.1	Project Scope	Market-driven and private finance driven decision-making under PPP usually results in capacity development for only those trades which are deemed financially feasible. Moreover, with specialised private terminal operators focusing on specific trades, cross-subsidisation to less attractive trades is not apparent.	No dry bulk in initial phase of the project	+ USD 367 M
T.2	Access to Markets	Under private management (PPP), terminals have become market-driven entities that pro-actively engage with (potential) clients to attract cargo to the terminal. This typically results in increased port traffic compared to traditional PSC cases.	Overall Traffic Sensitivity: +25%	+ USD 1,030 M

Comparison – Capex

Capex related drivers describe how private sector deals with investments, compared to traditional procurement

…

#	Topic	Rationale	Input Change from PSC to PPP	Output Change (NPV)
	CAPEX RELATED	**One of the primary reasons for private sector involvement in the seaport sector worldwide is to transfer (part of the) investment responsibilities from public budgets to private sector concessionaires. This transfer also provides other clear benefits from value perspective.**		
C.1	Investment Levels	Due to development-experience, disciplinary workings of private funding (banks/shareholders), and negotiation power, PPP is expected to realise the project for an overall lower budget than in the PSC case.	Overall Capex Sensitivity: -20%	+ USD 1,097 M
C.2	Investment Period	For the same reasons, but also from project management experience point of view, a PPP is expected to deliver the project earlier than in the PSC case.	Operations Start: -2 years	+ USD 588 M

Comparison – Opex

Opex related drivers describe how private sector deals with operations, compared to traditional procurement

#	Topic	Rationale	Input Change from PSC to PPP	Output Change (NPV)
	OPEX RELATED	**Another main reason for private sector involvement in the international seaport sector is the perceived improvement of overall operational efficiency, which directly follows from the disciplinary workings of private funding.**		
O.1	Maintenance Policy	Through optimised life-cycle management a PPP is better able to both reduce overall maintenance expenses and improve operational life of critical assets compared to the PSC case.	Maintenance Rate: -30% Economic Life: +20%	+ USD 300 M + USD 142 M
O.2	Employment	Port reforms have allowed private operators to rationalise and streamline the labour force in ports around the world. Modern management principles together with private finance discipline allows a PPP to achieve similar (or better) operational performance with less workers. Also overall cost of employment levels tent to become more in line with industry standards with the advent of private management.	Employment: -30% Cost of Employment: +10%	+ USD 313 M - USD 120 M
O.3	Fuel Consumption	The same principles and discipline allows a PPP to achieve similar (or better) operational performance using less resources such as fuel and electricity .	Fuel & Energy: -20%	+ USD 72 M
O.4	Overhead	Under private management overall overhead levels typically show substantial improvements. This is largely caused by a reduction of budget spillage in day-to-day business transaction and modern management, treasury, and administrative principles adopted by private management	Other Opex: -10%	+ USD 337 M

Comparison – Risks: Private Funding

In a PPP structure, part of the risks are transferred to the private sector. In the PDMC model, even a substantial share of these project risks is transferred to the private sector (to the PDMC and its sub-concessionaires). The increased cost of funds (debt and equity) can be considered the price for the value gains generated by involving the private sector in the project.

#	Topic	Rationale	Input Change from PSC to PPP	Output Change (NPV)
	RISK RELATED	**Risk management is a dominant topic in establishing modern PPP structures.**		
R.1	PDMC Model & Cost of Funds	Sub-concessioning provides the PDMC with a means to involve specialist organisations to manage terminal development, operational processes and the attraction of cargo. Cost of funding is expected to increase with the shift of project risks from public sector to privately funded entities.	Sub-Concessioning of Business Units Cost of Debt: + 2% Cost of Equity: + 2%	- USD 3,255 M

Contents

Value-for-Money – Overview

Based on the PSC case, the PPP case is built up based on the assumptions described earlier

Table 3.1 – Value for Money: Overview of output

#	Topic	Input Change from PSC to PPP	NPV
	PSC CASE		**USD 384 M**
T.1	Project Scope	No dry bulk in initial phase	+ USD 367 M
T.2	Access to Markets	Overall Traffic Sensitivity: +25%	+ USD 1,030 M
C.1	Investment Levels	Overall Capex Sensitivity: -20%	+ USD 1,097 M
C.2	Investment Period	Operations Start: -2 years	+ USD 588 M
O.1	Maintenance Policy	Maintenance Rate: -30% Economic Life: +20%	+ USD 300 M + USD 142 M
O.2	Employment	Employment: -30% Wages: +10%	+ USD 313 M - USD 120 M
O.3	Fuel Consumption	Fuel & Energy: -20%	+ USD 72 M
0.4	Overhead	Other Opex: -10%	+ USD 337 USD
R.1	Risks: Private Funding	Sub-Concessioning Cost of Debt: + 2% Cost of Equity: + 5%	- USD 3,255 M
	PPP CASE		**USD 1,255 M**
	TOTAL VALUE-FOR-MONEY		**USD 871 m**

Value-for-Money – Value Creation

PSC: Value created by lower costs of public funding. PPP: Value created by private efficiency gains

In the PSC Case, public sector takes full responsibility over the development and operation of the project. This would result in a Net Present Value (NPV) of the Project of approximately USD 384 million (IRR 9.9%; Blended Project WACC: 9.2%). The positive value is foremost a result from the relatively low cost of public funds, which has resulted in a relatively low WACC (discount factor)

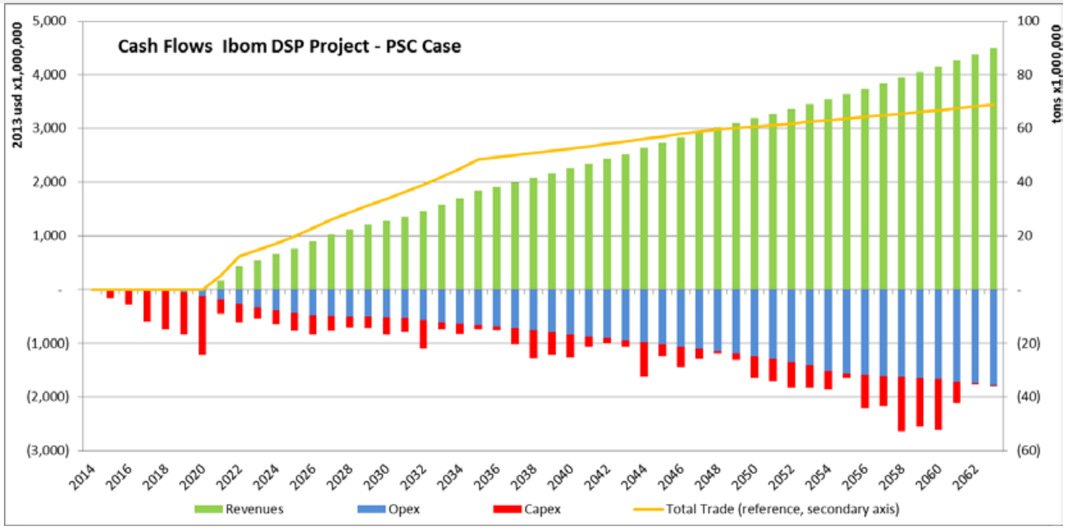


Figure 3.1 – Cash flows of the Ibom DSP Case: PSC Case

In the PPP Case, public sector develops the project together with the private sector. In the envisaged PDMC model, a substantial part of project responsibilities and risks are transferred to the private sector (PDMC and its sub-concessionaires take full responsibility over the development and operation of the project, except for the nautical fleet (NPA)). This PPP would result in a Net Present Value (NPV) of the Project of approximately USD 1,255 million (IRR 16.9%; Blended Project WACC: 13.0%). The positive value is foremost a result from efficiency gains due to private involvement, party offset by the higher costs of private funds.

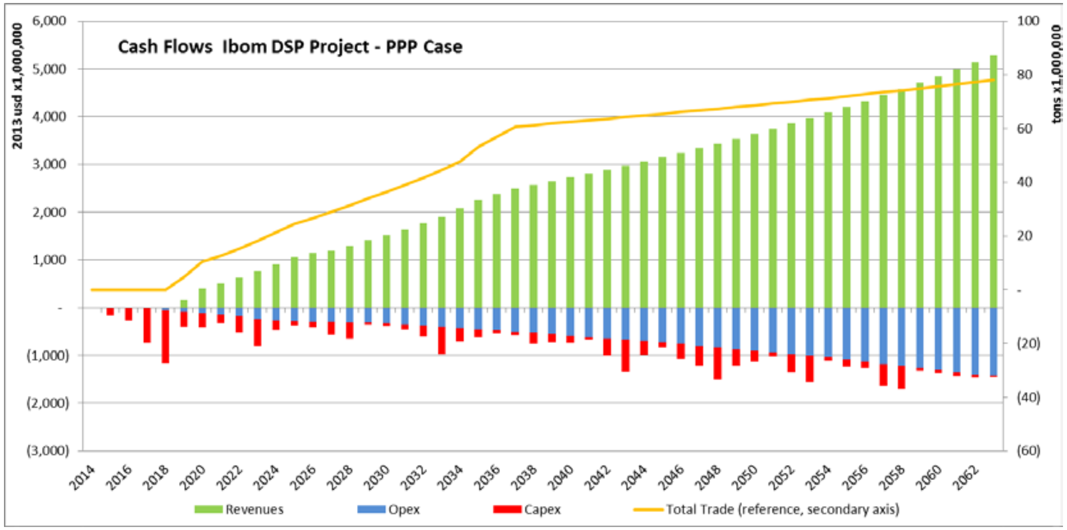


Figure 3.2 – Cash flows of the Ibom DSP Case: PPP Case

Value-for-Money – Preferred Procurement Methodology

With a PPP Project case rendering an NPV of USD 1.255 billion and the PSC case USD 0.384 billion. Total Value-for-Money established at USD 871 M, which is considerable. This underlines PPP as the Preferred Procurement Methodology, in line with the existing policies in the Nigerian port sector and industry best-practices.

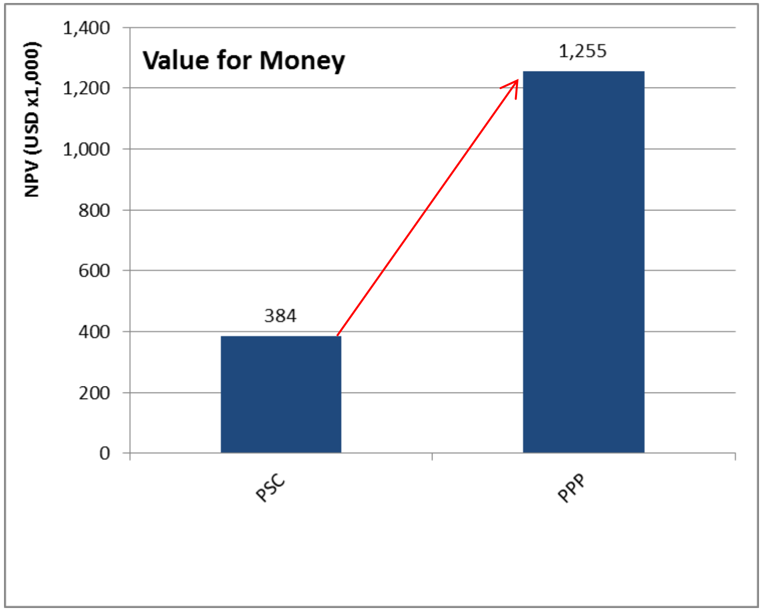


Figure 3.3 – Value for Money: difference between PSC and PPP case

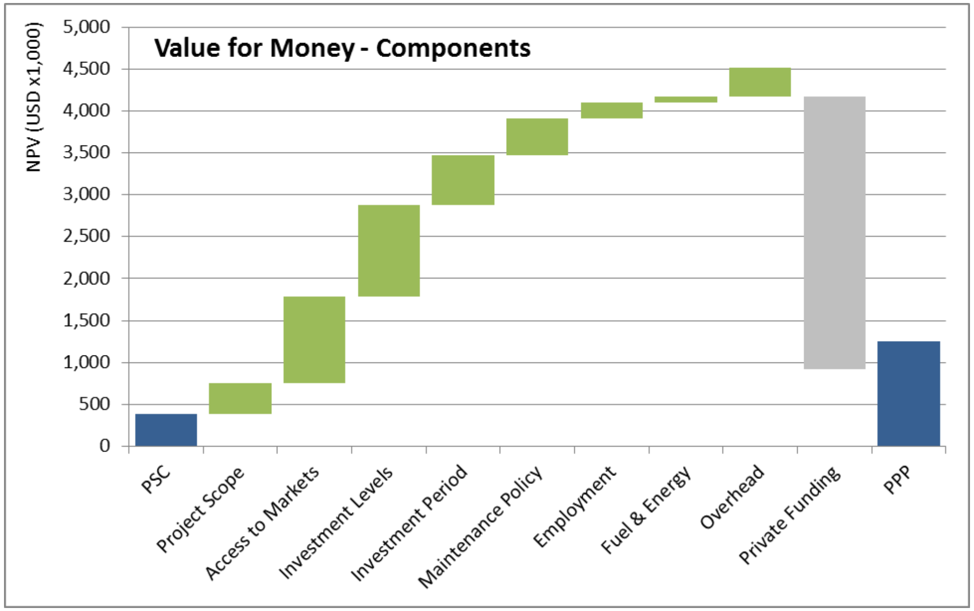


Figure 3.4 – Value for Money: from PSC to PPP case

Value-for-Money – Affordability – Willingness-to-Pay 1/3

Source: ICRC PPP Manual for Nigeria

The discounted Net Present Values derived from the Public Sector Comparator and shadow bid models are compared at the public sector test discount rate to demonstrate the preferred procurement methodology – PPP or conventional procurement – and the expected annual payments for Viability Gap Funding or any Availability Payments are compared to the expected future budgets. Payments for the service by users are assessed against Willingness to Pay data to ensure that the project revenues are realistic and affordable.

The primary project revenues are the tariffs, dues and charges as levied by the PDMC (and its sub-concessionaires) and the NPA (and its third party service providers).

The Nigerian Government has acknowledged the strategic position of its ports as import and export gateways to the national and regional economies. To protect the users of the ports, the tariffs, dues and charges which apply to the seaports are strictly regulated in the Nigerian market. This prevents excessive port pricing by private concessionaires and consequential negative economic impacts. Tariffs are regulated by the NPA through its Tariff Book, which is publicly available; and through direct agreements with its concessionaires. The NPA Tariff Book concerns fixed prices for cargo- and vessel-related port dues and services provided by the NPA and the direct agreements with the concessionaires concern maximum tariffs for operational tasks as executed under the concession agreements (typically: cargo handling and storage).

In the Business Case for the Ibom DSP Project, the NPA regulated tariffs are applied and allocated to the entity responsible for the underlying activities (either NPA or the PDMC; see next page). Establishment, management and adjustment of the regulated tariffs remains the responsibility of the NPA. This approach ensures that the users of the port are familiar with the tariffs.

As a conservative measure, the Business Case for the Ibom DSP Project assumes initial discounts on operations-related tariffs and further future price erosion on all tariffs, dues and charges. Discounts and erosion are applied to simulate competitive pricing by the Ibom DSP Project and to take into account expected decrease in port pricing once the market further matures. This measure adds realism and conservatism to the forecasted project revenues and strengthens Willingness-to-Pay amongst port users. These discounts and erosion is further elaborated in this section.

Value-for-Money – Affordability – Willingness-to-Pay 2/3

Project-related tariffs are managed by NPA through their Tariff Book and through individual agreements. Revenues are allocated to the entity responsible for the underlying activity. Concession Payments are the royalties payable by the Concessionaire (PDMC) to the Concession Grantor on statutory responsibilities ceded by the Concession Grantor to the Concessionaire.

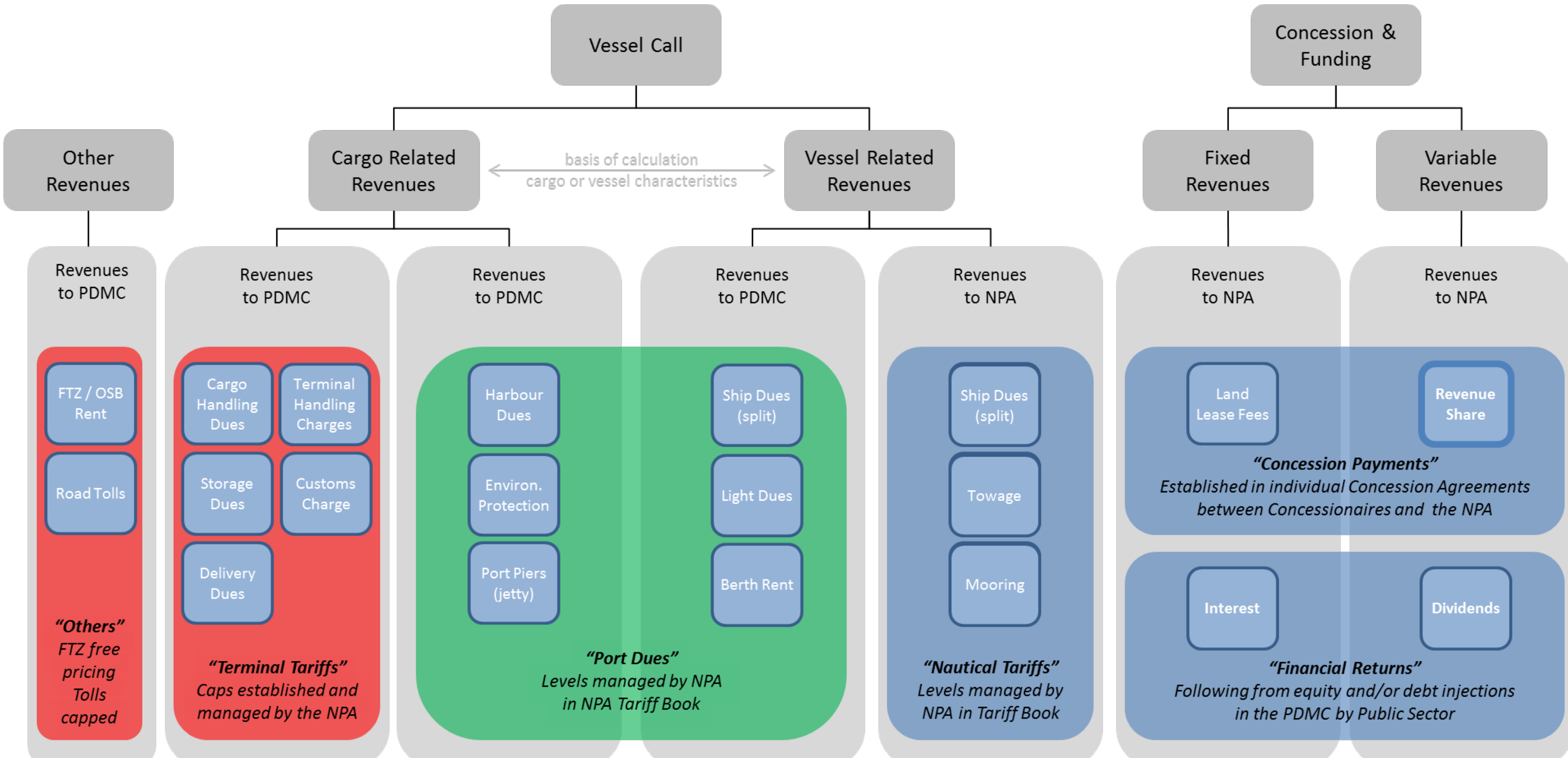


Figure 3.5 – Tariff Structure & Allocation

Value-for-Money – Affordability – Willingness-to-Pay 3/3

To ensure realism and Willingness-to-Pay, existing price levels are applied along with initial discounts and future price erosion.

Subject	Assumption
Terminal Tariffs	Base level based on tariffs at existing terminals 15% discount at start of operations (25% for petroleum products; 0% for Offshore Supplies) 2% annual price erosion from start operations until 20% has eroded (30% for petroleum products; 0% for Offshore Supplies) Regular annual inflation indexation
Nautical Tariffs	Base level based on NPA Tariff Book No discounts No erosion Regular annual inflation indexation
Port Dues	Base level based on NPA Tariff Book No discounts 2% erosion per annum starting in 2023 until 30% has eroded (0% for ship dues & berth rent) Annual inflation, indexation starting in 2020
Revenue Share (where applied)	Base level based on Business Case 10 year ramp-up period (+10% per annum)
Land Lease (where applied)	Base level based on Consultant's Estimate 50% discount during construction No erosion Regular annual inflation indexation

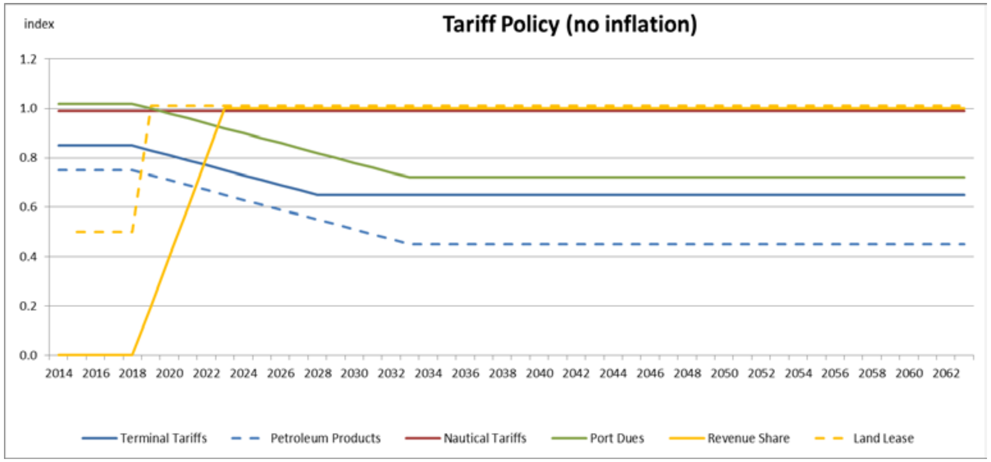


Figure 3.7 – Tariff Policy (no inflation)

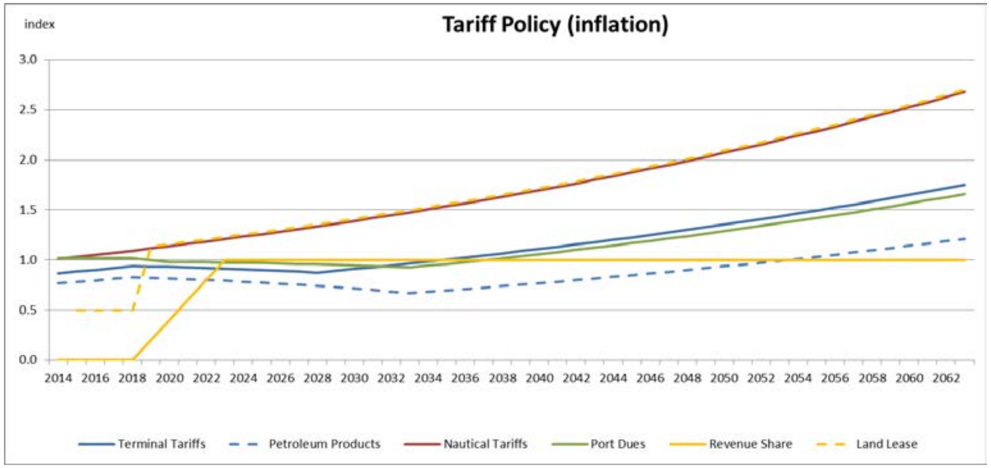


Figure 3.8 – Tariff Policy (with assumed inflation)

Value-for-Money – Project Budgeting 1/6

Source: ICRC PPP Manual for Nigeria

The discounted Net Present Values derived from the Public Sector Comparator and shadow bid models are compared at the public sector test discount rate to demonstrate the preferred procurement methodology – PPP or conventional procurement – and the expected annual payments for Viability Gap Funding or any Availability Payments are compared to the expected future budgets. Payments for the service by users are assessed against Willingness to Pay survey data to ensure that the project revenues are realistic and affordable.

The Ibom DSP Project is characterised by a significant shift of investment-responsibilities from the Public Sector (NPA and State) to the Private Sector (Concessionaire, PDMC). Despite this shift, both public bodies still have financial relation to the project and the NPA even retains an operational responsibility through the Harbour Master and the provision of Marine Services.

Entity	Investments	Expenses	Revenues
Nigerian Ports Authority (NPA, Concession Grantor and minority shareholder in PDMC)	Nautical Fleet: • pilot boats • tug boats • mooring craft Equity in PDMC GFS in PDMC	Nautical Services (wages, fuel, overhead) Nautical Fleet (maintenance, insurance) Harbour Master Port Administration Contract Compliance Monitoring	Part of Ship Dues (incl. Pilotage) Towage Tariffs Mooring Tariffs Landlease (Concession) Revenue Share (Concession) Financial Returns (Dividends) Financial Returns (Interest)
Akwa Ibom State Government (AKSG, minority shareholder in PDMC)	Equity in PDMC GFS in PDMC		Financial Returns (Dividends) Financial Returns (Interest)

The project shows a positive NPV for the Concessoinaire (PDMC), which means that a concession payment from the Concessionaire to the Concession Grantor (NPA) may be expected. In the Business Case, the concession payments are structured as an annual fixed landlease payment and a variable royalty in the form of a revenue share. The revenue share is considered the primary financial bidding parameter in the PPP tender. Therefore, the total level of concession payments cannot be established at this moment: they depend on the overall market appetite for the project and the competitiveness of the bidding process. For reference in this section, a conservative revenue share level of 10% is assumed.

Financial investments in the PDMC by public stakeholders are covered in more detail in the Project Structuring Part and in section D1 - Feasibility

Value-for-Money – Project Budgeting – Initial Capex 2/6

The envisaged PPP structure using a PDMC which is responsible for the majority of the initial investments results in a significant (>65%) decrease in required public budget, compared to the historic situation where the public sector makes all investments in the project. Moreover, the investments in the PPP case are predominantly financial investments (equity and/or GFS) in the PDMC, which do not render any operational responsibilities for the public sector (besides the nautical services by the NPA)

In the PSC Case, all project capex need to be covered by public sector: The connecting road (State) and the entire development (NPA). Moreover, as covered in the section where the PSC was established, total capex are expected to be much higher in the PSC case compared to the PPP case: USD 2.2b versus USD 1.7b . This is due to various drivers (e.g. scoping, inefficiencies, etc.).

In the PPP case, capex levels are generally lower (USD 1.7b) and a substantial part of the investment responsibilities have been transferred to the private sector (PDMC and its sub-concessionaires). Only public funding involvement in the project relates to a) the provision to the PDMC of the 20% committed capex contribution (through equity and Government Funding Support by both NPA and the State) and b) the investments in the nautical fleet by the NPA.

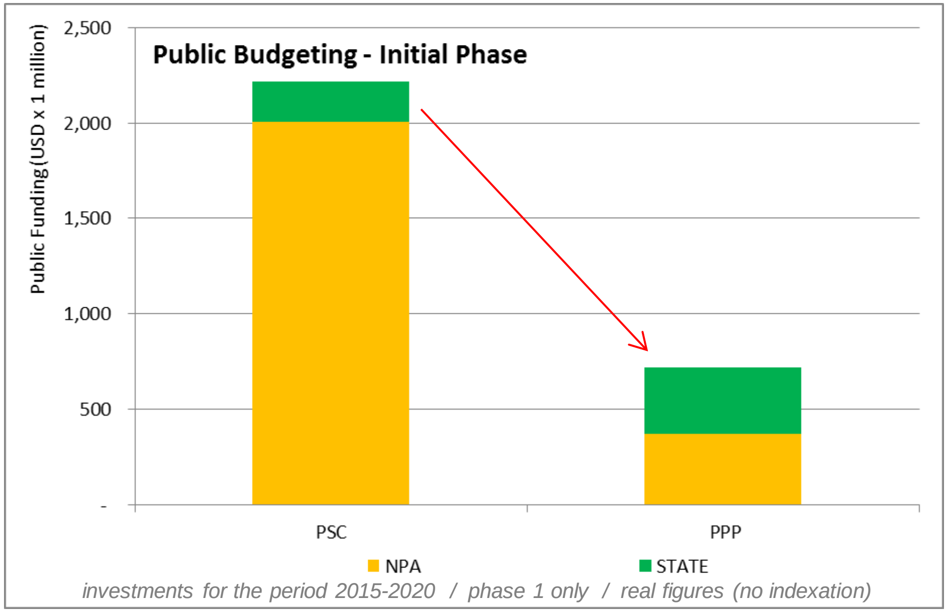


Figure 3.9 – Public Budgeting for the Ibom DSP project

Value-for-Money – Project Budgeting – NPA 3/6

With all project cash flows defined for the public sector PPP partners, their overall returns can be established. The following cash flows have been taken into account for the NPA:

1. **Equity Injections + Dividends**: Both NPA and the State shall inject equity in the PDMC (20% each; parallel to the 60% of the private investor) and each shall receive their share of the dividends, once available.
2. **GFS Injections + GFS Service**: The Federal Ministry of Finance shall provide part of the Government Funding Support (GFS) to the PDMC to ensure bankability. Consequently, GFS Injections by the Federal Ministry of Finance are not present in the NPA cash flow graphs. It is assumed that GFS for this project is structured as a soft loan, so GFS Service shall constitute of repayments and interest.
3. **Fleet Investments**: NPA shall not cede the responsibilities for nautical services and shall therefore invest in the nautical fleet. Over time, the fleet shall be expanded and replaced by the NPA
4. **Operational Costs**: NPA incurs costs for provision of nautical services, including the Harbour Master tasks
5. **Ship Dues**: NPA receives ship dues for towage and mooring (fixed component of the ship dues) and for pilotage and the Harbour Master tasks (share of the variable component of the ship dues (other share for PDMC for channel development/maintenance and waste management) .
6. **Concession Fees**: As Concession Grantor, the NPA shall receive Concession Payments, which are structured as fixed landlease payments and variable royalty payments (revenue share)

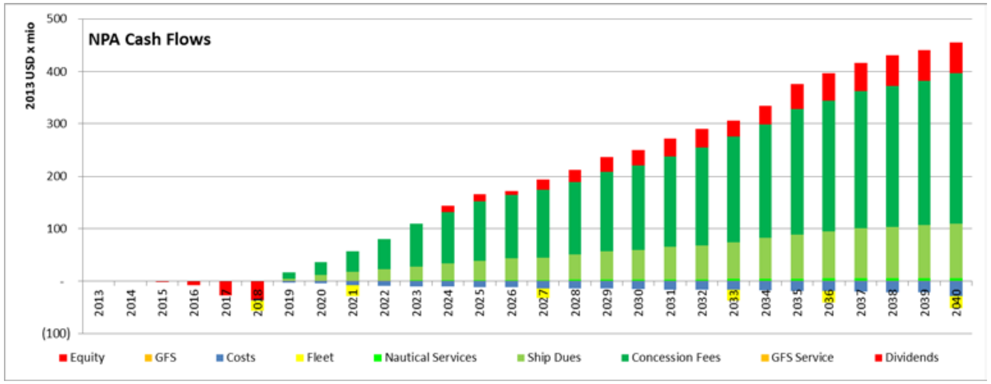


Figure 3.10 – Projected cash flows NPA for Ibom DSP (2015-40; 10% revenue share assumed; real)

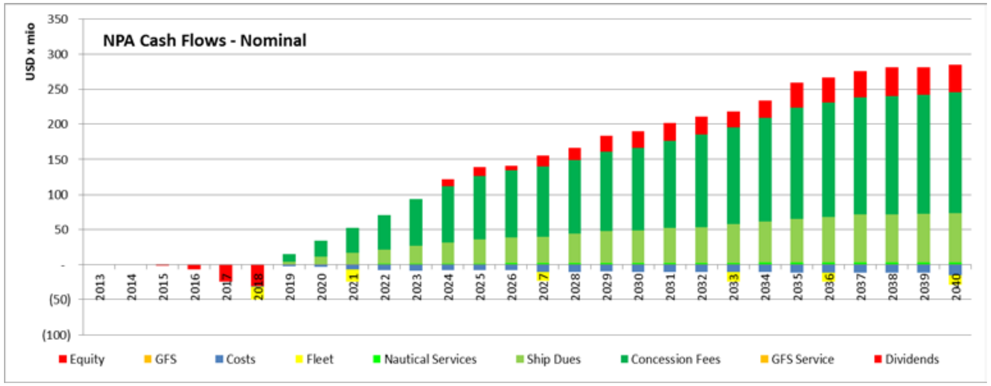


Figure 3.11 – Projected cash flows NPA for Ibom DSP (2015-40; 10% revenue share assumed; nominal)

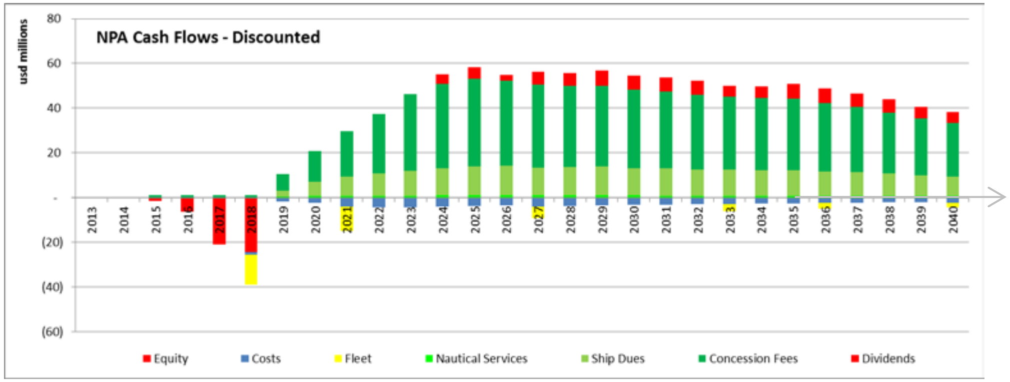
The PPP Structuring section in the Project Procurement File contains further reference to Public Budgeting in relation to the Ibom DSP Project

Value-for-Money – Project Budgeting – NPA 4/6

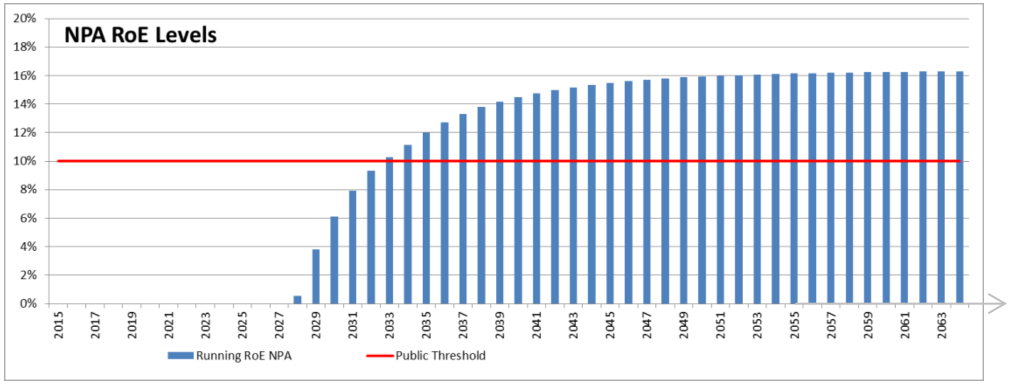
The NPA, covering its limited responsibilities as stipulated in the Concession Agreement, is financially feasible.

Business Case - NPA - Total NPA Cash Flows			
Project IRR	**15.16%**		**%**
Project NPV	**1,260,463,077**		**USD**
WACC	**10.00%**		**%**
	NPA	Private Investor	
Equity IRR	**16.30%**	**19.14%**	**%**

The NPA case of the Ibom DSP Project is feasible with an NPV of USD 1.3bn and an IRR of 15.2%



From equity-perspective, NPA can expect a 16.3% equity return on its 20% participation in the PDMC. This level is in excess to the assumed public threshold of 10%. The public RoE is slightly lower than the private returns since it is expected that additional equity injections which may be needed for early expansions are fully covered by the private investor (no additional public capital needed). As a consequence, this would slightly dilute the public positions in the PDMC over time.



Value-for-Money – Project Budgeting – Akwa Ibom State 5/6

With all project cash flows defined for the public sector PPP partners, their overall returns can be established. The following cash flows have been taken into account for the Akwa Ibom State Government:

1. **Equity Injections + Dividends**: Both NPA and the State shall inject equity in the PDMC (20% each; parallel to the 60% of the private investor) and each shall receive their share of the dividends, once available.
2. **GFS Injections + GFS Service**: The Federal Ministry of Finance shall provide part of the Government Funding Support (GFS) to the PDMC to ensure bankability. Consequently, GFS Injections by the Federal Ministry of Finance are not present in the State government cash flow graphs. It is assumed that GFS for this project is structured as a soft loan, so GFS Service shall constitute of repayments and interest.

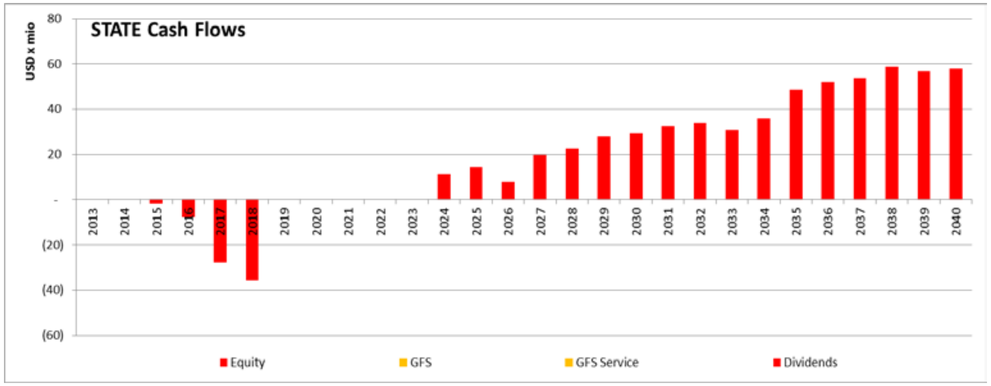


Figure 3.12 – Projected cash flows AKSG for Ibom DSP (2015-40; real)

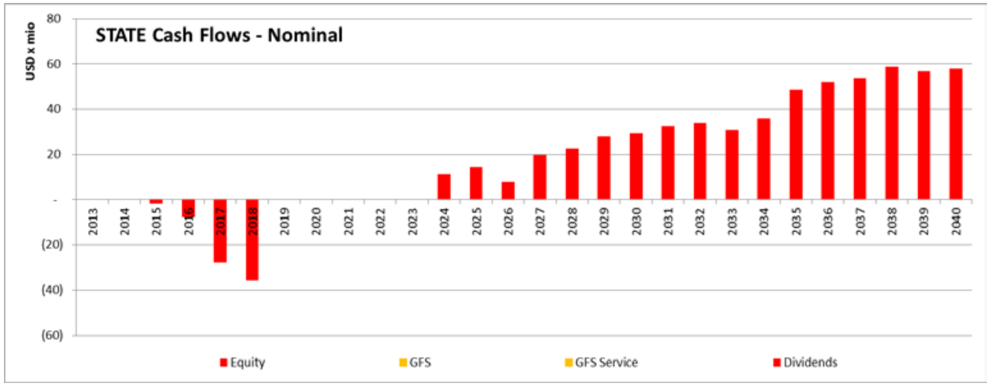


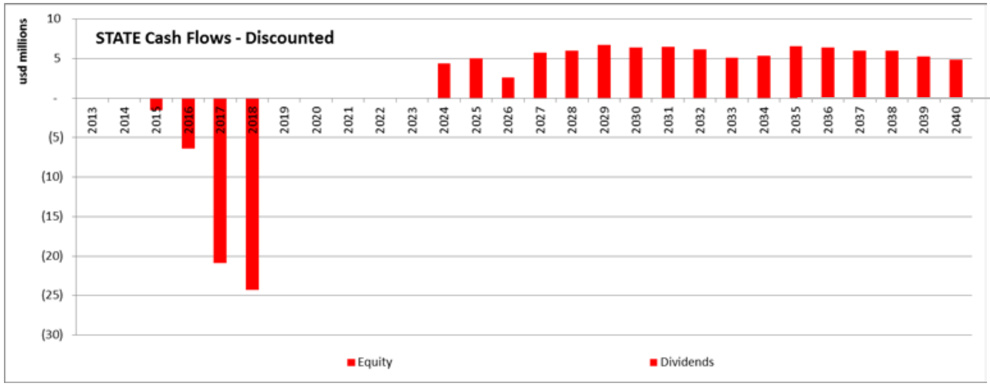
Figure 3.13 – Projected cash flows ASG for Ibom DSP (2015-40; nominal)

The PPP Structuring section in the Project Procurement File contains further reference to Public Budgeting in relation to the Ibom DSP Project

Value-for-Money – Project Budgeting – Akwa Ibom State 6/6

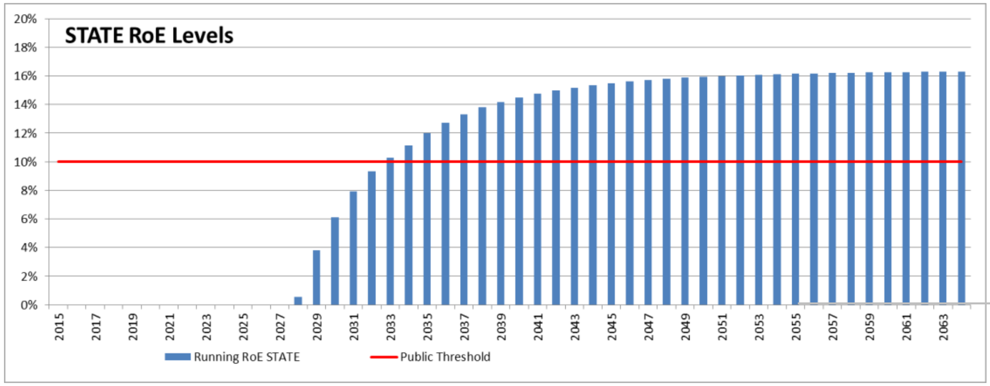
The State, covering its limited responsibilities as stipulated in the Concession Agreement, is financially feasible.

Business Case - STATE - Total STATE Cash Flows			
Project IRR	11.78%		%
Project NPV	100,224,708		USD
WACC	10.00%		%
	NPA	Private Investor	
Equity IRR	16.30%	19.14%	%



The AKSG case of the Ibom DSP Project is feasible with an NPV of USD 100 M and an IRR of 11.8%

From equity-perspective, the State can expect a 16.3% equity return on its 10% participation in the PDMC. This level is in excess to the assumed public threshold of 10%. The public RoE is slightly lower than the private returns since it is expected that additional equity injections which may be needed for early expansions are fully covered by the private investor (no additional public capital needed). As a consequence, this would slightly dilute the public positions in the PDMC over time.



Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs
maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

ECONOMIC COST BENEFIT ANALYSIS

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs maritime & transport business solutions

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Economic Cost Benefit Analysis
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Objective & Approach: Determine the economic impact of Ibom DSP on the Nigerian Economy

Economic Cost Benefit Analysis (CBA) Definition:

An Economic Cost Benefit Analysis should provide support for informed judgment and decision making. By means of a CBA the welfare contribution of a project to a region or country can be measured.

PPP-Manual for Nigeria (September 2012) guideline:

It is particularly important to the government policy makers that the feasibility phase should also include an Economic Cost Benefit Analysis, and correspondingly demonstrates the economic benefits of the project. The purpose of economic analysis is to determine whether there is an economic justification case for the investment decision. The economic assessment goes beyond the items typically included in a financial analysis and includes:

- The economic benefits from the project;
- The economic costs of the project;
- The balance of these expressed in present value terms (i.e. the net economic benefit or Economic Rate of Return (ERR)).
- The balance of these expressed in accumulated value terms over the entire concession period.

Ibom DSP CBA Objective:

The objective of this economic Cost Benefit Analysis is to determine whether the economic costs that are created by Ibom DSP can be compensated by economic benefits. As such, the economic Cost Benefit Analysis primarily aims to assess whether the project will create a positive economic Net Present Value; the analysis does not focus on approximating the exact economic Net Present Value. In order to approximate the exact Economic Net Present Value, a more detailed analysis is required.

Ibom DSP CBA Scope:

The economic Cost Benefit Analysis for the Ibom Deep Sea port and Free Trade Zone assesses the impact of Ibom DSP on the Nigerian economy. As such, a national scope is applied to the economic CBA. The determination of the geographic scope has significant impact on the approach of the economic CBA. Since a national approach to the economic CBA is applied, double-counting of effects have to be carefully avoided.

Ibom DSP CBA Timeframe:

The economic effects for Ibom DSP are estimated over a period of 30 years. A case covering a period of 50 years (the full concession period) is used to show the economic effects of Ibom DSP for reference with other greenfield port projects in Nigeria.

Structure of the Economic Cost Benefit Analysis: 6 main components to be quantified

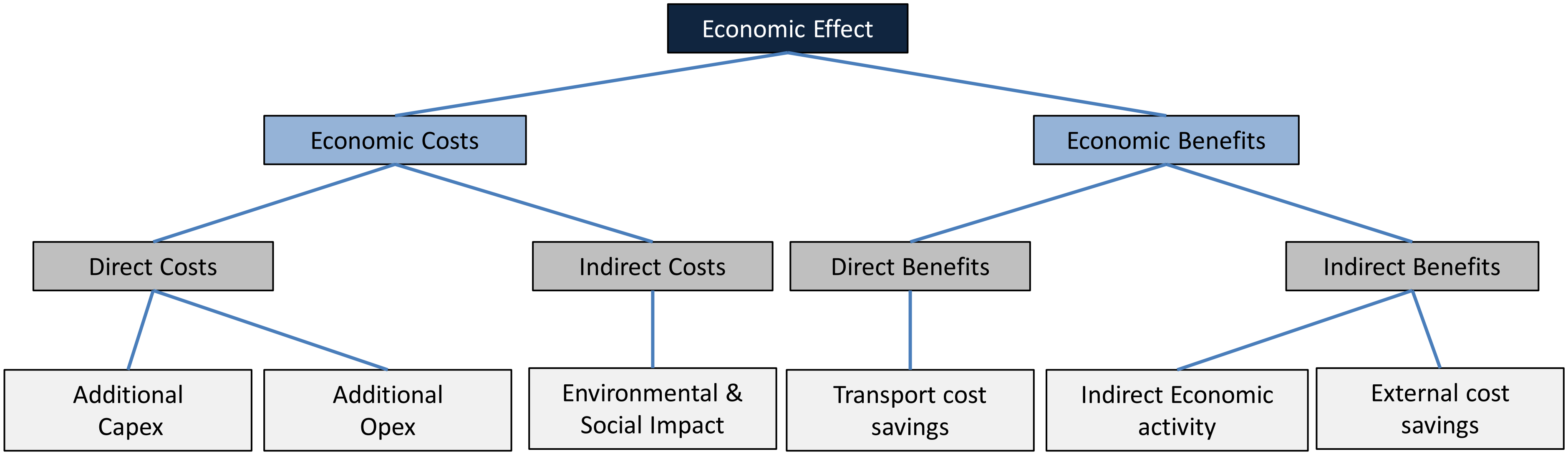


Figure 1 – Structure of Economic Cost Benefit Analysis

The figure above presents the structure of the Economic Cost Benefit Analysis for the Ibom Deep Sea port & Free Trade Zone Project. The economic effect is the result of the combination of economic costs and economic benefits. Both components consist of a direct part and an indirect part. The direct costs consist of the incremental capital expenses and the incremental operational expenses that result from Ibom DSP. The inputs for the direct costs are obtained from the financial business case. The indirect costs consist of the local environmental and social costs that result from the construction of the Ibom Deep Sea port and Free Trade Zone.

The direct benefits of the project consist of the cost savings in the transport chain; hinterland transport cost savings, maritime transport cost savings and port handling cost savings. The financial revenues of the port are excluded from the direct benefits, since these revenues are paid by Nigerian consumers and are as such no benefit to the economy as a whole. The indirect benefits consist of indirect economic activity, measured by additional labour and additional added value as a result of increased traffic and external cost savings that are the result of a more efficient hinterland corridor.

Outcome of the Economic Cost Benefit Analysis: Positive Economic Effect of 2.3 billion USD in 30Y NPV terms

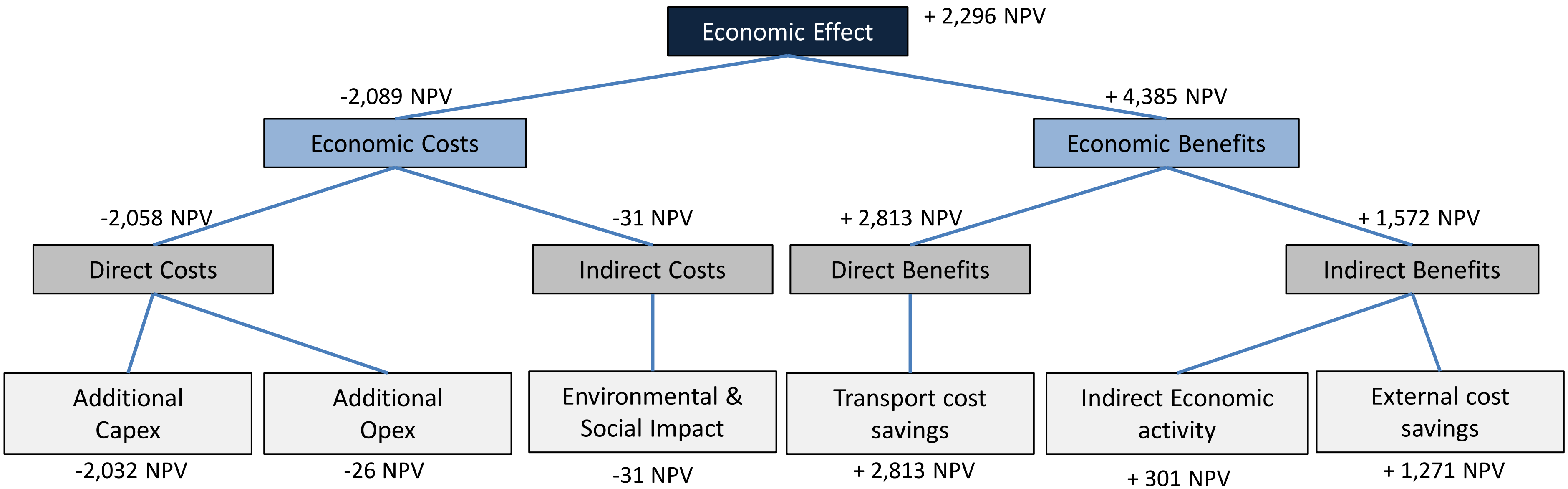


Figure 2 – Output of Economic Cost Benefit Analysis (mio USD)

The figure above presents the outcome of the Economic Cost Benefit Analysis for the Ibom Deep Sea port & Free Trade Zone Project. The economic effect of the Ibom Deep Sea port & Free Trade Zone Project is estimated at 2.296 billion USD (NPV). The incremental economic costs created by Ibom DSP (2.089 billion NPV) are compensated for by the economic benefits (4.385 billion NPV).

The direct costs of Ibom DSP are estimated by using input from the financial business case. The indirect costs, the local environmental and social impact, are a preliminary cost estimation based on the environmental and social impact assessment scoping. A preliminary cost of 31 million USD NPV is estimated; this estimation contains an error margin of (+/- 30%). The full environmental impact assessment will assess a more accurate estimation; this preliminary estimation is included in this analysis in order to present the relative impact of the environmental and social impact on the overall macro-economic effect of the Ibom Deep Sea Port.

The economic benefits are estimated at 4.385 billion USD NPV. The largest share of these benefits are created by direct benefits; transport cost savings are estimated at 2.813 billion USD NPV. The indirect benefits are estimated at 1.572 billion USD NPV; this effect is created by indirect economic activity (301 million USD NPV) and external cost savings (1.271 billion USD NPV).

Outcome of the Economic Cost Benefit Analysis: Positive Economic Effect of 189 billion USD in 50Y cumulative terms

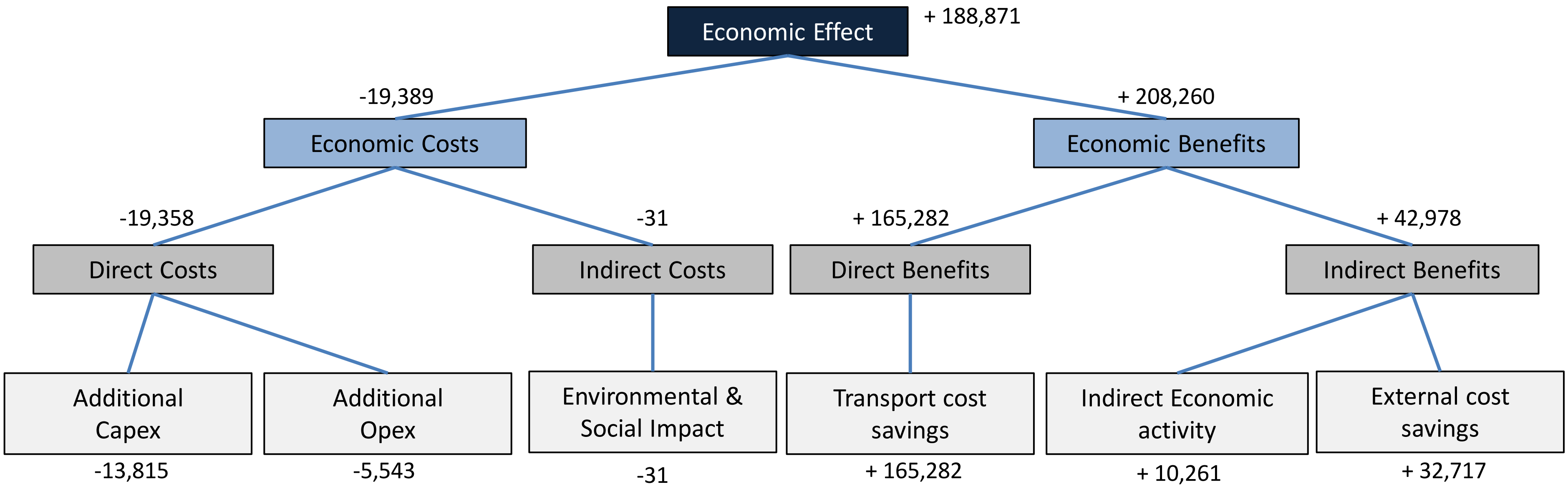


Figure 3 – Output of Economic Cost Benefit Analysis (mio USD)

The figure above presents the outcome of the Economic Cost Benefit Analysis for the Ibom Deep Sea port & Free Trade Zone Project over the entire concession period of 50 years. The incremental costs created by IBOM DSP (19.4 billion USD) are compensated by the economic benefits (208.3 billion USD).

In order to arrive at the total positive effect of 189 billion USD, the following adjustments were applied to the method as used in the Economic Cost Benefit Analysis using NPV:

- Project modelling period: extended from 30 years to 50 years (entire project concession period)
- Accumulation: no NPV calculation was used. All economic costs and benefits were accumulated over the entire concession period without the use of a discount rate.

It should be noted here that the economic value takes into account the effects of other known port developments, including projects in Lekki and Badagry.

Economic Cost Benefit Analysis Ibom Deep Sea Port and FTZ

As can be seen in the figure on the left below, the economic costs that occur in the first five years are rapidly compensated for by the economic benefits that are created by the Ibom Deep Sea Port and Free Trade Zone.

The figure on the right (top) presents the breakdown of the additional economic costs that are created by the Ibom Deep Sea Port and FTZ project. The majority of the costs take place in the first five years due to the capital costs in the port. After the first five years, period re-investments and expansion investments are conducted. The operational costs build up gradually and reach their highest level around the year 2025.

The figure on the right (bottom) presents the breakdown of the economic savings as a result of the Ibom DSP project. As can be seen in the figure, the largest share of the economic savings are created by savings in the transport chain. Subsequently, the external costs of transport are significant as well. The smallest share in overall economic saving is created by the port induced growth that results from the cargo throughput in Ibom DSP.

The table below presents the outcome of the five main components, including the environmental & social costs that are quantified on the basis of a preliminary qualitative assessment for this economic cost benefit analysis.

Table 1 – Output of Economic Cost Benefit Analysis

	NPV (adjusted)	NPV	Total 30(y)	Total 50(y)
Direct Costs				
Additional Capex Ibom DSP	(2,032)	(2,720)	(8,644)	(13,815)
Additional Opex Ibom DSP	(26)	(55)	(1,069)	(5,543)
Indirect Costs				
Environmental & Social Costs	(31)	(31)	(31)	(31)
Direct Benefits				
Transport Cost Savings	2,813	7,181	61,066	165,282
Indirect Benefits				
Indirect Economic Activity	302	453	4,104	10,261
External Costs savings	1,271	1,589	12,669	32,717
Economic Effect	**2,296**	**6,417**	**68,096**	**188,871**

Amounts in million USD

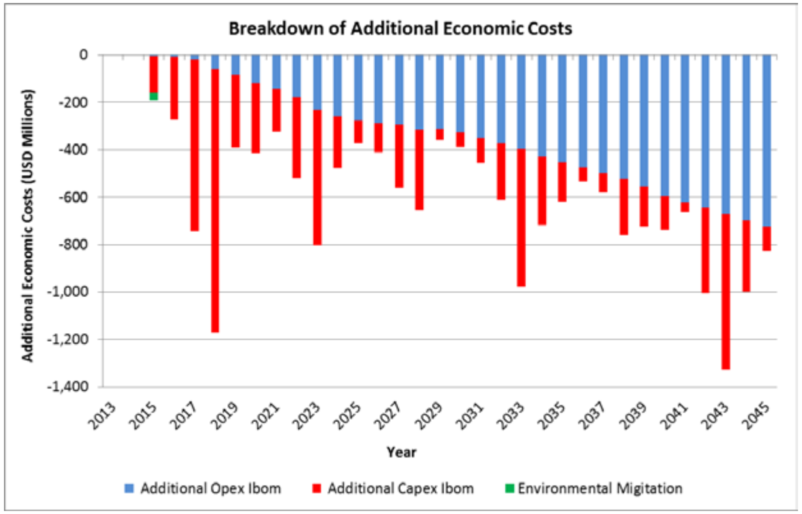


Figure 3 – Breakdown of Additional Economic Costs

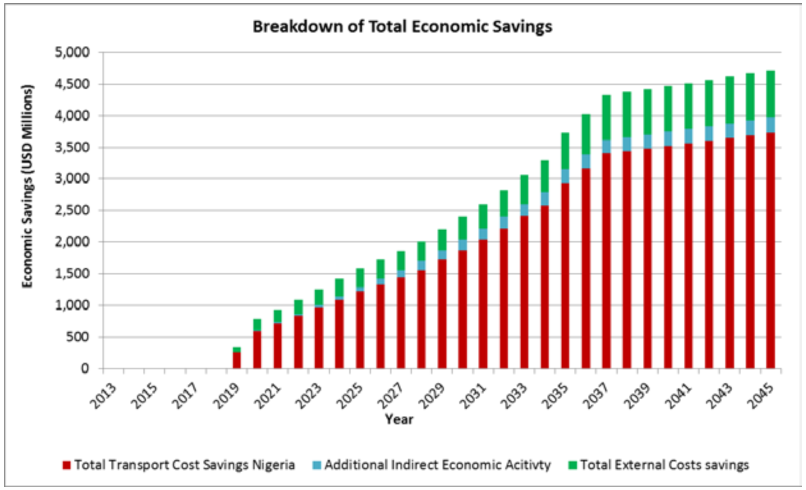


Figure 4 – Breakdown of Total Economic Savings

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Main Table of Content

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1.1 Methodological Framework: Introduction

This chapter presents the methodological Framework that is applied to the economic cost benefit analysis of Ibom DSP. Due to the complexity of the economic impact of ports, it is important to define a clear and structured methodology that corresponds with the 'Objectives and Approach' that is presented earlier in this document. This chapter presents the following components:

Step-wise Approach

The first paragraph presents the step-wise approach that is applied to the quantification of the five components of the economic cost benefit analysis for Ibom DSP. The step-wise approach describes the steps that need to be taken in order to translate the financial cash flows into economic cash flows.

Project Definition

The second paragraph presents the project definition of Ibom DSP in an economic context. The project definition distinguishes two cases: the project case and a no-project case. For both cases, the main assumptions are presented. The economic effects for both cases are a direct consequence of the assumptions set in the project definition. Ultimately, the economic impact of Ibom DSP is calculated by the determination of the difference between the project case and the no-project case.

Socio-Economic Context

The third paragraph presents the socio-economic context for Ibom DSP. The socio-economic context presents the main beneficial effect of Ibom DSP on the Nigerian economy. The main beneficial effect of Ibom DSP on the Nigerian economy is the efficiency gain in the transport costs of the country: as a result of its strategic location Ibom DSP will significantly improve the efficiency of the transport chain to East-Nigeria. This will result in significant economic savings for the Nigerian Economy.

Hypothesis

The fourth and last paragraph of this chapter presents the hypothesis of the economic cost benefit analysis for Ibom DSP. The hypothesis states that the project case has a positive effect on the Nigerian economy, implying that the benefits (direct and indirect) need to be larger than the costs (direct).

1.2 Methodological Framework: Step-wise approach to CBA

The figure on the right presents the step-wise approach that is applied towards the economic CBA for Ibom DSP. Eight steps are identified, divided over four main stages. The first stage, the so called 'vital basics', is a generic component applied to all types of costs and benefits. The other three stages, which concern the translation of the financial business case results, are conducted per individual cost component or benefit component.

In the first stage (vital basics) the project case and the alternative case are determined: the determination of the project case is essential for the approach to the input of the other three stages. Additionally, the hypothesis of the economic CBA is presented in this stage.

In the second stage, the relevant inputs from the financial feasibility analysis are incorporated in the analysis. As explained earlier, the input derived from the financial feasibility analysis focuses on the opex, capex, timing and traffic components; financial revenues are not incorporated in the economic analysis.

The third stage in the economic CBA is to translate the financial results into economic cash flows; this is done by means of conversion & allocation factors. Through conversion factors, the shadow prices of the costs and benefits are calculated. The allocation factors correct for double-counting of effects.

The last stage in the economic CBA is used to project economic cash flows. By applying the social discount rate to the economic cash flows, the Net Present Value and the economic internal rate of returns (EIRR) of the cash flows can be determined.

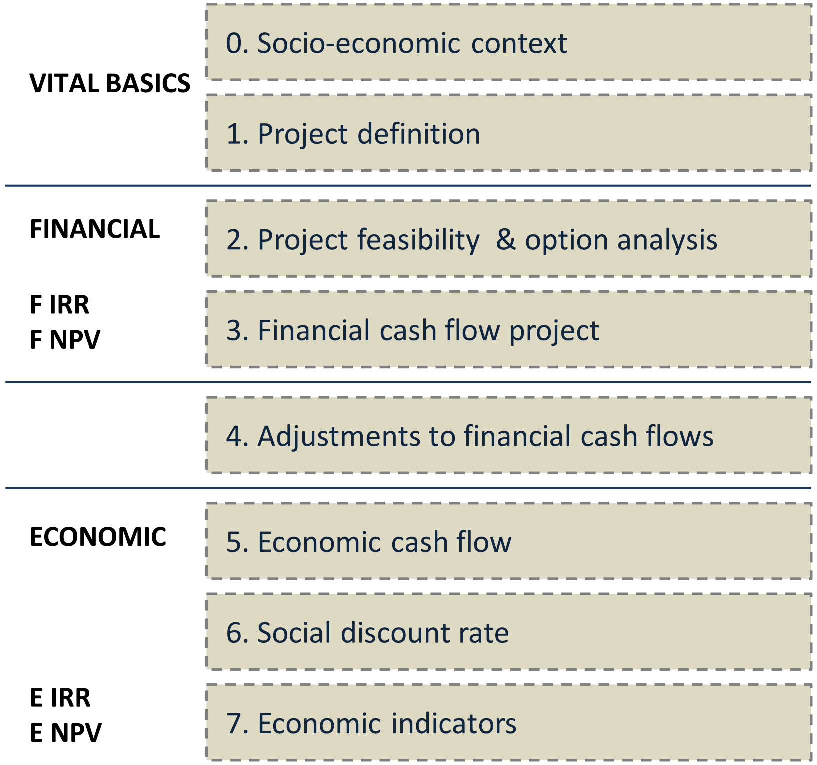

Figure 1.1 – Step-wise approach to CBA

1.3 Methodological Framework: Project Definition

Project Definition

The project definition distinguishes two cases: the project case and a no-project case. For both cases, the main assumptions are presented below. The economic effects for both cases are a direct consequence of the assumptions set in the project definition. Ultimately, the economic impact of Ibom DSP is calculated by the determination of the difference between the project case and the no-project case.

No-Project case

The no-project case assumes:

- Ibom Deep Sea port & FTZ are not developed;
- Lekki Port and Badagry Port are developed.

Subsequently, these assumptions hold:

- Division of demand for throughput between East and West conform the traffic forecast;
- Current Eastern ports (Harcourt, Onne and Calabar) handle Eastern demand up to full port capacity (expansion & efficiency improvements assumed);
- Western ports handle the remainder of the Eastern demand that cannot be handled by Eastern ports as a result of capacity restrictions.

Project case

This scenario assumes:

- Ibom Deep Sea port & FTZ are developed;
- Lekki Port and Badagry Port are developed.

Subsequently, these assumptions hold:

- Division of demand for throughput between East and West conform the traffic forecast;
- Current Eastern ports (Harcourt, Onne and Calabar) handle Eastern demand up to full port capacity (expansion & efficiency improvements assumed);
- Ibom DSP handles the remainder of the Eastern demand that cannot be handled by the current Eastern ports as a result of capacity restrictions.

1.4 Methodological Framework: Socio-Economic Contex

Socio-Economic context: Ibom DSP better positioned to serve East-Nigeria

No-Project case

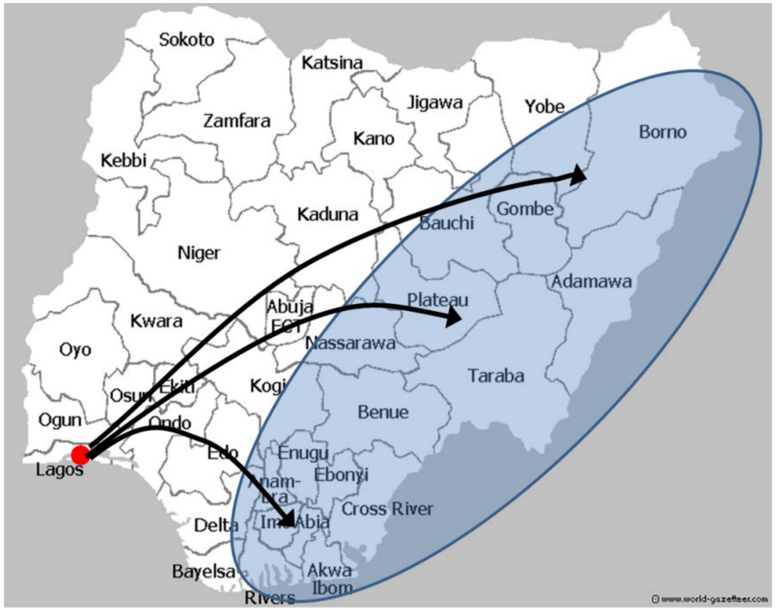

Figure 1.2 – Serving East Nigeria without Ibom DSP

Project case

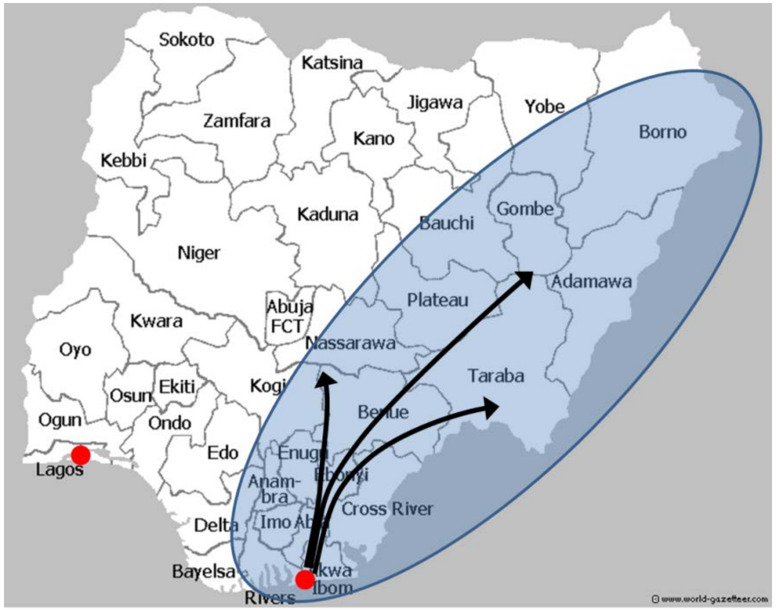

Figure 1.3 – Serving East Nigeria with Ibom DSP

The two figures represent the main difference between the No-project case and the Project case. The Ibom Deep Sea port and FTZ serve as a gateway for East-Nigeria. In the No-project case, Ibom Deep Sea port and FTZ are not developed; in this case the majority of the Eastern demand has to be served via the ports in the Lagos area. This results in hinterland transport corridors with a relatively large distance.

The Project case assumes the development of Ibom Deep Sea port and FTZ. As can be seen in the right picture, the distances of the hinterland transport corridors that run via Ibom DSP to the East are smaller in comparison to the Lagos corridors. As such, Ibom DSP is expected to create transport cost savings for the Nigerian economy. In addition, the external cost created by truck transport are expected to reduce as correspondingly.

1.5 Methodological Framework: Hypothesis

Hypothesis: transport cost savings & indirect benefits compensate for additional Capex & Opex of Ibom DSP

Ibom Deep Sea and FTZ project beneficial for economy of Nigeria, if:

The savings as a result of smaller hinterland distance to East-Nigeria and the combination of increased price competition and efficiency in port handling are larger than the additional capital costs and operations costs created by Ibom DSP.

In order to test this hypothesis, the analysis focuses on calculating the **incremental effects** of Ibom DSP on the Nigerian economy. The incremental effect is defined as the difference between the project case and the no-project case. This approach is applied in order to calculate the direct economic benefits (transport cost savings) and a component of the indirect economic benefits (external cost savings). Both components are in nature a cost the economy. By calculating the incremental effect, the **cost savings** of the project case vis-à-vis the no-project case can be calculated; this creates benefits for the economy.

No-Project case

Advantages:

- No Capex Ibom DSP;
- No Opex Ibom DSP;
- No local environmental damage in Akwa Ibom.

Disadvantages:

- Higher hinterland transport costs to East-Nigeria;
- Higher external cost of truck transport to East-Nigeria;
- Lower competition in the port sector, less incentive for competitive pricing and efficient operations in ports;
- Reduced economic activity in East-Nigeria, resulting in relatively lower total port throughput in Nigeria.

Project case

Advantages:

- Lower cost of hinterland transport to East-Nigeria;
- Lower external costs of truck transport to East-Nigeria;
- Increased competition in port sector, more incentive for price reductions and efficient operations in ports.
- Increased economic activity in East-Nigeria, which results in an overall increase of throughput in the Nigerian port sector.

Disadvantages:

- Increase of overall Capex in Nigeria;
- Increase of overall Opex in Nigeria;
- local environmental damage in Akwa Ibom

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2.1 Techniques for Quantification: Introduction

This chapter presents the techniques that are used to quantify the components of the Economic impact of Ibom DSP. As presented earlier, five components are quantified. Although all components differ significantly with respect to the detailed quantification of the effect of Ibom DSP, there is a generic technique that is applied to all components before the detailed quantification is conducted. This chapter presents the following topics:

Conversion & allocation factors: description

The first paragraph presents the implication and determination of conversion and allocation factors. As mentioned before, a vital step in the economic cost benefit analysis is to translate financial cash flows to economic cash flows. The translation of financial cash flows to economic cash flows is conducted by means of conversion & allocation factors. Through conversion factors, the shadow prices of the costs and benefits are calculated. The allocation factors correct for double-counting of effects.

Social Discount Rate

The third paragraph of this chapter presents the assumption for the social discount rate. The social discount rate is a vital assumption for the economic cost benefit analysis. The social discount rate determines the discount rate that is used to calculate the net present values of the cash flows. According to the PPP-manual of Nigeria and international best practice standards, the net present value of the economic cash flow of a project determines the economic impact. As such, the social discount rate is an important assumption in the quantification of the economic impact of Ibom DSP.

2.2 Techniques for Quantification: conversion & allocation factors

Conversion & allocation factors: description

This paragraph presents the implication and determination of conversion and allocation factors. As mentioned before, a vital step in the economic cost benefit analysis is to translate financial cash flows to economic cash flows. The translation of financial cash flows to economic cash flows is conducted by means of conversion & allocation factors. Through conversion factors, the shadow prices of the costs and benefits are calculated. The allocation factors correct for double-counting of effects. An elaboration of both factors is presented below.

Conversion factors:

The financial feasibility is based on market prices. When market prices do not reflect the social opportunity cost of inputs and outputs, the usual approach is to convert them into accounting prices using appropriate conversion factors. Reasons that the market prices do not accurately reflect the social opportunity costs of input and output can be:

- Inefficient markets; or
- Setting non cost-reflective tariffs on public services.

The adjustment to accounting prices is in general substantial for wages and for fiscal corrections. Typically in an economy characterised by extensive unemployment or underemployment, the opportunity cost of labour used in the project may be less than the actual wage rates.

Allocation factors:

The net present values of the economic costs need to be allocated to the Nigerian economy. Not all costs can be allocated to the Nigerian economy, as some of the expenses create economic benefits for the Nigerian economy.

Example: a share of the overall capex of Ibom is spent within Nigeria (construction, transport of materials etc.). As such, this share of the capex does not create an economic cost for the Nigerian economy. Other components of the capex, such as materials and equipment, are spent outside Nigeria. These components are therefore accounted for as costs for the Nigerian economy.

For every component of the economic CBA, an allocation factor is assumed based on a qualitative argumentation.

2.4 Technique of Quantification: Social Discount Rate

Motivation for discounting

The Nigerian PPP-Manual (September 2012) indicates that the result of the economic cost benefit analysis should be expressed in Net Present Value terms (NPV henceforth), accompanied by an economic internal rate of return (EIRR henceforth). In order to calculate the net present value of the economic costs and benefits, the cash flows of the various components need to be discounted. The applied discount factor is known as the social discount rate: the social discount rate should reflect the social view on how future benefits and costs are to be valued against present ones.

Assumptions for social discount rate

The social discount rate (r) is generally calculated by the formula presented in the table below; r = e * g + p. The term 'e' represents the elasticity of marginal social welfare with respect to public expenditure. This term is generally between 1 and 2, in which 1 represents a low elasticity and 2 a high elasticity of social welfare with respect to public expenditure. A low elasticity implies that for every additional dollar spent by public authorities, the social welfare increases only marginally. In contrast, an elasticity close to 2 implies a strong increase in social welfare in case of increased public spending. Given the size of the Nigerian economy, the elasticity of public spending is naturally limited in comparison to smaller countries. However, there is still significant progress to be made in social welfare. As such, the elasticity of social welfare with respect to public spending is set at 1.5.

The term 'g' represents the growth rate of public expenditure, this effect is estimated by means of using a proxy: the real GDP growth rate. For the average real GDP growth rate in the next 30 years, the assumption has been set at 6%. This is slightly lower than the real GDP growth rate in recent years, yet for an average for a period of 30 years the assumption of 6% can still be considered relatively optimistic.

The term 'p' represents the rate of pure time preference; this term is called the 'dead rate' since it is additional and independent of the other factors. The dead rate is set at 1%, which is conform the generally applied values in economic CBAs. As a result of the three assumptions, the social discount rate can be calculated. For the economic CBA of the Ibom Deep Sea port and Free Trade Zone project, a social discount rate of 10% is assumed.

Table 2.1 – Establishing the Social Discount Rate

	Factor	Description	Assumed value
e	elasticity of marginal social welfare with respect to public expenditure	In general between 1 and 2	1.5
g	growth rate of public expenditure	Based on real GDP growth rate	6%
p	rate of pure time preference	Dead rate	1%
r	**social discount rate**	**r = eg + p**	**10%**

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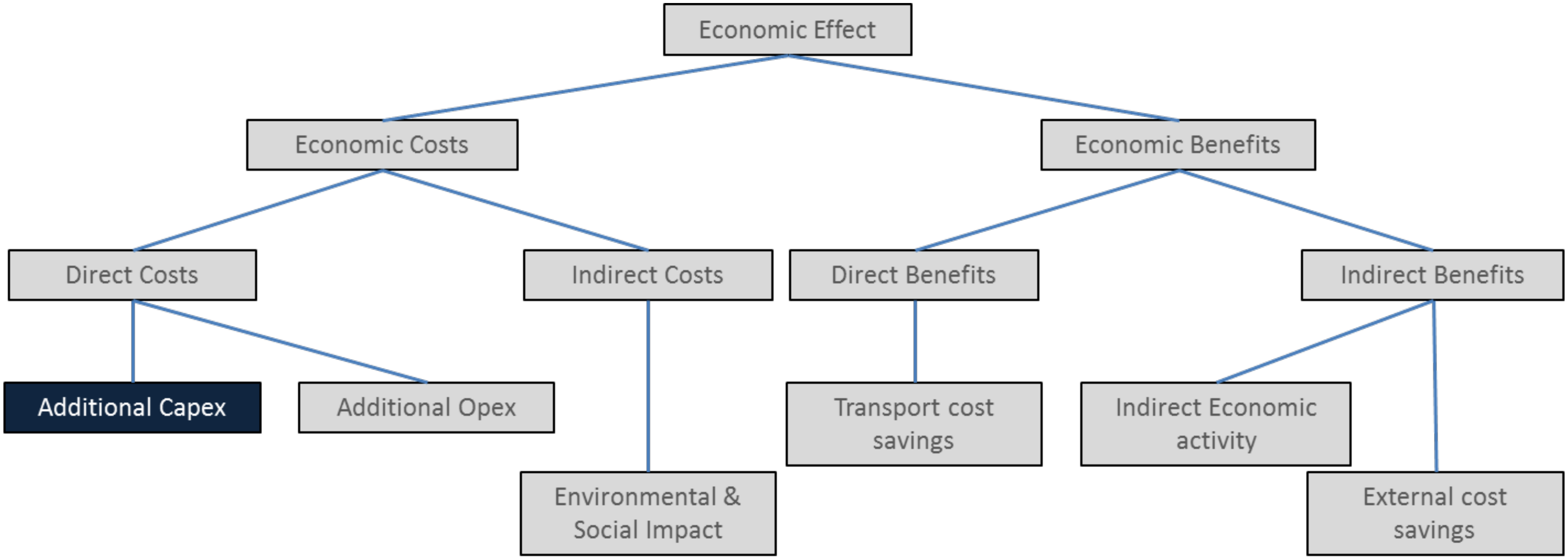
3.1 Quantification of Additional Capex: Introduction



This chapter presents the quantification of the first component of the direct economic cost: the additional capex as a result of Ibom DSP. The chapter contains the following paragraphs:

Main Assumptions

The first paragraph presents the main assumptions for project case and the no-project case

Conversion & Allocation Assumptions

The second paragraph presents the assumptions for conversion & allocation per cost component: infrastructure, superstructure and equipment

Results

The third paragraph presents the outcome of the analysis and the interpretation of the results.

3.2 Quantification of Additional Capex: main assumptions

No-Project case:

Port of Lekki:

- Total capex: 1.55 billion USD;
- Start year construction: 2014;
- End year construction: 2016;
- Capex division over years: 0.33-0.33-0.33.

Port of Badagry:

- Total capex: 2 billion USD;
- Start year construction: 2015;
- End year construction: 2017;
- Capex division over years: 0.33-0.33-0.33.

Project case:

Ibom DSP:

- Conform investment plan in the financial business case

Port of Lekki:

- Total capex: 1.55 billion USD;
- Start year construction: 2014;
- End year construction: 2016;
- Capex division over years: 0.33-0.33-0.33.

Port of Badagry:

- Total capex: 2 billion USD;
- Start year construction: 2015;
- End year construction: 2017;
- Capex division over years: 0.33-0.33-0.33.

The capex assumptions for the ports of Lekki and Badagry only include the initial capex: there is no assumption made for expansions. As a result of this, the quantification is an understatement of the actual effect of Ibom DSP. It can be expected that the two other ports will conduct their expansions at a later stage as a result of the lower demand due to the presence of Ibom DSP.

The fact that the expansion-related investments in the Project case are conducted at a later point in time than the expansion-related investments in the No-Project case, implies that the Net Present Value of the expansion-related investments in the Project case are lower than in the No-Project case. Since expansion-related investments are not incorporated, the capex-effect in the economic CBA is an understatement of the actual effect of Ibom DSP.

3.3 Quantification of Additional Capex: Conversion & Allocation

<u>Conversion Factors:</u>

Conversion factors are only defined for the capex for Ibom DSP. No assumptions are made for the capex of Lekki & Badagry, since there is no difference between the two scenarios (project vs no-project) with respect to the capex of Lekki & Badagry.

Infrastructure Investments: 0.95

The conversion factor for infrastructure investments is set at 0.95 because of the small share of Nigerian labour that is used in the infrastructure construction.

Superstructure Investments: 0.95

The conversion factor for superstructure investments is set at 0.95 because of the small share of Nigerian labour that is used in the superstructure construction.

Equipment Investments: 1.00

The conversion factor for equipment investments is set at 1.0, because it is not assumed that a significant share of equipment investments is spent on (subsidized) Nigerian equipment.

Project Preparation: 1.00

The conversion factor for equipment investments is set at 1.0, because the project preparation will primarily require high-skilled labour. Since this labour group generally has a lower unemployment rate than low-skilled labour, the conversion factor for this project preparation is set at 1.0.

<u>Allocation Factors:</u>

Allocation factors are only defined for the capex for Ibom DSP. No assumptions are made for the capex of Lekki & Badagry, since there is no difference between the two scenarios (project vs no-project) with respect to the capex of Lekki & Badagry.

Infrastructure Investments: 0.70

Due to the expectation that a significant share of the infrastructure construction or connected services is conducted by Nigerian firms, the allocation factor for infrastructure investments is set at 0.7.

Superstructure Investments: 0.70

Due to the expectation that a significant share of the superstructure construction or connected services is conducted by Nigerian firms, the allocation factor for superstructure investments is set at 0.7.

Equipment Investments: 0.95

Due to the expectation that only a minor share of all equipment investments takes places within Nigeria, the allocation factor for equipment investments is set at 0.95.

Project Preparation: 0.75:

Due to the fact that a significant share of the project preparation activities is conducted by Nigerian firms, the allocation factor for projection preparation is set at 0.75.

3.4 Quantification of Additional Capex: Outcomes

The financial costs of the capital investments of Ibom DSP & FTZ project are estimated at approximately 8.6 billion USD, or a Net Present Value amount of approximately 2.03 billion USD.

The economic costs of the Ibom Deep Sea port & FTZ project are estimated at 1.76 billion USD. The economic costs are derived by multiplying the assumed allocation factors and conversion factors with the financial Net Present Value amounts.

The equipment investments create the largest economic costs for the Nigerian economy. Despite the fact that the financial costs of infrastructure and superstructure investments are higher, the equipment investments create a larger cost. This due to the fact that almost all (95%) of equipment investments are spent outside Nigeria, whereas a significant share of the infrastructure investments and superstructure investments are spent within Nigeria (30% for both components).

The majority of the capital investments in conducted in the first five years. After the first five years, periodic re-investments and expansion investments are conducted.

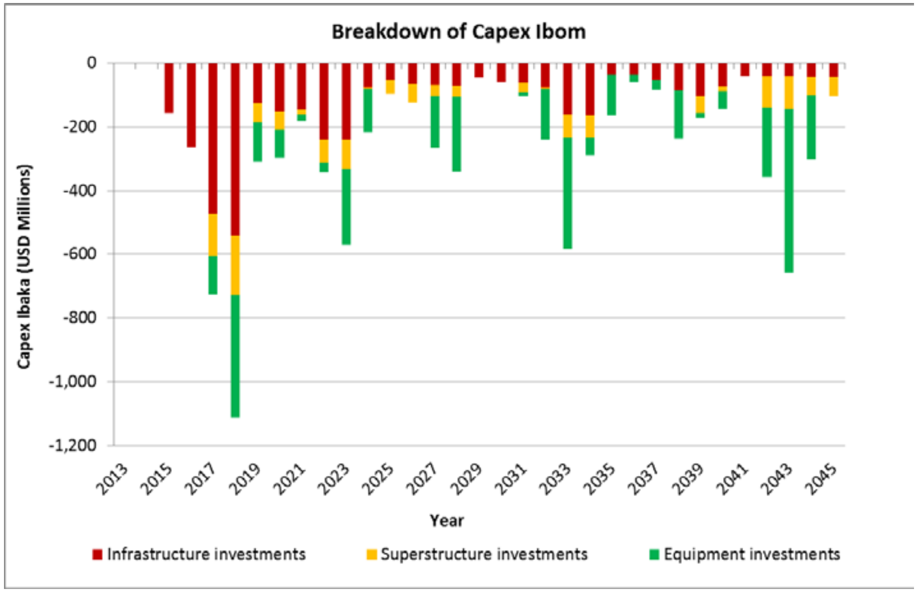


Figure 3.1 – Breakdown of Capex Ibom DSP

Table 3.1 – Economic quantification of Capex Ibom DSP (mio USD)

quantification	Allocation	Conversion Factor	NPV (adjusted)	NPV	Total 30(y)
Infrastructure investments	0.70	0.95	(1,017)	(1,529)	(3,848)
Superstructure investments	0.70	0.95	(270)	(406)	(1,353)
Equipment investments	0.95	1.00	(746)	(785)	(3,442)
Additional Capex Ibom DSP	**-**	**-**	**(2,032)**	**(2,720)**	**(8,644)**

Amounts in million USD

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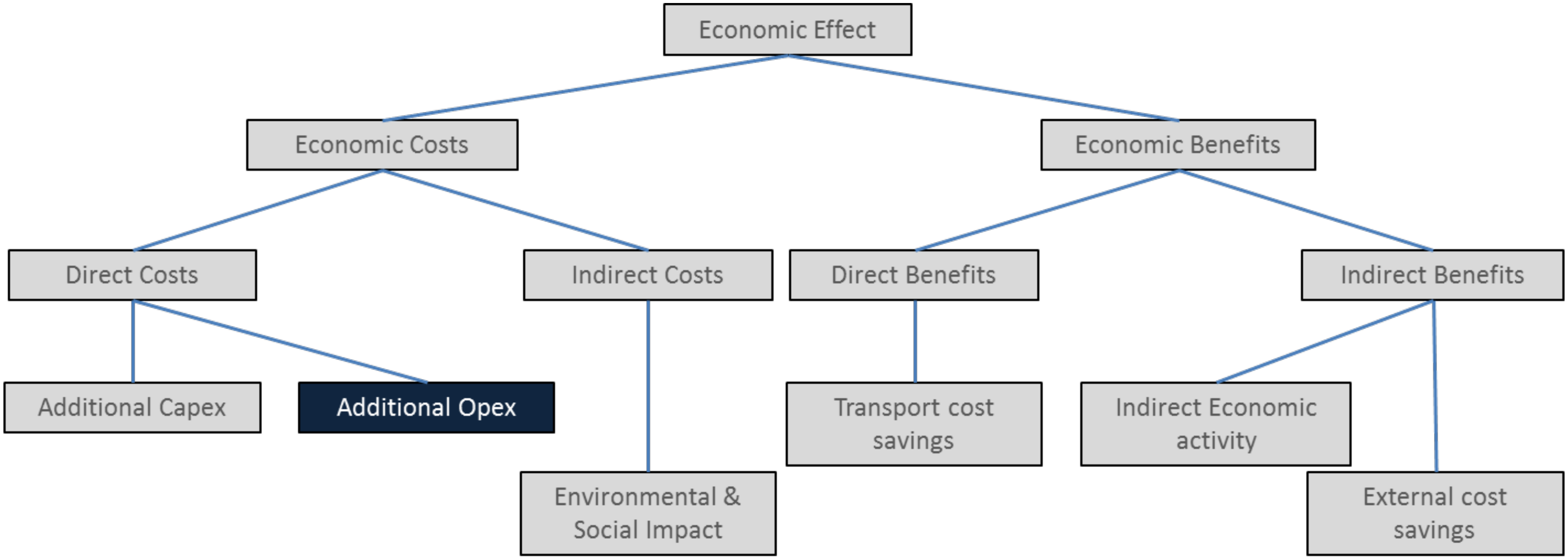
4.1 Quantification of Additional Opex: Introduction



This chapter presents the quantification of the second component of the direct economic cost: the additional opex as a result of Ibom DSP. The chapter contains the following paragraphs:

Main Assumptions

The first paragraph presents the main assumptions for project case and the no-project case.

Conversion & Allocation Assumptions

The second paragraph presents the assumptions for conversion & allocation per cost component: labour, fuel & electricity, maintenance, insurance and other costs

Results

The third paragraph presents the outcome of the analysis and the interpretation of the results.

4.2 Quantification of Additional Opex: main assumptions

No-Project case:

Traffic assumptions port of Lekki & Badagry:

Western ports handle the Western demand and the remainder of the Eastern demand that cannot be handled by Eastern ports as a result of capacity restrictions.

In order to estimate the Opex of the two other port projects, Opex-ratios are derived from the business case of Ibom DSP. The following ratios are derived and assumed for the opex calculations for the ports of Lekki & Badagry:

- Labour: gradually decreasing from 4.43 USD per ton throughput in 2019 to 2.6 USD per ton throughput in 2035 due to economies of scale;
- Fuel & Electricity: gradually decreasing from 1 USD per ton throughput in 2019 to 0.92 USD per ton throughput in 2035 due to economies of scale;
- Maintenance: step-wise increasing from 1.5 USD per ton throughput in 2019 to 4.3 USD per ton throughput in 2025, step wise reduction to 2.6 USD per ton in 2035. Step-wise increase due to investments ahead of demand, reduction due to economies of scale;
- Insurance: gradually decreasing from 1.92 USD per ton throughput in 2019 to 0.74 USD per ton throughput in 2035 due to economies of scale;
- Overhead: gradually decreasing from 2.93 USD per ton throughput in 2019 to 2.15 USD per ton throughput in 2035 due to economies of scale;

No-Project case:

Traffic assumptions port of Lekki & Badagry:

Western ports handle the Western demand.

Opex Ibom DSP:

- Conform financial business case

In order to estimate the Opex of the two other port projects, Opex-ratios are derived from the business case of Ibom DSP. The following ratios are derived and assumed for the opex calculations for the ports of Lekki & Badagry:

- Labour: gradually decreasing from 4.43 USD per ton throughput in 2019 to 2.6 USD per ton throughput in 2035 due to economies of scale;
- Fuel & Electricity: gradually decreasing from 1 USD per ton throughput in 2019 to 0.92 USD per ton throughput in 2035 due to economies of scale;
- Maintenance: step-wise increasing from 1.5 USD per ton throughput in 2019 to 4.3 USD per ton throughput in 2025, step wise reduction to 2.6 USD per ton in 2035. Step-wise increase due to investments ahead of demand, reduction due to economies of scale;
- Insurance: gradually decreasing from 1.92 USD per ton throughput in 2019 to 0.74 USD per ton throughput in 2035 due to economies of scale;
- Overhead: gradually decreasing from 2.93 USD per ton throughput in 2019 to 2.15 USD per ton throughput in 2035 due to economies of scale;

4.3 Quantification of Additional Opex: conversion and allocation

Conversion factors:

Labour conversion factor: 0.70

This assumption is supported by the relatively high unemployment rate in Nigeria. Due to the high unemployment rate, the economic cost of labour is lower than the financial cost of labour.

Fuel & Electricity conversion factor: 1.25

At this moment, fuel& electricity are stull subsidized by the Nigerian government. As such, the economic cost of fuel & electricity is higher than the financial cost of fuel & electricity.

Maintenance, Insurance and other expenses: 1.00

For the remaining three operational cost components, no significant subsidies are in place. As such, the conversion factor is set at 1.

Table 4.1 – Allocation & Conversion factors for Opex Ibom DSP

	Allocation factor	Conversion Factor
Labour expenses	0.60	0.70
Fuel & Electricity	0.80	1.25
Maintenance	0.33	1.00
Insurance expenses	0.75	1.00
Other expenses	0.70	1.00

Allocation factors:

Labour allocation factor: 0.50

It is expected that approximately 50% of the labour costs is spent outside Nigeria (white collar mainly). As a result, the total labour costs are accounted for 60% as a cost for the Nigerian economy.

Fuel & Electricity: 0.70

Although Nigeria has significant fuel & electricity production plants, most fuel & electricity is imported or produced by foreign firms within Nigeria. As such, 70% of the fuel & electricity costs are allocated as a cost to the Nigerian economy.

Maintenance: 0.33

The allocation factor for maintenance is set at 0.33, since it is expected that most maintenance will be conducted by Nigerian firms. However, some parts such as infrastructure maintenance and maintenance for special equipment will still be conducted by foreign firms.

Insurance expenses: 0.75

Given the expectation that most infrastructure will be insured via foreign banks, the allocation factor for insurance is relatively high: 0.75.

Other expenses: 0.70

A general allocation factor is assumed here for analytical purposes: 0.7.

4.4 Quantification of Additional Opex: Outcomes

The overall economic cost of the additional Opex of Ibom DSP is estimated at approximately 26 million USD. This amount is the combination of the operational expenses of the Ibom DSP Project and the net savings of the operational expenses in the ports of Lekki and Badagry that are the result of the lower traffic in these two ports.

The economic cost of the additional opex is derived from the financial business case, which estimated the total operational expenses in Ibom DSP at 10.9 billion USD (1.4 billion USD NPV). When properly allocated and converted, the economic costs NPV of the Ibom DSP Opex is estimated at 743million USD.

The economic savings of operational expenses in the port of Lekki and Badagry are estimated at approximately 717 million USD. This saving is the result from the lower throughput in these ports due to the competition with Ibom DSP. The saving in the opex of Lekki and Badagry is lower than the cost of the operational expenses in Ibom DSP.

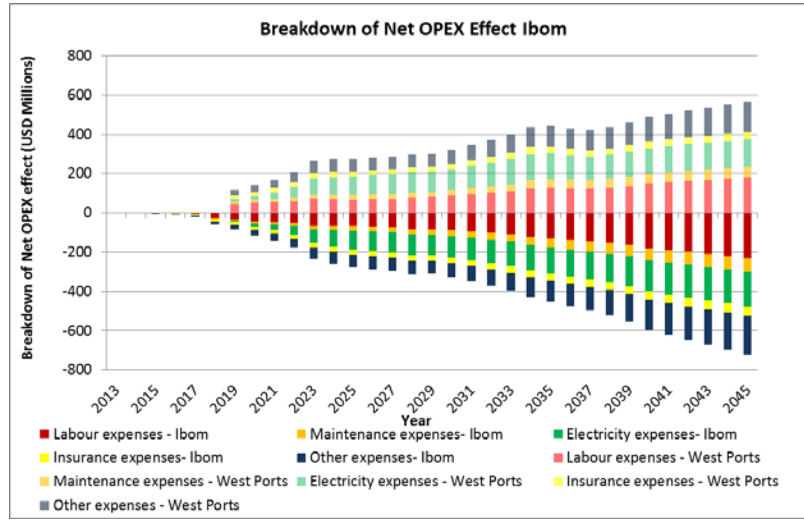


Figure 4.1 – Breakdown of net Opex effect Ibom DSP

Table 4.2 – Economic quantification of Opex Ibom DSP (mio USD)

	Allocation	Conversion Factor	NPV (adjusted)	NPV	Total 30(y)
Opex West ports (savings)			717	1,364	9,843
of which:					
Labour expenses	0.50	0.70	137	393	2,865
Fuel & Electricity	0.70	1.20	103	123	944
Maintenance	0.60	1.00	233	389	2,807
Insurance expenses	0.60	1.00	81	135	824
Other expenses	0.50	1.00	162	324	2,401
Opex Ibom DSP			-743	-1,419	-10,912
of which:					
Labour expenses	0.50	0.70	-145	-416	-3,202
Fuel & Electricity	0.70	1.20	-104	-124	-1,046
Maintenance	0.60	1.00	-235	-392	-3,071
Insurance expenses	0.60	1.00	-89	-148	-912
Other expenses	0.50	1.00	-169	-339	-2,680
Additional Opex Ibom DSP			**(26)**	**(55)**	**(1,069)**

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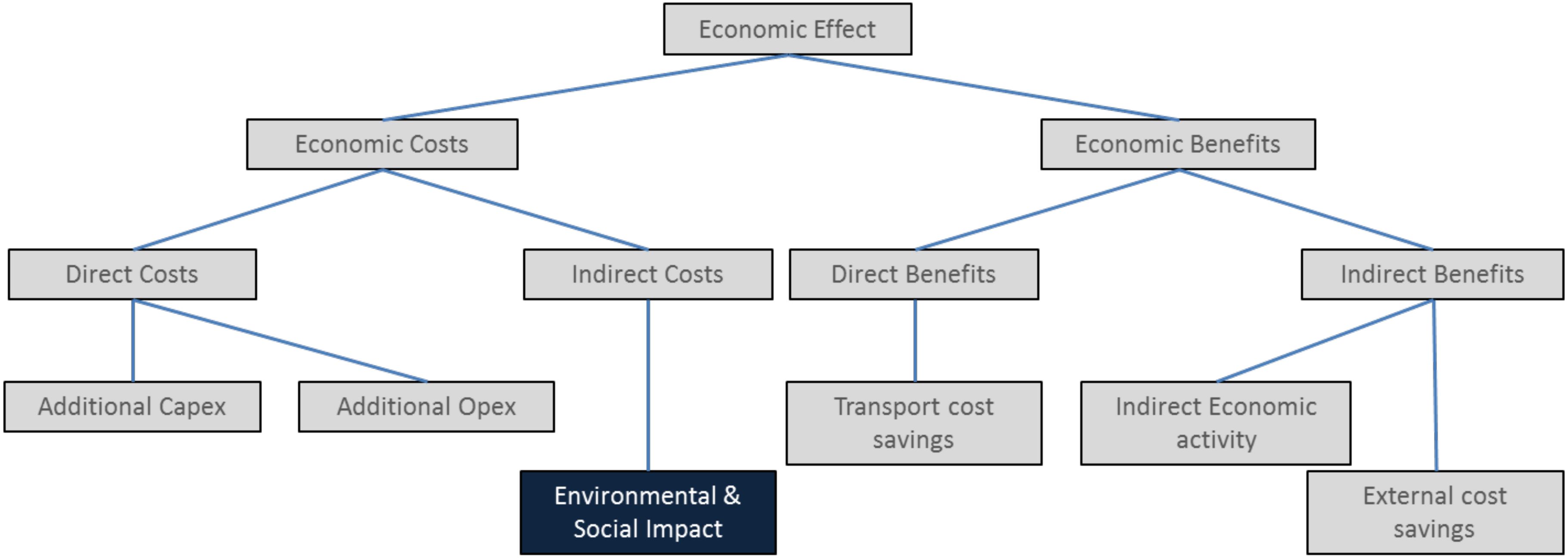
5.1 Indirect Costs: Introduction



This chapter presents the qualitative approach to the indirect economic cost created by the Ibom Deep Sea Port. The indirect costs of the Ibom Deep Sea Port Project consist of Environmental & Social impacts. The chapter contains the following paragraphs:

Main Assumptions

The first paragraph presents the main assumptions for project case and the no-project case.

Analytical Framework

The second paragraph presents the analytical framework for the Indirect Cost Estimation.

Preliminary Results

The third paragraph presents the preliminary outcomes of the indirect cost estimation.

5.2 Indirect Costs: Main Assumptions

No-Project case:

Indirect costs related to the ports of Lekki & Badagry:

No cost estimation drafted in this analysis. in line with the Capex assumptions , the indirect cost analysis assumes that there is no difference between the two cases with respect to the construction scope of the ports of Lekki and Badagry. As such, there is no marginal cost difference between the two project cases.

Indirect costs related to Ibom Deep Sea Port:

In the No-Project case, Ibom Deep Sea Port is not constructed and hence no indirect costs are created In the construction area of Ibom Deep Sea port.

No-Project case:

Indirect costs related to the ports of Lekki & Badagry:

No cost estimation drafted in this analysis. in line with the Capex assumptions , the indirect cost analysis assumes that there is no difference between the two cases with respect to the construction scope of the ports of Lekki and Badagry. As such, there is no marginal cost difference between the two project cases.

Indirect costs related to Ibom Deep Sea Port:

In the Project case, Ibom Deep Sea Port is constructed and hence indirect costs are created In the construction area of Ibom Deep Sea port. The indirect costs are estimated on the basis of the Environmental and Social Impact Assessment (ESIA) scoping that is presented in the supporting documents of the Outline Business Case for the Ibom Deep Sea Port.

The boxes above preset the setting for the indirect cost analysis. The indirect costs for the Nigerian economy are equal to the indirect costs related to the construction of Ibom Deep Sea Port. Since a difference between the two cases with respect to the construction scope for the greenfield ports of Lekki and Badagry is not assumed, there is no marginal difference in indirect effects as a result of construction of these ports. Hence, the net effect of indirect costs is equal to the indirect costs related to the Ibom Deep Sea Port.

The indirect effects are not subject to discounting and allocation calculations. The allocation of indirect costs is inherently equal to 1; the indirect effects consist of local environmental & social costs. As such, the indirect costs are solely allocated to the Nigerian economy.

The discounting rate of indirect costs is set to 0, which implies that no discounting takes place. This assumption is based on the notion that there is no 'time preference' for the value of nature or social heritage. As such, the natural and social resources that are affected by Ibom Deep Sea Port can be regarded as a 'steady state' resource (this approach is applied more often in economic CBAs).

5.3 Indirect Costs: Analytical Framework

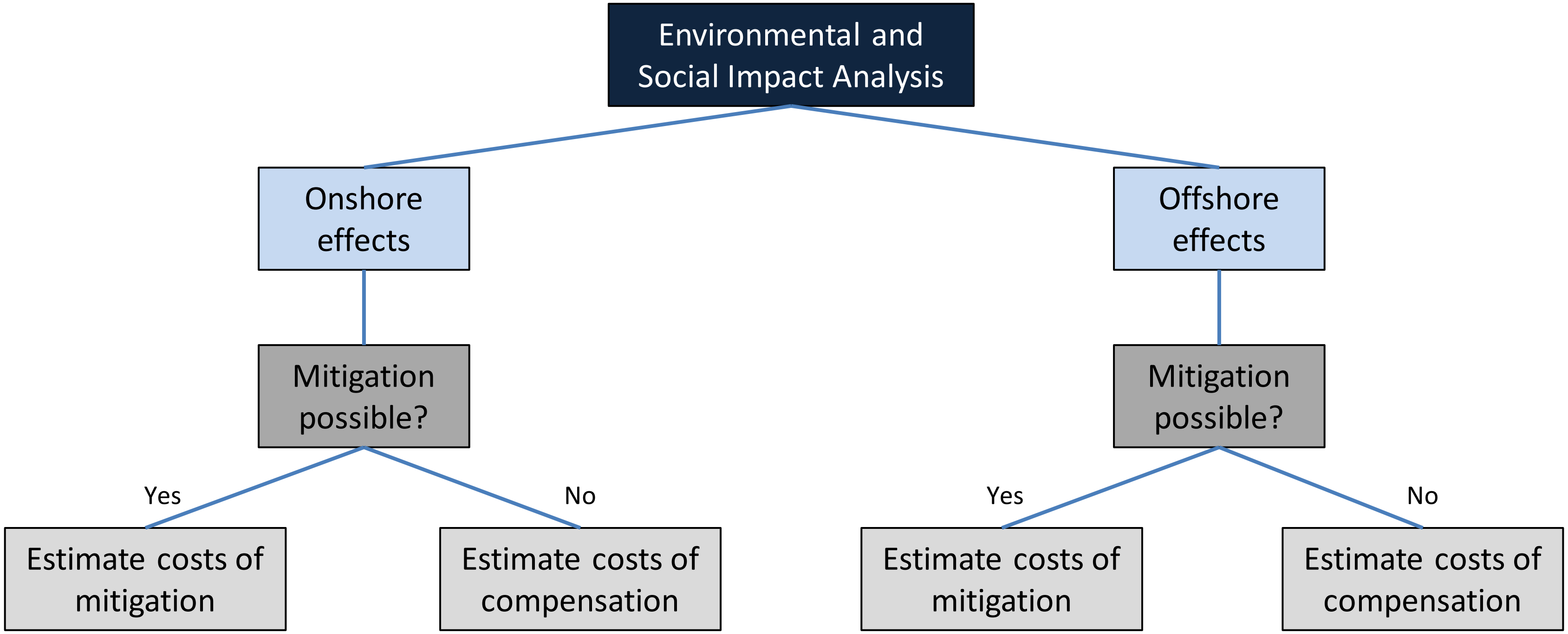


Figure 5.1 – Analytical framework for indirect costs

The figure above presents the analytical framework for the indirect cost estimation. The indirect costs are estimated by means of an environmental and social impact analysis (ESIA). For the full scoping of the ESIA, reference is made to the ESIA document in the supporting documents of the Outline Business Case for the Ibom Deep Sea Port.

Two types of effects are identified: onshore effects and offshore effects. To both type of effects, a similar structural approach is applied. First, the possibility of mitigation of the indirect cost is assessed per component. If mitigation is possible, the costs for mitigation measures is assessed. In case there is no possibility for cost mitigation, the costs related to compensation of affected parties is estimated.

Since the full ESIA is yet to be conducted, the cost estimation is preliminary and has a relatively high error margin (+/- 30%). Despite the preliminary nature, The results of the indirect cost estimation provide insight in the magnitude of the indirect cost. In addition, the preliminary results give insight in the mitigation measures that need to be undertaken, as well as the compensation that must be provided.

5.3 Indirect Costs: Preliminary results

The preliminary cost estimation of the indirect effect of the Ibom Deep Sea Port is presented in the table below. The indirect costs are estimated at approximately 31 million USD (error margin +/- 30%). For all components that can be mitigated, the anticipated mitigation measure is presented. The only component that cannot be mitigated is the cultural heritage: a sum 0f 50,000 USD is required for compensation.

Table 5.1 –Overview Indirect Costs Ibom DSP

Component	Mitigation possible?	Estimated Costs (USD) Mitigation	Estimated Costs (USD) Compensation	Type of measures for mitigation
Onshore				
Surface and ground water	Yes	700,000	0	Procurement of booms and skimmers
Vegetation and flora	Yes	750,000	0	Creating wildlife sanctuary
Fauna and habitats	Yes	800,000	0	Creating wildlife sanctuary
Air	Yes	50,000	0	Dust control and enlightenment
Noise & vibration	Yes	60,000	0	Noise barriers and public enlightenment
Light pollution	Yes	50,000	0	Light barriers and public enlightenment
Soil	Yes	100,000	0	Impacted soil remediation after construction works
Landscape	Yes	500,000	0	Street and roadside tree planting in the whole complex and 30km link road
Cultural heritage resources	No	50,000	50,000	
Traffic & Transport	Yes	300,000	0	Public enlightenments, training and retraining of drivers, additional road furniture for safety
Demographic & population	Yes	6,000,000	0	Provision of staff housing, etc, to alleviate burden on existing accommodation in the area
Land use and development	Yes	3,500,000	0	Physical resettlement of PAP
Socio-cultural institutions and Government Administration	Yes	1,600,000	0	Fees for environmental monitoring and reporting; and periodic visits of the team of federal, state & local environmental regulators
Livelihoods and Micro-Economic	Yes	1,500,000	0	Skill acquisition trainings, especially in fish processing and preservation; and micro-credits
Social infrastructure	Yes	2,500,000	0	Borehole water schemes, schools rehabilitation, markets
Community health	Yes	5,000,000	0	Establishment of new or rehabilitation of existing healthcare facilities in the 2 LGAs, public enlightenment campaigns on disease prevention
Waste management	Yes	4,500,000	0	Waste (solid and liquid) handling facilities: landfill and sewage treatment
Sub-total		***27,960,000***	***50,000***	
Offshore				
Sediments & water quality	Yes	400,000	0	Education of dredging crews and close monitoring of dredging activities
Habitats	Yes	100,000	0	Education of dredging crews and close monitoring of dredging activities
Fish and other commercially interesting species	Yes	100,000	0	Education of dredging crews and close monitoring of dredging activities
Marine cultural heritage	No	0	0	
Socio-economics	Yes	2,000,000	0	Provision of training on modern fishing techniques equipment for local fishermen since they will have to go deeper into the sea for fishing
Sub-total		***2,600,000***	***0***	
TOTAL		30,560,000	50,000	

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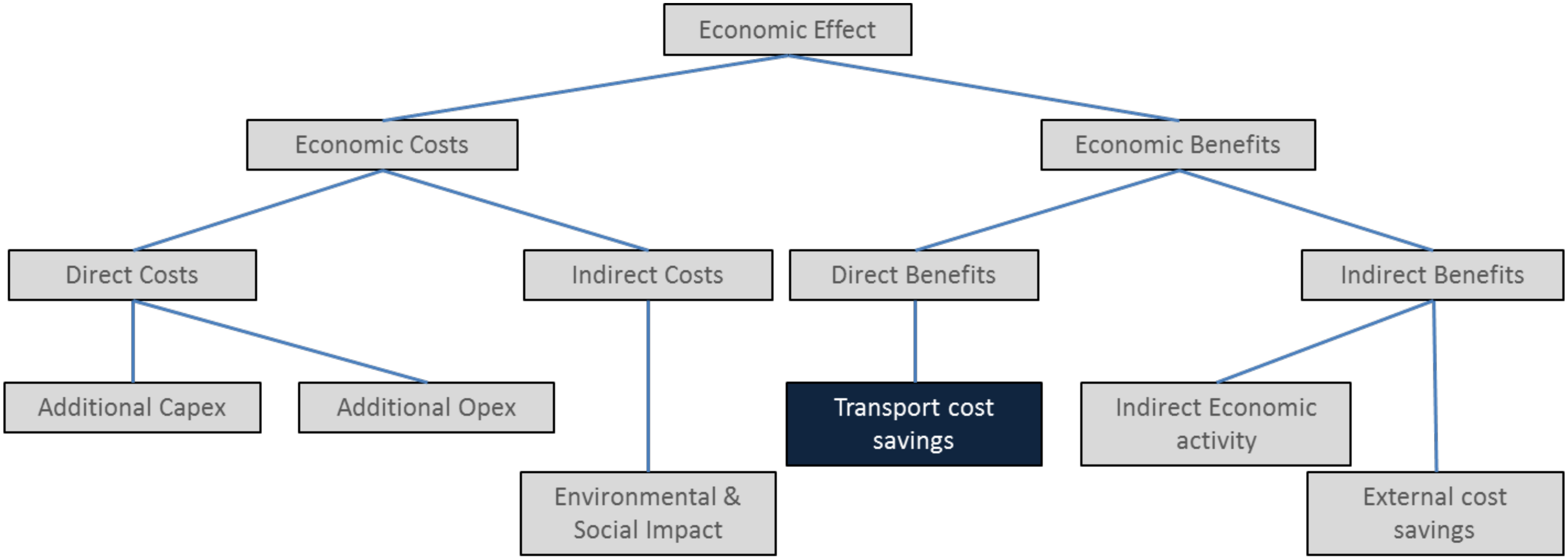
6.1 Quantification of Transport Cost Savings: Introduction



This chapter presents the quantification the direct benefits: the transport cost savings that are the result of the strategic location of Ibom DSP in East-Nigeria. This chapter consists of the following paragraphs:

Summary of Transport Cost Savings

The first paragraph presents the main assumptions, the conversion & allocation factors and the outcome for the three types of transport cost savings; maritime transport cost savings, port handling cost savings and hinterland transport cost savings.

Quantification of Maritime Transport Cost Savings

The second paragraph presents the detailed assumptions and outcomes for the maritime transport cost savings.

Quantification of Port Handling Cost Savings

The second paragraph presents the detailed assumptions and outcomes for the port handling cost savings.

Quantification of Hinterland Transport Cost Savings

The second paragraph presents the detailed assumptions and outcomes for the hinterlandtransport cost savings.

6.2.1 Quantification of transport cost savings: main assumptions

The logistic chain for trade to and from East-Nigeria consists of three components. The three components are analyzed individually in order to assess the effect of Ibom DSP on the total transport chain accurately. The following three components are defined and analyzed:

Maritime transport leg costs:

- Project case: Ibom DSP is expected to attract a significant share of the Nigerian traffic to East-Nigeria at the expense of the amount of traffic to Western ports. This creates a delta in the marine transport distance; European routes have a slightly higher distance to Ibom DSP than the Lagos ports, whereas Ibom DSP is closer to the main routes from Asia.
- No-project case: all excess demand for cargo handling services from East-Nigeria is handled by Western ports. The Western ports have a relatively large distance to the main Asian routes, which creates additional costs in the transport chain. On the other hand, the Western ports have an distance-advantage for cargo from Europe.

Port handling costs:

- Project case: Ibom DSP is expected to create increased competition in the Nigerian port sector. Consistent with the assumption in the financial business case, the economic CBA assumes that this will lead to a significant reduction in port tariffs. The reduced port tariffs apply to all cargo segments (different assumptions per cargo segment) and ports.
- No-project case: the Nigerian port sector without Ibom DSP is characterized by lower competition relative to the port sector with Ibom DSP. As a result, the downward pressure on port tariffs is smaller. The price reduction as a result of competition is 50% lower in the no-project case than in the project case.

Hinterland transport leg costs:

- Project case: Ibom DSP handles the excess Eastern demand (current ports in East-Nigeria assumed to attain full utilization, even after expansion). The hinterland transport costs are quantified by the following formula: weighted average distance from Ibom DSP to East-Nigeria (km) * East-Nigerian demand (tons) * transport costs (USD per ton/km).
- No-Project case: the western ports handle the excess Eastern demand (current ports in East-Nigeria assumed to attain full utilization, even after expansion). The hinterland transport costs are quantified by the following formula: weighted average distance from Lagos to East-Nigeria (km) * East-Nigerian demand (tons) * transport costs (USD per ton/km).

6.2.2 Quantification of transport cost savings: conversion & allocation

This section presents the assumptions for the conversion factors and allocation factors for the quantification of the transport cost savings. Conversion factors and allocation factors are assumed per component of the logistic chain in order to increase the relevance of the quantification. This individual approach is required due to the significant differences in the three components: the three components are all characterized by specific production factors and origin of businesses.

Conversion factors:

Maritime transport leg costs: 1.0

Subsidies on maritime transport in Nigeria or abundances of production factors in the maritime transport sector have not been identified . As such, a conversion factor of 1 is assumed.

Port handling costs: 1.0

Subsidies on maritime transport in Nigeria or abundances of production factors in the port sector additional to ones corrected for in the operational expenses have not been identified. As such, a conversion factor of 1 is assumed.

Hinterland transport costs: 1.1

The hinterland transport sector is indirectly subsidized by the government through the subsidies on fuel. As such, the economic costs of hinterland transport are higher then the prices levied by transport firms. This higher economic cost is accounted for by a conversion factor of 1.1.

Allocation factors:

Maritime transport leg costs: 0.5

The port statistics of the NPA show that 90% of the vessels entering Nigerian ports are non-Nigerian. As such, economic cost of maritime transport can be allocated for 90% to the Nigerian economy.

Port handling costs: 0.5

The port handling costs are set at 0.7; it is assumed that 30% of the turnover in the Nigerian port sector is generated by Nigerian firms. The other 70% is generated by foreign firms (APMT, ICTSI, Intels etc.); this share can be allocated as a cost to the Nigerian economy.

Hinterland transport costs: 0.3

The hinterland transport sector is an important source for labour: the high truck intensity in Nigeria implies that a lot of jobs are lost when the overall demand for hinterland transport reduces. As such, the allocation factor of the savings made in the hinterland transport sector is relatively low: 0.3.

6.2.3 Quantification of Transport Cost Savings: Outcome

The total transport cost savings as a result of the Ibom Deep Sea port & Free Trade Zone are estimated at approximately 7.18 billion USD (NPV). When corrected for allocation and conversion factors, the Net Present Value is estimated at 2.81 billion USD.

The majority of the savings are created in the hinterland transport sector. Although this sector has a relatively low allocation factor (due to the loss of labour), the adjusted NPV is estimated at 1.51 billion USD for the period 2013-2045. The effect of Ibom DSP on hinterland transport costs is in line with the main hypothesis: a gateway in East-Nigeria leads to significant improvements in the overall efficiency of Nigeria's import and export flows.

The second main saving component is the port handling sector: the savings in this sector are estimated at approximately 1.3 billion USD for the period 2013-2045. This effect is the result of the improved competition created by Ibom DSP. Although only 50% of the port handling savings are allocated to the Nigerian economy, the port handling cost savings still represent a significant share in the total savings in the logistic transport chain.

The smallest contribution in overall transport chain savings is created by the maritime transport cost savings. An amount of approximately 181 million USD for the period 2013-2045 is saved in the maritime transport leg due to Ibom DSP. This saving is the result of the preferential position of Ibom DSP with respect to the trade between Nigeria and Asia: the small distance advantage creates a small amount of savings in the overall transport chain.

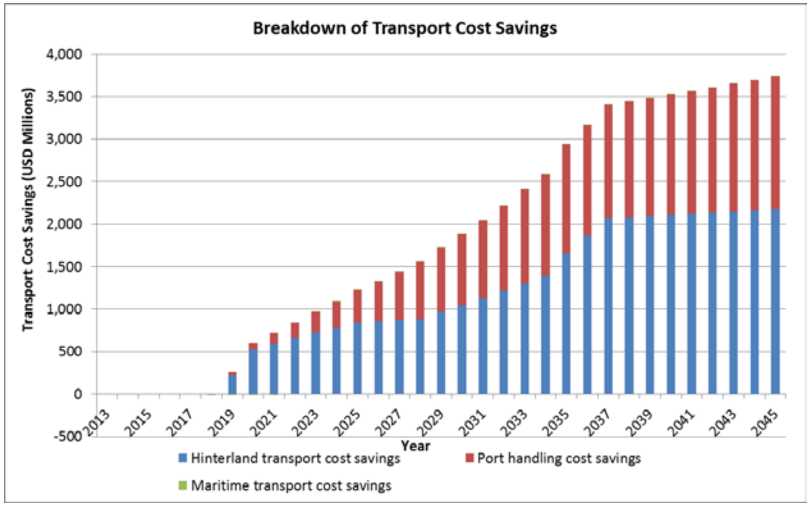


Figure 6.1 – Breakdown of transport cost savings Ibom DSP

Table 6.1 – Quantification of transport cost savings Ibom DSP (mio USD)

	Allocation	Conversion Factor	NPV (adjusted)	NPV	Total 30(y)
Hinterland transport cost savings	0.30	1.10	1,509	4,574	36,628
Port handling cost savings	0.50	1.00	1,303	2,607	24,435
Maritime transport cost savings	0.50	1.00	181	363	3,392
Total Transport Cost Savings Nigeria			**2,813**	**7,181**	**61,066**

6.3.1 Quantification of maritime transport cost savings: assumptions

The marine transport cost savings are the result of the location-advantage of Ibom DSP with respect to the transport routes between Asia and Nigeria, compared to the Lagos ports. At this moment, the marine trade of Nigeria is primarily focused at the trade between Europe (either direct or relay) and Nigeria. The market share of the trade between Nigeria and Europe is decreasing in the latest years due to the increased importance of the trade between Nigeria and Asia.

It is expected that in the long-term, Asia will overtake Europe as the main trading partner for Nigeria. As a result of this expectation, Ibom DSP can provide savings in marine transportation. The share assumptions are presented in the table below. As can be seen in the table, Europe is still dominant in all cargo segments. For containers, breakbulk and vehicles, it is expected that Europe will lose its dominant position. For dry bulk and liquid bulk it is assumed a small reduction in overall market share, yet Europe remains dominant in these markets.

The shift in market share is observed in latest years; as a result the model assumes that the share shift from the start of the model (2013). For all cargo segments, the shift of market share takes requires a period of 15 year to attain the final market share. The market share shift is a linear development.

The table below includes reference pricing for the five cargo segments, based on calculations that include current vessel types. Since a change in vessel types would affect Ibom DSP in a similar way as Badagry and Lekki, no assumption is made regarding the reference pricing. For both routes (Europe and Asia), the distance disadvantage are translated to a share of the overall price of maritime transportation.

Table 6.2 – Assumptions for maritime transport cost savings Ibom DSP

	Reference Pricing	Distance/price disadvantage Lagos-Asia	Distance/price disadvantage Ibom DSP - Europe	Start Share Europe (2013)	End share Europe (2028)
Containers	1,800 USD per TEU	0.010%	0.010%	60%	33%
Breakbulk	100 USD per ton	0.100%	0.100%	60%	40%
Vehicles	200 USD per unit	0.200%	0.200%	80%	50%
Dry Bulk	3 USD per ton	0.005%	0.005%	70%	60%
Liquid Bulk	4 USD per ton	0.003%	0.003%	75%	60%

6.3.2 Quantification of maritime transport cost savings: outcomes

The marine transport cost savings are estimated at 362 million USD NPV. When corrected for allocation and conversion factors, the Net Present Value is estimated at 181 million USD.

The marine transport cost savings are the result of the location-advantage of Ibom DSP with respect to the transport routes between Asia and Nigeria, compared to the Lagos ports.

At this moment, the marine trade of Nigeria is primarily focused at the trade between Europe (either direct or relay) and Nigeria. The market share of the trade between Nigeria and Europe is decreasing in the latest years due to the increased importance of the trade between Nigeria and Asia.

It is expected that in the long-term, Asia will overtake Europe as the main trading partner for Nigeria. As a result of this expectation, Ibom DSP can provide savings in marine transportation.

The allocation factor is set at 0.5; this is due to the expectation that the cost reduction will only partly add to the consumer surplus. The cost reduction will also add to the producer surplus. Since almost all marine trade is facilitated by foreign shipping lines, the producer surplus cannot be allocated to the Nigerian economy

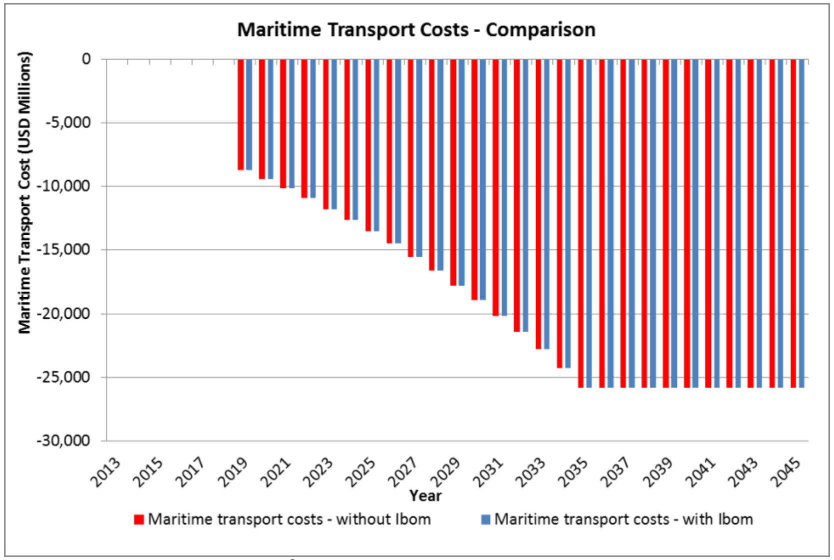


Figure 6.2 – Comparison of maritime transport costs

Table 6.3 – Quantification of maritime transport cost savings Ibom DSP (mio USD)

	Allocation factor	Conversion factor	NPV (adjusted)	NPV	Total (30y)
Marine Transport Costs - Net Effect Ibom DSP - Containers	0.50	1.00	127,939	255,879	2,336,769
Marine Transport Costs - Net Effect Ibom DSP - Breakbulk	0.50	1.00	72,126	144,251	1,170,410
Marine Transport Costs - Net Effect Ibom DSP - Vehicles	0.50	1.00	(17,702)	(35,404)	(98,056)
Marine Transport Costs - Net Effect Ibom DSP - Dry Bulk	0.50	1.00	(93)	(186)	(3,270)
Marine Transport Costs - Net Effect Ibom DSP - Liquid Bulk	0.50	1.00	(1,005)	(2,010)	(13,832)
Marine Transport Costs - Net Effect Ibom DSP - Total			**181,265**	**362,530**	**3,392,021**

6.4.1 Quantification of port handling cost savings: main assumptions

This section presents the assumptions for the quantification of port handling cost savings. The assumptions focus on the clear definition of the two cases and the incremental effect of Ibom DSP. In addition, the main inputs for the quantification of port handling cost savings are presented.

No-Project case

In the No-Project case, the Nigerian port sector consists of the current ports and the ports of Lekki and Badagry. The two latter ports will create increased competition in the Nigerian port sector, yet in a sector with only two major players the ports still have considerable monopolistic power.

The financial business case for Ibom DSP assumes a tariff reduction as a result of the increased competition. This tariff reduction is assumed per individual cargo segment, as can be seen in the table below.

Due to the reduced competition in the no-project case, it is assumed that the price reduction as a result of increased competition is only half of the effect of the price reduction assumed in the financial business case.

Project case

In the project case, Ibom DSP creates an alternative gateway next to the ports in the Lagos state. This leads to situation of increased competition in the Nigerian port sector. As a result, significant reductions in the overall price of port handling are attained.

The reduction in tariffs is assumed per cargo segment. The tariff reductions are equal to the price reductions set in the financial business case.

The port handling costs are derived from the financial business case. The port handling costs are analyzed at a terminal level: no assumptions are made regarding the price of marine services or customs.

Table 6.4 – Comparison of port handling costs savings

	No-Project case		Project case	
	Absolute tariff (initial)	Price effect competition	Absolute tariff (initial)	Price effect competition
Containers	321 USD per TEU (2013 level)	-15%	321 USD per TEU (2013 level)	-30%
Breakbulk	25 USD per ton (2013 level)	-10%	25 USD per ton (2013 level)	-20%
Vehicles	45 USD per unit (2013 level)	-10%	45 USD per unit (2013 level)	-20%
Dry bulk	5 USD per ton (2013 level)	-10%	5 USD per ton (2013 level)	-20%
Liquid bulk	19 USD per ton (2013 level)	0%	19 USD per ton (2013 level)	0%

6.4.2 Quantification of port handling cost savings: outcomes

The overall economic savings with respect to port handling costs are estimated at 2.61 billion USD (NPV). When corrected for allocation & conversion factors, the economic effect of Ibom DSP with respect to port handling cost savings is estimated at approximately 1.3 billion USD.

As can be seen in the figure to the right, the majority of the port handling cost savings is realized at the end of the period. The period stretches from 2013 to 2045; at the start of the period the port handling cost savings are build up gradually.

The gradual build up of cost savings can be explained by the underlying assumptions with respect to tariff reductions created by Ibom DSP. The tariff reductions are gradually build up after the start of operations at Ibom DSP; the reduction of tariffs is not a one-time event. Hence the port handling cost savings are build up gradually.

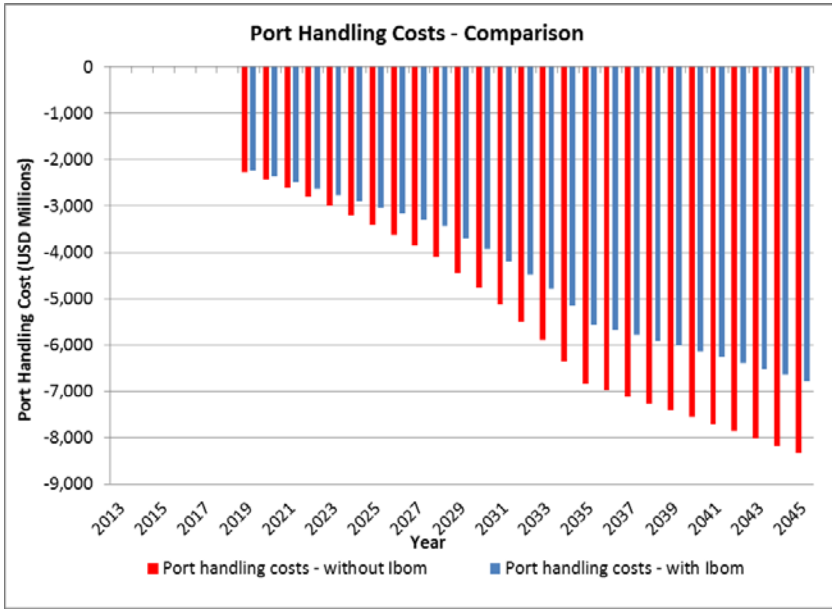


Figure 6.3 – Comparison of port handling costs

Table 6.5 – Quantification of port handling cost savings Ibom DSP (mio USD)

	Allocation factor	Conversion factor	NPV (adjusted)	NPV	Total (30y)
Containers	0.50	1.00	643	1,285	12,289
Breakbulk	0.50	1.00	199	398	3,176
Vehicles	0.50	1.00	19	38	330
Dry Bulk	0.50	1.00	-	-	-
Liquid Bulk	0.50	1.00	443	886	8,640
Total			**1,303**	**2,607**	**24,435**

6.5.1 Quantification of hinterland transport cost savings: assumptions

As mentioned before, the no-project case assumes that the Eastern demand is handled by ports in the Lagos area, except for cargo handled in Delta ports which are assumed to attain full occupancy. In the project case, Ibom DSP handles the cargo that would otherwise be handled by Lagos ports as a result of capacity restrictions in the Delta ports.

As can be seen in the table to the right (top), the weighted average distance between Ibom DSP and East-Nigeria is approximately 400km smaller than the distance between Lagos and East-Nigeria. These distances are used to determine the ton/kms that will have to be travelled by trucks to East-Nigeria in order to facilitate all demand.

The table on the right (bottom) presents the costs per km for the five cargo segments. The assumptions are based on empirical studies in Europe; the prices are translated to Nigeria USD-prices.

The input presented in the two tables is used to quantify the overall external costs of truck transportation as a result of demand to East-Nigeria. Since there is no difference in assumptions regarding the traffic facilitation to central and West-Nigeria, the costs of truck transport to these two regions are not quantified.

Table 6.6 – Assumptions for hinterland transport cost savings

Component	Assumption
No-Project case	
Distance Lagos - East Nigeria	650 kilometer
Traffic Lagos – East-Nigeria	Eastern demand – capacity Eastern ports
Distance Ibom DSP – East-Nigeria	250 kilometer
Traffic Ibom DSP – East-Nigeria	0
Project case	
Distance Lagos - East Nigeria	650 kilometer
Traffic Lagos – East-Nigeria	0
Distance Ibom DSP – East-Nigeria	250 kilometer
Traffic Ibom DSP – East-Nigeria	Eastern demand – capacity Eastern ports

Table 6.7 – Assumptions for trucking costs

Component	Cost	Unit
Trucking costs – containers	(0.8)	USD per TEU/km
Trucking costs – breakbulk	(0.15)	USD per ton/km
Trucking costs – vehicles	(0.07)	USD per unit/km
Trucking costs – dry bulk	(0.15)	USD per ton/km
Trucking costs – liquid bulk	(0.15)	USD per ton/km

6.5.2 Quantification of hinterland transport cost savings: outcome

The Net Present Value of the hinterland transport cost savings is estimated at 4.57 billion USD. When corrected for allocation factors and conversion factors, the economic value of the savings is estimated at 1.51 billion USD.

The majority of the savings is realized in the liquid bulk segment, dry bulk segment and container segment. A conversion factor of 1.1 is applied, due to the fact that the transport sector consumes significant amounts of fuel. Since fuel is subsidized, the shadow price is higher than the financial price. The fuel effect outweighs the effect of additional unemployment due to a lower demand for truck transportation services.

The allocation factor for hinterland transport costs is set to 0.3. This relatively low assumption is supported by the fact that most input for truck transportation is produced within Nigeria (labour). Hence the lower demand for transportation backfires on the Nigerian economy.

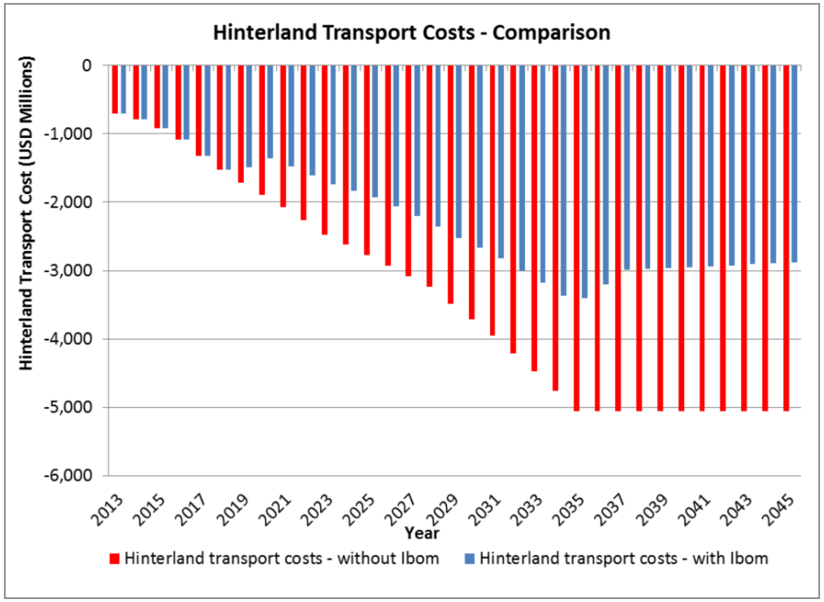


Figure 6.4 – Comparison of hinterland transport costs

Table 6.8 – Quantification of hinterland transport cost savings Ibom DSP (mio USD)

	Allocation factor	Conversion factor	NPV (adjusted)	NPV	Total (30y)
Hinterland Transport Cost Savings - containers	0.30	1.10	210	638	4,631
Hinterland Transport Cost Savings - breakbulk	0.30	1.10	70	212	1,062
Hinterland Transport Cost Savings - vehicles	0.30	1.10	7	21	136
Hinterland Transport Cost Savings - dry bulk	0.30	1.10	123	373	6,540
Hinterland Transport Cost Savings - liquid bulk	0.30	1.10	1,099	3,330	24,258
Hinterland Transport Cost Savings - total			**1,509**	**4,574**	**36,628**

Amounts in million USD

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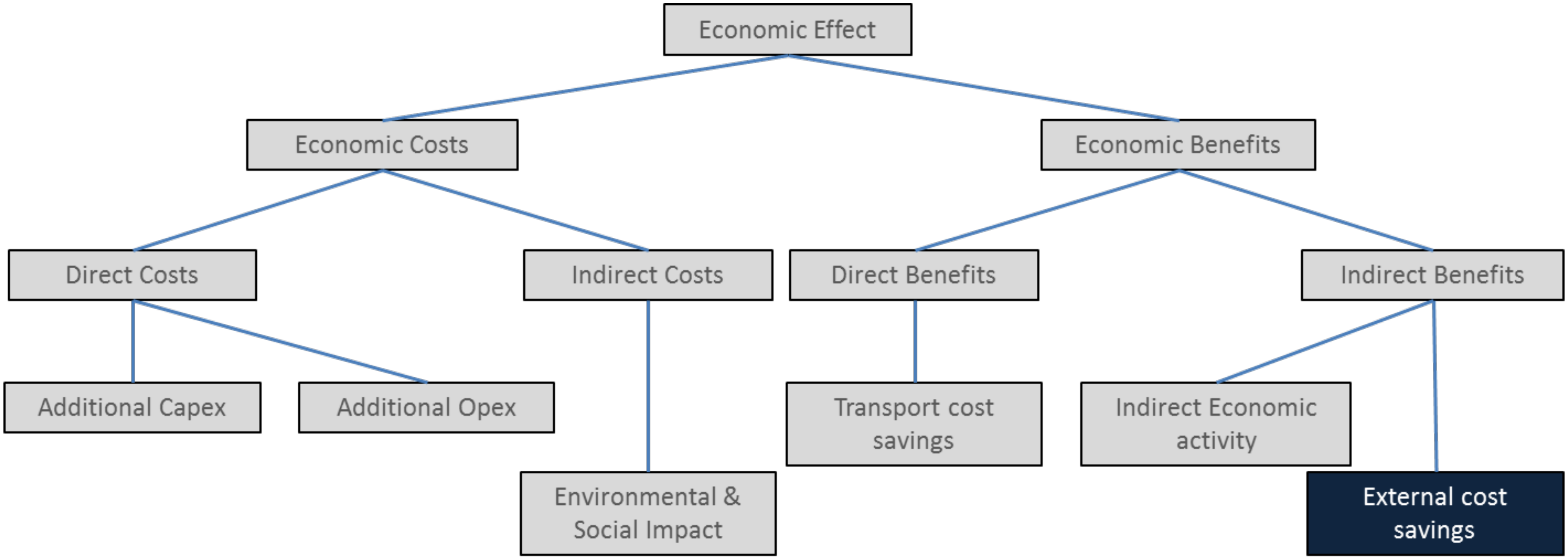
7.1 Quantification of External Cost Savings: Introduction



This chapter presents the quantification of the first component of the indirect economic benefits: the external cost savings as a result of Ibom DSP. These savings are created by the more efficient hinterland connection to East-Nigeria that is provided by Ibom DSP. The chapter contains the following paragraphs:

Assumptions

The first paragraph presents the assumptions for project case and the no-project case. In addition, this paragraph presents the conversion and allocation factors for the external cost savings: accidents, air pollution, climate change, noise, up and downstream, nature & landscape, biodiversity losses, soil & water pollution and urban effects.

Results

The second paragraph presents the outcome of the analysis and the interpretation of the results.

7.2 Quantification of External Cost Savings: assumptions

As mentioned before, the no-project case assumes that the Eastern demand is handled by ports in the Lagos area, except for cargo handled in Delta ports which are assumed to attain full occupancy. In the project case, Ibom DSP handles the cargo that would otherwise be handled by Lagos ports as a result of capacity restrictions in the Delta ports.

As can be seen in the table to the right (top), the weighted average distance between Ibom DSP and East-Nigeria is approximately 400km smaller than the distance between Lagos and East-Nigeria. These distances are used to determine the ton/kms that will have to be travelled by trucks to East-Nigeria in order to facilitate all demand.

The table on the right (bottom) shows the nine components of external costs that are created by trucks. For each component, the cost per ton/km of travelled distance is presented as well. The input in this table is derived from the world-leading institute CE Delft, specialized in quantifying external costs of freight transportation.

The input presented in the two tables is used to quantify the overall external costs of truck transportation as a result of demand to East-Nigeria. Since there is no difference in assumptions regarding the traffic facilitation to central and West-Nigeria, the costs of truck transport to these two regions are not quantified.

Table 7.1 – Assumptions external costs 1

Component	Assumption
No-Project case	
Distance Lagos - East Nigeria	650 kilometer
Traffic Lagos – East-Nigeria	Eastern demand – capacity Eastern ports
Distance Ibom DSP – East-Nigeria	250 kilometer
Traffic Ibom DSP – East-Nigeria	0
Project case	
Distance Lagos - East Nigeria	650 kilometer
Traffic Lagos – East-Nigeria	0
Distance Ibom DSP – East-Nigeria	250 kilometer
Traffic Ibom DSP – East-Nigeria	Eastern demand – capacity Eastern ports

Table 7.2 – Assumptions external costs 2

Component	Cost	Unit
External costs - accidents	(22.44)	USD/1,000 tkm
External costs - air pollution	(11.09)	USD/1,000 tkm
External costs - climate change	(3.43)	USD/1,000 tkm
External costs - Noise	(3.30)	USD/1,000 tkm
External costs - Up and Downstream	(3.56)	USD/1,000 tkm
External costs - Nature & Landscape	(0.92)	USD/1,000 tkm
External costs - Biodiversity Losses	(0.66)	USD/1,000 tkm
External costs - Soil & Water Pollution	(1.32)	USD/1,000 tkm
External costs - Urban Effects	(1.19)	USD/1,000 tkm

7.3 Quantification of External Cost Savings: outcomes

The Net Present Value of the external cost savings are estimated at approximately 1.59 billion USD. When corrected for allocation factors and conversion factors, the effect of the Ibom Deep Sea port & FTZ project is estimated at approximately 1.27 billion USD.

The largest saving is created by a reduction in the costs of accidents. Since Ibom DSP provides a shorter (and less densely used) connection to East-Nigeria , the amount of accidents as a result of truck traffic is significantly reduced. Subsequently, the costs of accidents is lower as a result of Ibom DSP: approximately 595 million USD for the period 2013-2045.

The second big saving component is the reduction in the costs of air pollution, which is also created by the shorter connection provided by Ibom DSP. The savings in air pollution costs are estimated at 294 million USD. Other significant saving components are the climate change costs, the noise costs and the external costs of the up and downstream services and industries related to the truck transport.

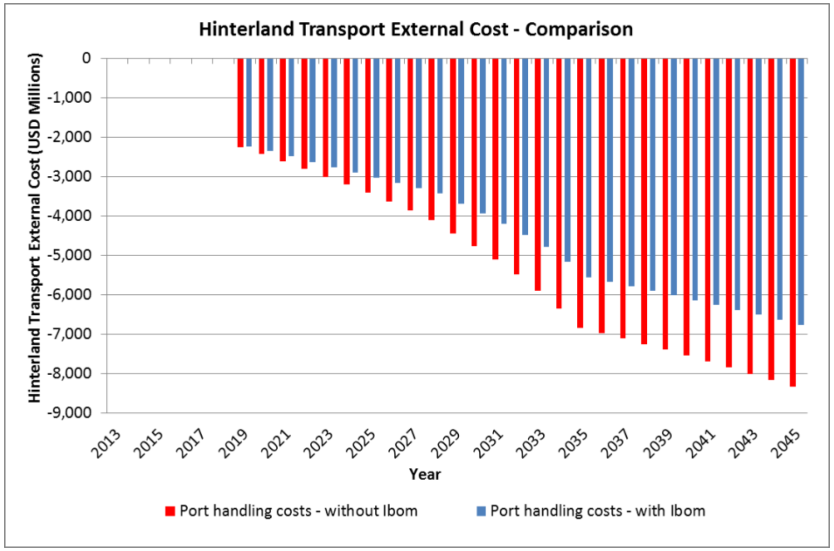


Figure 7.1 – Comparison of external costs of hinterland transport

Table 7.3 – Quantification of external cost savings Ibom DSP (mio USD)

	Allocation factor	Conversion factor	NPV (adjusted)	NPV	Total (30y)
Cost of accidents - Net Effect Ibom DSP	0.80	1.00	595	744	5,933
Cost of Air Pollution - Net Effect Ibom DSP	0.80	1.00	294	368	2,932
Cost of Climate Change - Net Effect Ibom DSP	0.80	1.00	91	114	907
Cost of Noise - Net Effect Ibom DSP	0.80	1.00	88	109	873
Cost of Up and Downstream - Net Effect Ibom DSP	0.80	1.00	95	118	942
Cost of Nature & Landscape - Net Effect Ibom DSP	0.80	1.00	25	31	244
Cost of Biodiversity Losses - Net Effect Ibom DSP	0.80	1.00	18	22	175
Cost of Soil & Water Pollution - Net Effect Ibom DSP	0.80	1.00	35	44	349
Cost of Urban Effects - Net Effect Ibom DSP	0.80	1.00	32	39	314
Total Social & Environmental Costs - Net Effect Ibom DSP			**1,271**	**1,589**	**12,669**

Amounts in million USD

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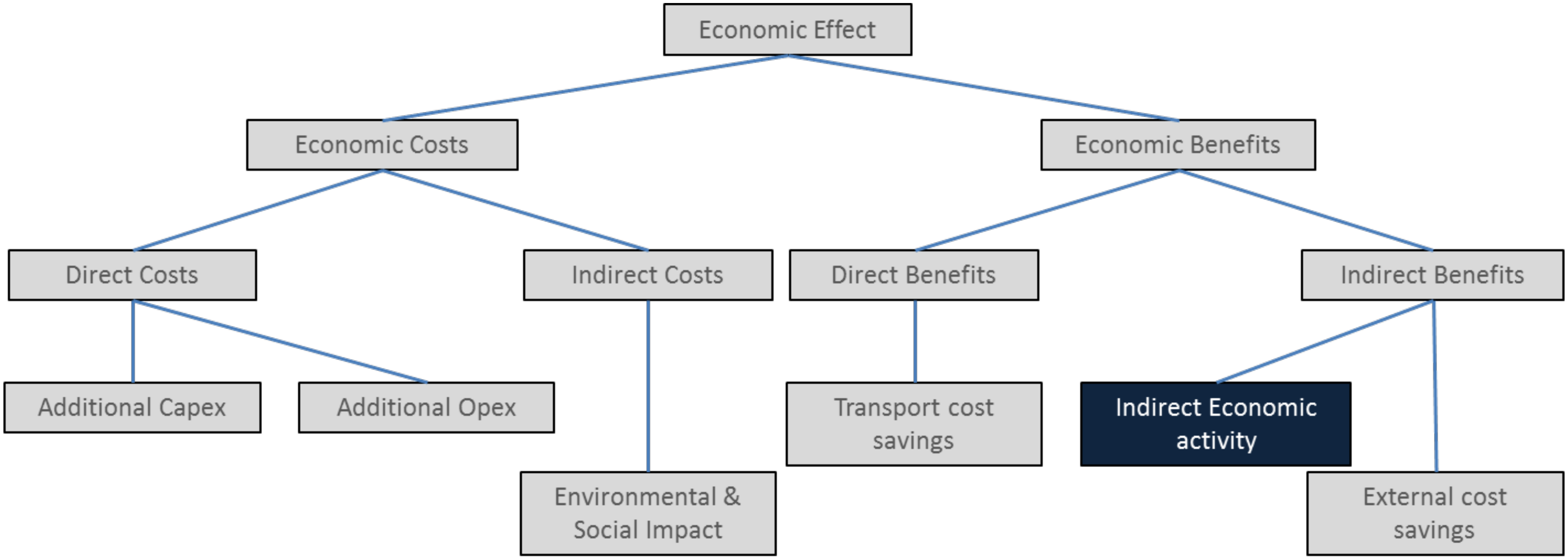
8.1 Quantification of Indirect Economic Activity: Introduction



This chapter presents the quantification of the second component of the indirect economic benefits: the indirect economic activity as a result of Ibom DSP. This indirect economic activity is created by the additional maritime throughput as a result of the gateway-function of Ibom DSP. The chapter contains the following paragraphs:

Assumptions

The first paragraph presents the assumptions for project case and the no-project case. In addition, this paragraph presents the conversion and allocation factors for the two types of indirect economic activity: indirect labour and indirect added value of businesses.

Results

The second paragraph presents the outcome of the analysis and the interpretation of the results.

8.2 Quantification of Indirect Economic Activity: main assumptions

Methodology:

In the no-project case, the Eastern parts of Nigeria are forced to use Lagos ports as their gateway for import and export. Since this is a sub-optimal and inefficient situation, the regional economy in East-Nigeria is slightly limited in its growth potential. As a result of the inefficient corridor to Lagos, the cargo demand from East-Nigeria is slightly lower in the no-project case compared to the project case.

The higher overall cargo demand in Nigeria in the project-case has a direct effect on the added value in the country. Based on empirical studies, the added value multiplier is set at 15 USD per ton throughput in the port sector. There is an additional effect of the higher overall cargo demand in Nigeria in the project-case :the number of labour positions within the port sector are increased. Based on research conducted by the World Bank, the multiplier for the value of indirect labour is set at 1.61; this is multiplier by the value of additional labour created by additional cargo.

Assumptions:

The conversion factor for the indirect labour is set at 1.20. The argumentation for this conversion factor is in line with the argumentation for direct labour; due to the relatively high unemployment in Nigeria the shadow price (benefits in this case) of labour is higher than 1. The allocation factor is equal to 1, since it is assumed that approximately all direct labour will be Nigerian-based.

The conversion factor for the indirect added value is set at 1.00. It is no possible to determine whether there are market distortions in the markets closely connected to the port. As such, it is not possible to argue that the conversion factor for indirect added value should significantly differ from 1. The allocation factor for the indirect added value is assumed at 0.5 This is due to the fact that a major share of the indirect added value will be generated by non-Nigerian firms. As such, not all indirect added value can be allocated to the Nigerian economy.

Table 8.1 – Assumptions indirect economic activities

	Delta cases	Driver component	Multiplier	Allocation	Conversion
Indirect Labour	Lower port throughput	direct port labour	1.61 * value direct labour	1.0	1.2
Indirect added value	Lower port throughput	cargo throughput	15 USD per ton throughput	0.5	1.0

8.3 Quantification of Indirect Economic Activity: outcomes

The Net Present Value of the indirect economic activity as a result of Ibom DSP is estimated at approximately 356 million USD. When corrected for allocation factors and conversion factors, an economic NPV of approximately 189 million USD is estimated.

As can be seen in the table below, the indirect labour effect is significantly smaller than the indirect added value effect. The indirect economic activity is estimated by multiplying the additional cargo created by Ibom DSP with an assumed indirect added value per ton throughput. The indirect economic activity created by Ibom DSP & FTZ project (adjusted NPV) is estimated at 170 million USD for the period 2013-2045.

The estimated economic value of the indirect labour created by the Ibom Deep Sea port & FTZ project is equal to 19 million USD (adjusted NPV). The indirect labour is estimated by multiplying the value of direct labour in the port with an indirect labour multiplier derived from empirical studies.

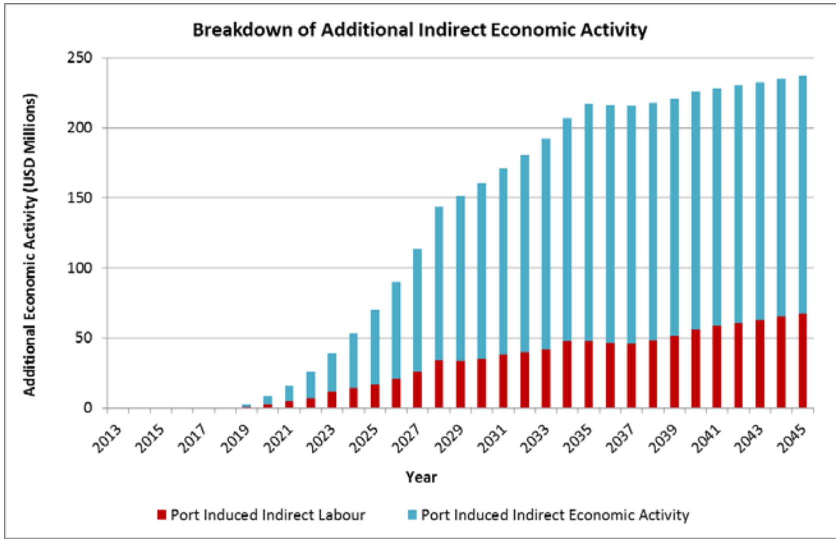


Figure 8.1 – Breakdown of additional indirect economic activity

Table 8.2 – Quantification of indirect economic activities Ibom DSP (mio USD)

	Allocation	Conversion Factor	NPV (adjusted)	NPV	Total 30(y)
Indirect Labour	1.00	1.20	129	108	987
Indirect Added Value	0.50	1.00	172	345	3,116
Additional Port Induced Economic Growth	-	-	**302**	**453**	**4,104**

Amounts in million USD

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Main Table of Content

9. Interpretation of CBA results

Outcome of the Economic Cost Benefit Analysis: Positive Economic Effect of 2.3 billion NPV

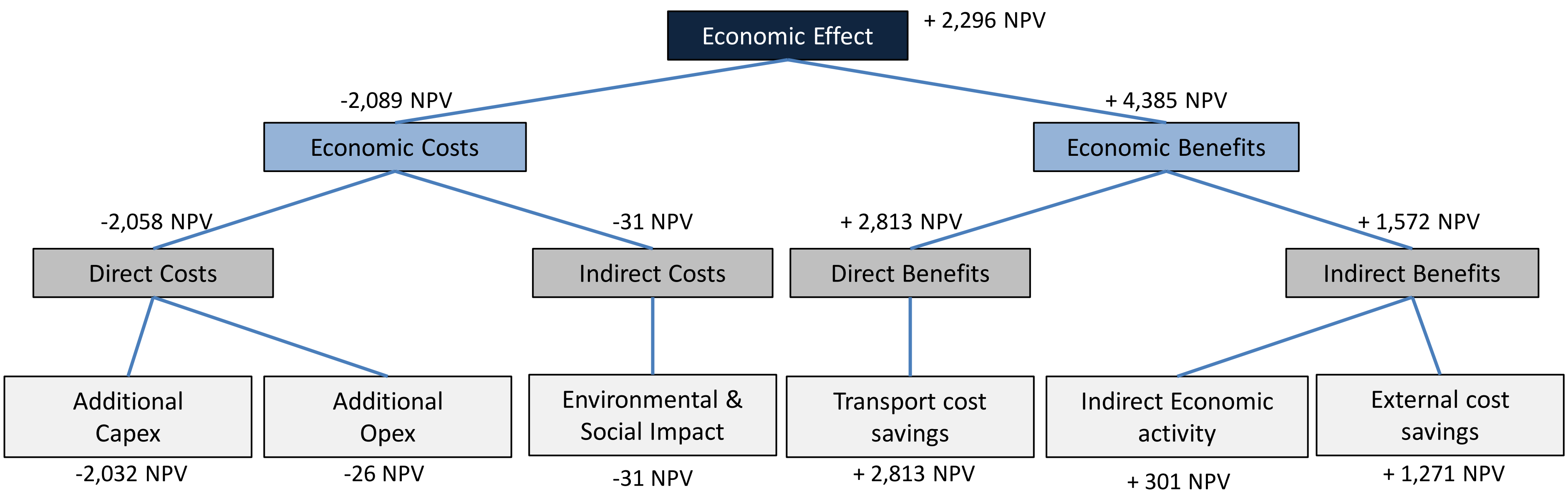


Figure 9.1 – Output of Economic Cost Benefit Analysis Ibom DSP (mio USD)

9. Interpretation of CBA results

Outcome of the Economic Cost Benefit Analysis: Positive Economic Effect of 189 billion for the total concession period

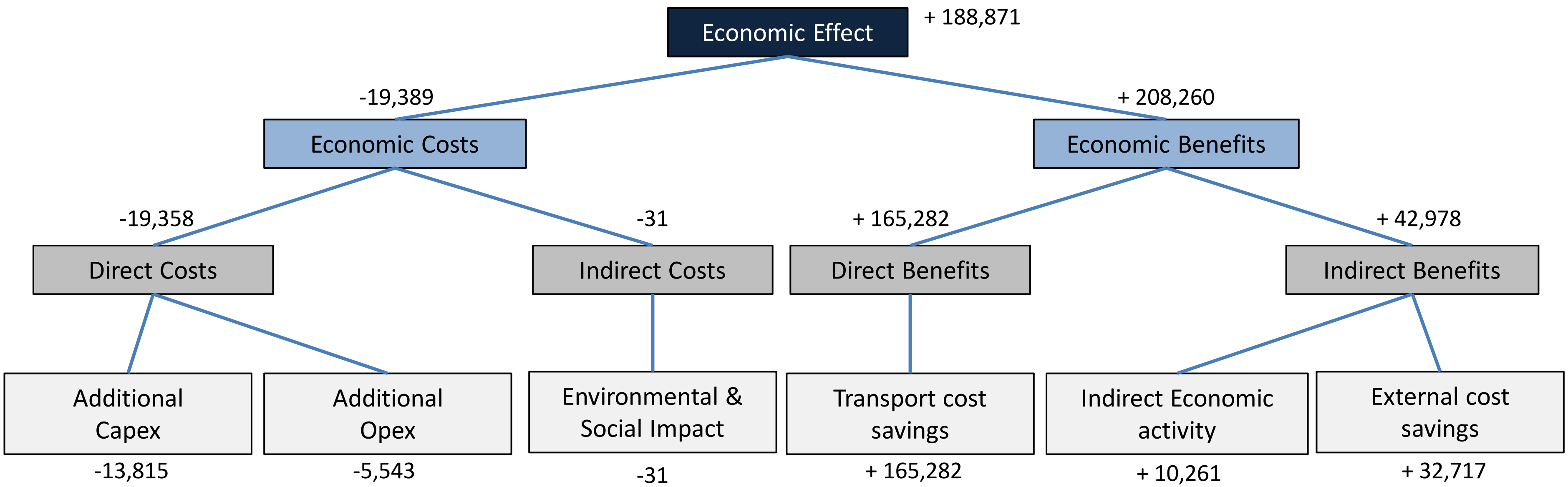


Figure 9.2 – Output of Economic Cost Benefit Analysis Ibom DSP (mio USD)

9. Interpretation of CBA results

Main outcome of the conducted Economic CBA: an Eastern gateway creates significant economic benefits

The economic cost benefit analysis for Ibom DSP shows that by means of the construction of a gateway port in East-Nigeria, the total Nigerian economy can be boosted. The initial hypothesis is approved: the cost savings in the transport chain are larger than the extra cost that are created by the construction and operation of Ibom DSP.

Throughout the analysis, a conservative approach towards the quantification of the costs and benefits of Ibom DSP has been adopted. The selection of scenarios proves this conservative approach: in both scenarios it is assumed that the ports of Badagry and Lekki are developed according to their most optimistic timelines. This reduces the overall impact of Ibom DSP on the overall Nigerian port sector, yet still the transport cost savings created by Ibom DSP can compensate for the capex and opex.

As can be seen in the figure on the bottom of the page, the six main components of the economic cost benefit analysis are quantified in this analysis. The only component that is quantified on t preliminary basis at this stage is the local environmental and social impact of the construction and operation of Ibom DSP. In order to reduce the error margin of this effect, a full environmental and social impact assessment will be conducted. However given the estimated cost of 31 million USD, it does not seem likely that the environmental and social impact will be of a magnitude that would turn the overall economic impact into a negative effect (>2.3 billion USD).

There is an effect that could potentially create an extra cost for the Nigerian economy: the construction of additional hinterland infrastructure capacity. The direct access-road to the port is included in the overall capex of the port, yet it is unclear whether additional inter-state connections need to be constructed in order to facilitate the transport from Ibom DSP to its hinterland.

Although inter-state connections could increase the costs of the project-case significantly, it is not clear whether this cost is incremental when compared to the no-project case.

It can be expected that in the absence of an Eastern gateway, the Western road infrastructure needs to be upgraded significantly in order to handle almost all Nigerian traffic. As such, more detailed analysis needs to be conducted before the absolute costs and the incremental effect of additional road infrastructure construction in East-Nigeria can be estimated.

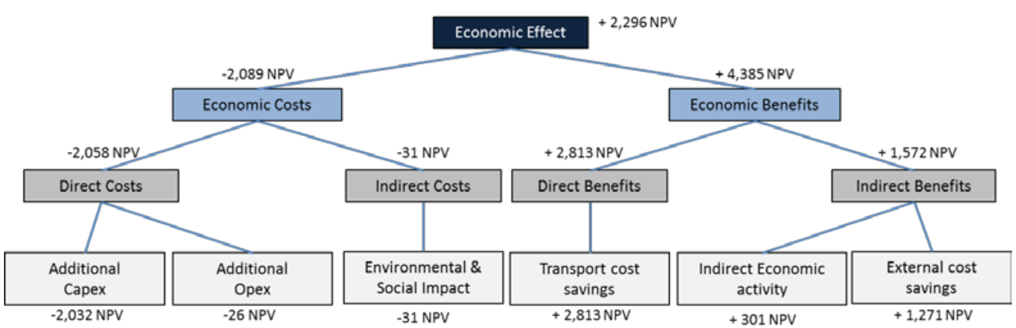


Figure 9.3 – Output of Economic Cost Benefit Analysis Ibom DSP (mio USD)

Project Initiators:

Transaction Advisors:

Felak Concept Limited

mtbs

maritime & transport business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

PROJECT IMPLEMENTATION PLAN

FINAL

Felak Concept Limited and Maritime & Transport Business Solutions B.V.

26 May 2014

Project Initiators:

Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Project Implementation Plan
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Implementation Plan - Introduction

ICRC PPP Manual for Nigeria

A Project implementation Plan is developed once all of the project (pre) feasibility has been conducted to reflect the timing and the interrelationships of all the major components of the project. The purpose of the Project Implementation Plan is to provide a detailed list of the remaining studies, procurement milestones, and other task required to bring the project to fruition.

Contents

Contents

Critical Decisions, Positions & Approvals

The following steps are considered vital for successful project implementation. These steps require immediate attention/action upon delivery of the OBC and the Procurement File

1. Approval of the Outline Business Case to advance to Phase 3
2. Inclusion of the project in the NPA Ports Master Plan
3. Approval of the Site: Final Port Location (concession area), Proposed Channel Alignment, Proposed Road Connection
4. Transfer of Project Area to Concession Grantor (NPA)
5. Promulgation of the Port (concession area)
6. Approval of Project Structure: PDMC model with public minority shareholding (40%), and sub-concessioning by PDMC allowed without public procurement
7. Approval of the NPA-PDMC Tariff Allocation: Port Dues
8. Approval of Phase 1 Investments: Containers, Breakbulk, RoRo, Petroleum Products, Offshore Supplies, Dry Bulk; Phase 1 Capex: USD 1.7b-2.6b; Design Vessel -15m draft; Quay length: 1,000m-2,150m
9. Approval of Public Budgets: USD 1.04b maximum public investment contribution (40% of max scope phase 1); structured as 40% equity injections and the balance as Government Funding Support as soft loan(s)
10. Establishment of incentive-package: NEPZA regime (+) and other fiscal incentives
11. Approval of Phase 3 Implementation Proposal

Contents

Remaining Tasks & Studies

A. Start Procurement Implementation Phase

Phase 3 of Transaction Advisory after Initial Due Diligence Phase (phase 1) and combined Outline Business Case & Procurement Preparation Phase (phase 2)

B. Execute Detailed Survey Campaign:

Output Available for Bidders through data room to establish detailed designs

OBC Survey was only aimed at Location Selection and verification of Dredging/Reclamation Volumes

C. Execute Full Environmental Impact Assessment:

Output and Clearance Available for Bidders through data room to establish environmental and corporate social responsibility (CSR) plans

Remaining Studies & Tasks – A. Procurement Implementation

Tender Implementation in approximately 1 year from start tender. Implementation by Q1 2015 to be met with a timely start of the tender. More details in Project Procurement File.

The envisaged tender process for the Ibom DSP Project comprises of many steps which are executed by the Transaction Advisors, the Procurement Committee and/or the Private Sector.

Table 1 – Critical Path of the Tender Procedure for Ibom DSP

#	Step on Critical Path	Trigger(s)
0	Start Tender Process	Approval of NI EoI & RfQ
1	Publish NI EoI & RfQ	Start Tender Process
2	Register & Develop Application	Publishing of NI EoI & RfQ
3	Open Applications	Application Deadline
4	Evaluate Applications	Opening of Applications
5	Review Proposed Shortlist	Reception of Qualification Report
6	Formalise Shortlist	Reception of Proposed Shortlist
7	Upload RfP & Open DataRoom	Formalised Shortlist
8	Develop Bids	Upload RfP & Open DataRoom
9	Open Bids	Bid Deadline
10	Evaluate Bids	Opening of Bids
11	Nominate Preferred Candidate	Reception of Bid Evaluation Report
12	Negotiate & Finalise Contracts	Nomination of Tentative Preferred Candidate
13	Formalise Preferred Candidate	Reception of Nomination, Final Contracts and Verification Report
14	Signing Contract	Finalised Contract
	SUB-TOTAL FOR TENDER	
	Conditions Precedent Period	*Signed Contract*

Remaining Studies & Tasks – B. Detailed Survey 1/5

A detailed survey of the entire Concession Area is required to provide potential bidders with detailed site information to develop their bids. This survey should be executed during the Concession Tender and outputs need to be made available to bidders during the Bidding Phase through the Data Room.

More detailed information with respect to the local circumstances is necessary to elaborate the feasibility design into a detailed design. Following surveys are required for the next design stage:

- Geotechnical survey (on- and offshore)
  - Cone Penetration Tests (CPT's)
  - Bore holes with Vane tests, Standard Penetration Tests (SPT's) and soil sampling;
  - Extensive laboratory test programme, which amongst others holds the following tests:
    - Classification tests: unit weight, water content, angularity, carbonate content, specific gravity, permeability test, particle size distribution, unconsolidated undrained tests, Atterberg limits;
    - Consolidation tests on undisturbed samples: Oedometer tests;
    - Strength/stiffness tests on undisturbed samples: CU Triaxial tests, CD Triaxial tests, Min/max density tests;

- Hydrographical survey (detailed, in access channel and port entrance areas)
  - Bathymetrical survey
  - Side scan sonar survey;
  - Shallow seismic reflection survey (geophysical survey in connection with geotechnical survey).

Remaining Studies & Tasks – B. Detailed Survey 2/5

A detailed survey of the entire Concession Area is required to provide potential bidders with detailed site information to develop their bids. This survey should be executed during the Concession Tender and outputs need to be made available to bidders during the Bidding Phase through the Data Room.

- Topographical survey of the area (port and FTZ perimeter):
  - Land elevation;
  - Identification of objects (XYZ)

- Metocean survey, to collect following data:
  - Meteorology;
  - Oceanography;
  - Winds;
  - Waves;
  - Visibility;
  - Tides;
  - Currents.

  Measuring period of a Metocean survey is at least 6 months, or by collecting data:
  - Water levels: 4 staff gauges (minimum 1 year of historical data);
  - Waves: divers at various locations (minimum 1 year of historical data);
  - Flow velocities: ADCP, literature and public domain (minimum 1 year of historical data);
  - Grain size: sea bed samples at various locations.

Remaining Studies & Tasks – B. Detailed Survey 3/5

A detailed survey of the entire Concession Area is required to provide potential bidders with detailed site information to develop their bids. This survey should be executed during the Concession Tender and outputs need to be made available to bidders during the Bidding Phase through the Data Room.

Following detailed studies are required to determine detailed port design and its impact and performance:

- Geotechnical (3D interpretative model) with:
  - Classification of soils to be dredged and reclaimed
  - Consolidation, stability and settlement of subsoil in reclamation areas and breakwater location
  - Suitability and unsuitability of dredge volumes
  - Geotechnical design parameters for quaywall constructions

- Detailed wave modelling (based on metocean data)
  - Offshore operational and extreme wind climate
  - Breakwater layout optimalisation;
  - Extreme value analysis of both waves and waterlevels;
  - Design evaluation based on extreme wave conditions.

- Morphological study
  - Tidal currents and wind induced currents near the port area;
  - Morphological impact on environmental stability;
  - Morphological behaviour of approach channel, port entrance and port area;

Remaining Studies & Tasks – B. Detailed Survey 4/5

A detailed survey of the entire Concession Area is required to provide potential bidders with detailed site information to develop their bids. This survey should be executed during the Concession Tender and outputs need to be made available to bidders during the Bidding Phase through the Data Room.

- Wave agitation study
  - Wave agitation study to find optimal breakwater layout;
  - Downtime analysis;

- Scale model tests of breakwater design (based on survey data and final design)
  - 2D flume tests: testing of optimal breakwater cross section with regard to wave overtopping and armour stability;
  - 3D basin tests to verify stability of breakwater roundhead with regard to armour stability and wave penetration.

- Nautical studies
  - Navigation simulations (fast-time and real-time);
  - Berthing- and mooring simulations.
  - Breakwater layout verification with regard to nautical aspects: port entrance width, access channel layout, port basin.
  - Access channel alignment with respect to deep sea route, oil & gas industry assets

Remaining Studies & Tasks – B. Detailed Survey 5/5

A detailed survey of the entire Concession Area is required to provide potential bidders with detailed site information to develop their bids. This survey should be executed during the Concession Tender and outputs need to be made available to bidders during the Bidding Phase through the Data Room.

- Port Logistics masterplan
  - Expectations for commodity split, per terminal
  - Study hinterland connections, source/destination for various commodities
  - Use of inland terminals, inland storages for liquids, dry ports concept
  - Phasing and development plan for roads, rail, pipelines connections
  - Customs procedures per commodity, incl. type & number Inspections, percentages, X-ray policies, etc. (logistics on terminal level)

- Port Utilities masterplan
  - Define consumptions for power, water, main network, redundancy
  - Location and capacity study for water treatment plant (desalination plant) and power plant
  - Collective sewage collection network, location of waste water treatment plant
  - Data and telecom network / receiving station
  - Firefighting policy per terminal, HSSE requirements
  - Terms of References to terminal concessionaires

Remaining Studies & Tasks – C. Environmental Impact Assessment 1/5

The full EIA needs to be executed before construction can start. To allow Bidders to take into account any mitigation and/or compensation measures in their bids, full EIA approval and outcomes need to be available to the Bidders during the Bidding Phase.

Introduction

IDSP will commission a detailed, integrated Environmental and Social Impact Assessment to be conducted in accordance with Nigerian requirements on Environmental Impact Assessment and EBRD Environmental and Social Policy (2008).

A key outcome of the scoping process is the definition of the Terms of Reference (ToR) of the detailed ESIA study. The findings of the ESIA study will be presented in an ESIA report (or EIA report in line with Nigerian Regulations) which will be prepared in compliance with National Nigerian standards and regulations as well as international standards. As for all previous ESIA steps performed by IDSP (Alternative Sites Assessment and Scoping) IDSP has selected the more stringent EBRD standards as the international standards benchmark for the ESIA report. The following sections present the Terms of Reference of the detailed ESIA which will be performed for IDSP.

Objective

IDSP recognizes that comprehensive planning and management of environmental and socio-economic issues are essential to the execution of any successful project and, therefore, intends to fully integrate environmental and socio-economic considerations into the life cycle of the proposed Project.

To support this, IDSP will commission a detailed, integrated Environmental and Social Impact Assessment (hereafter referred as an ESIA) to be conducted in accordance with the following Nigerian requirements:

Environmental Impact Assessment Act 86 of 1992

The Act No. 86 of 1992 makes EIA mandatory for all new major public and private proposed projects in Nigeria. The EIA Act sets out to:

Consider the likely impacts and the extent of these impacts on the environment before embarking on any proposed project or activity.

Promote the implementation of appropriate policy in all Federal lands consistent with all laws and decision making processes through which the goal of this Act may be realized.

Remaining Studies & Tasks – C. Environmental Impact Assessment 2/5

Steps

Following on from the scoping phase of the project, the ESIA will:

Update and finalize the technical project description as further engineering details become available, working closely with project engineers to confirm details such as the final layout of the port and associated facilities, final locations and layout of temporary infrastructures (such as worker camps), and construction and operation plans:

1. Conduct additional consultation and further define the scope of the ESIA as necessary;
2. Collect additional baseline data through desktop research and field studies to complete a comprehensive description of the environmental, social and cultural heritage conditions;
3. Develop mitigation and enhancement measures and outline an Environmental and Social Management Plan (ESMP) including an approach for monitoring.
4. Report findings in a comprehensive ESIA report.

Scope – Area

Figure 1 – Environmental Study Area

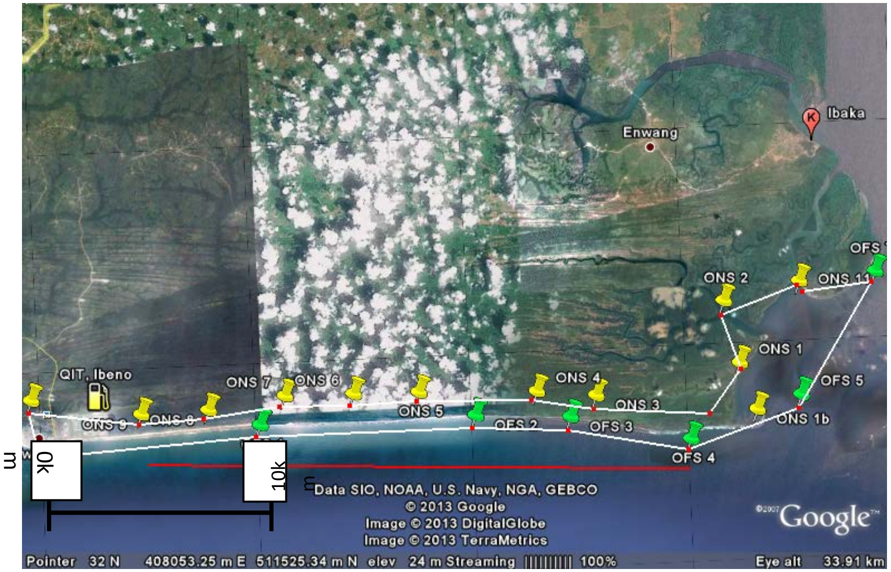


Figure 2 – Social Study Area

Remaining Studies & Tasks – C. Environmental Impact Assessment 3/5

Scope

Nine environmental specialist studies (ESS) will be conducted on the selected area:

1. Groundwater Study
2. Surface Water Flow and Quality Study
3. Air Quality and Climate Study
4. Noise Study
5. Flora Studies
6. Soil Study
7. Aerial Fauna Studies
8. Terrestrial Fauna Studies
9. Fish and Aquatic Habitat Baseline Studies

The social baseline studies include three interrelated aspects:

1. Socio-economics
2. Community health
3. Living cultural heritage both tangible and intangible

Detailed background on the Full Environmental Assessment study can be found in chapter 7 of the Social & Environmental Scoping Study, which is included in the Supporting Documents to this Outline Business Case.

Remaining Studies & Tasks – C. Environmental Impact Assessment 4/5

An outline of the proposed contents of the ESIA report is provided below.

The content may be altered during the evolution of the project or based on the findings of on-going consultation, however it is anticipated that the contents of the ESIA report will accord broadly within the suggested framework.

The ESIA report would be presented in eight chapters.

1. Chapter one is an introduction containing relevant background information and the legal and administrative framework for EIA in Nigeria among other information.
2. The second chapter presents the project justification, the need/value and the envisaged sustainability of the project as well as the project development and site/site options considered.
3. Chapter Three contains detailed description of the proposed project including its location, overall layout, basis for design, type and specifications of equipment/facilities to be installed, source of power supply to the plant, operation/maintenance of facility, and specific project activities as contained in the conceptual design report.
4. The fourth chapter describes the baseline ecological and socio-economic status of the study area respectively. Information on consultation with stakeholders is also presented in this chapter.
5. Chapter Five discusses the identified potential and associated environmental impacts of the proposed project.
6. Chapter Six highlights the various mitigation measures proffered against the identified significant impacts.
7. Chapter Seven provides a cost-effective environmental management plan that would be adopted throughout the project cycle. It also enumerates the environmental monitoring programme, the waste management programme and the project's decommissioning/abandonment plan.
8. Chapter Eight gives the conclusion and requests approval for project implementation.

Detailed background on the Full Environmental Assessment study can be found in chapter 7 of the Social & Environmental Scoping Study, which is included in the Supporting Documents to this Outline Business Case.

Remaining Studies & Tasks – C. Environmental Impact Assessment 5/5

Table 2 – Environmental Program of Activities EIA

Activity	Time
Disclosure of this Scoping report, scoping leaflet and the Project's Stakeholder Engagement Plan	20thSeptember 2013
First consultation stage – Scoping	8th - 20thSeptember 2013
Wet season baseline data acquisition	August/September 2013
Dry season baseline data acquisition	December 2013/January 2014
Preparation of Draft ESIA Report	February, 2014
Disclosure of ESIA package including: • Draft Environmental and Social Impact Statement • Environmental and Social Management and Monitoring Plan	February – March, 2014
Preparation of Final ESIA Report	Anticipated to be in May, 2014

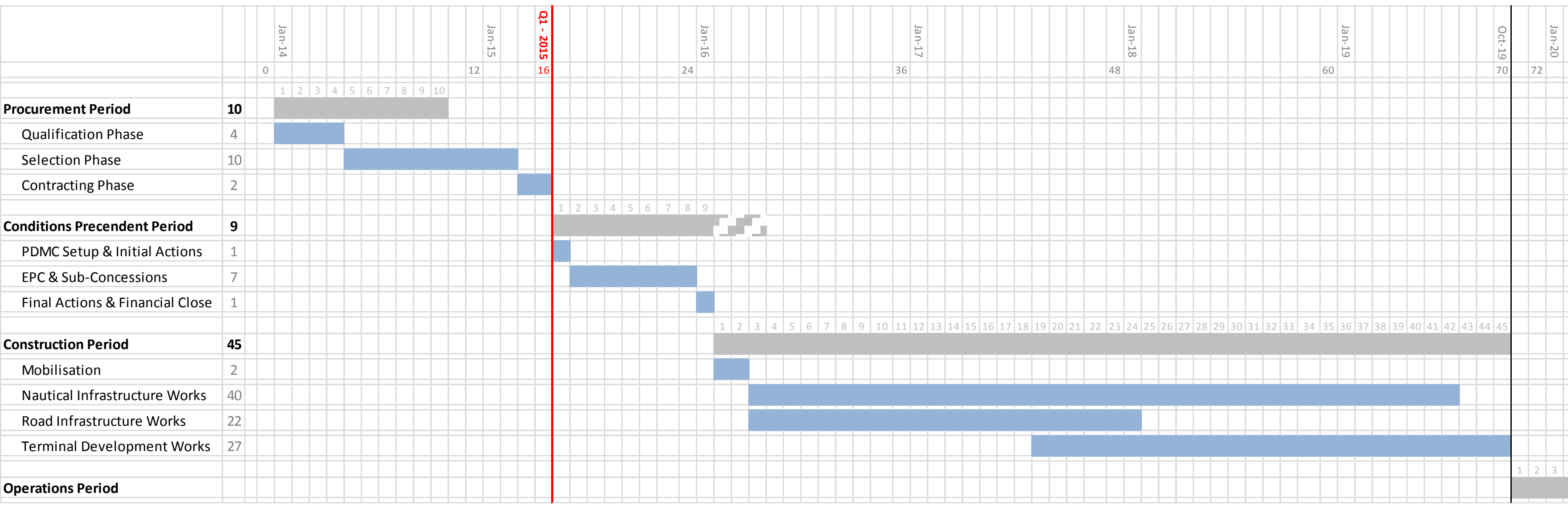
Detailed background on the Full Environmental Assessment study can be found in chapter 7 of the Social & Environmental Scoping Study, which is included in the Supporting Documents to this Outline Business Case.

Contents

Project Milestones – Project – Overview

Tender runs for 70 months from early 2014 to Q1 2015 (tender implementation: signing of the PPP Agreement), followed by 9-12 months Conditions Precedent Period and 45 months Construction Period.

The overall project timing is visualized below

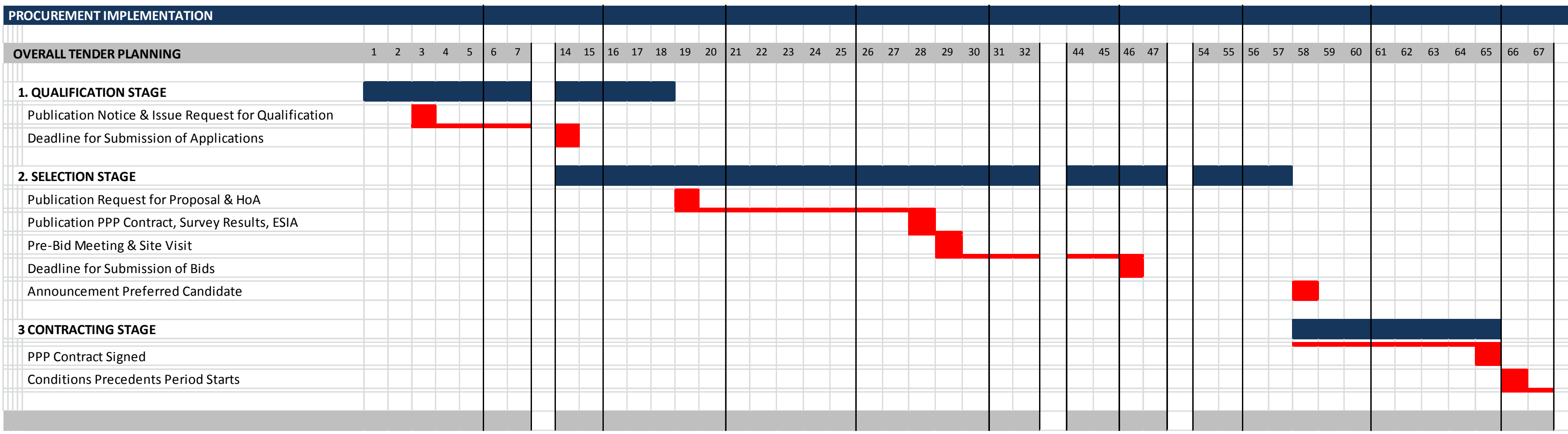


Project Milestones – Procurement – Overview

Tender runs for 65 weeks from early 2014 to Q1 2015 (tender implementation: signing of the PPP Agreement)

Detailed Procurement Planning included in Procurement File (*Procurement Planning*)

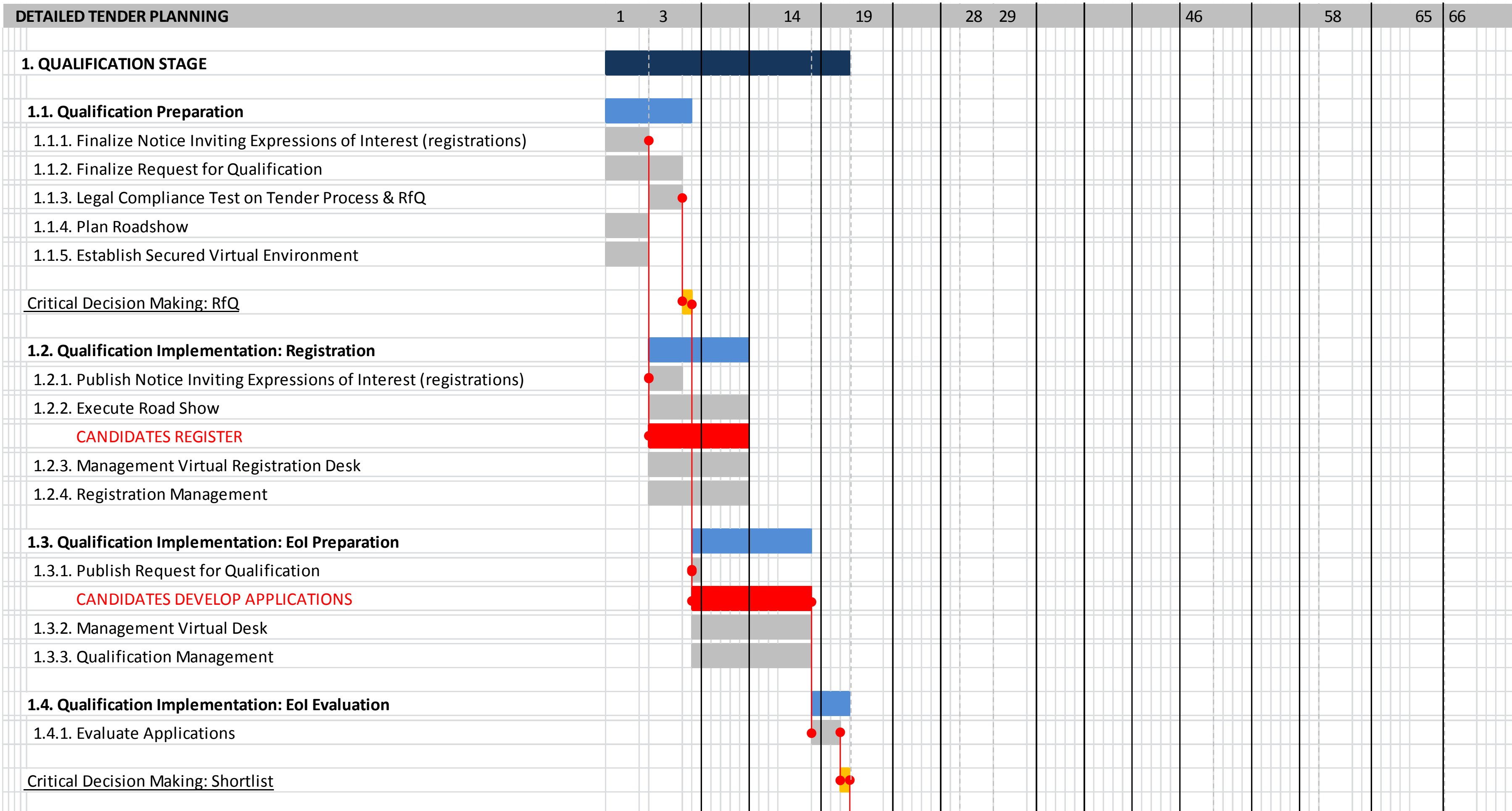
The overall tender timing from Private sector perspective is visualized below



Project Milestones – Procurement – Qualification Stage

Felak Concept Limited mtbs

Qualification Stage runs for 18 weeks from finalizing the Notice to establishing the Shortlist



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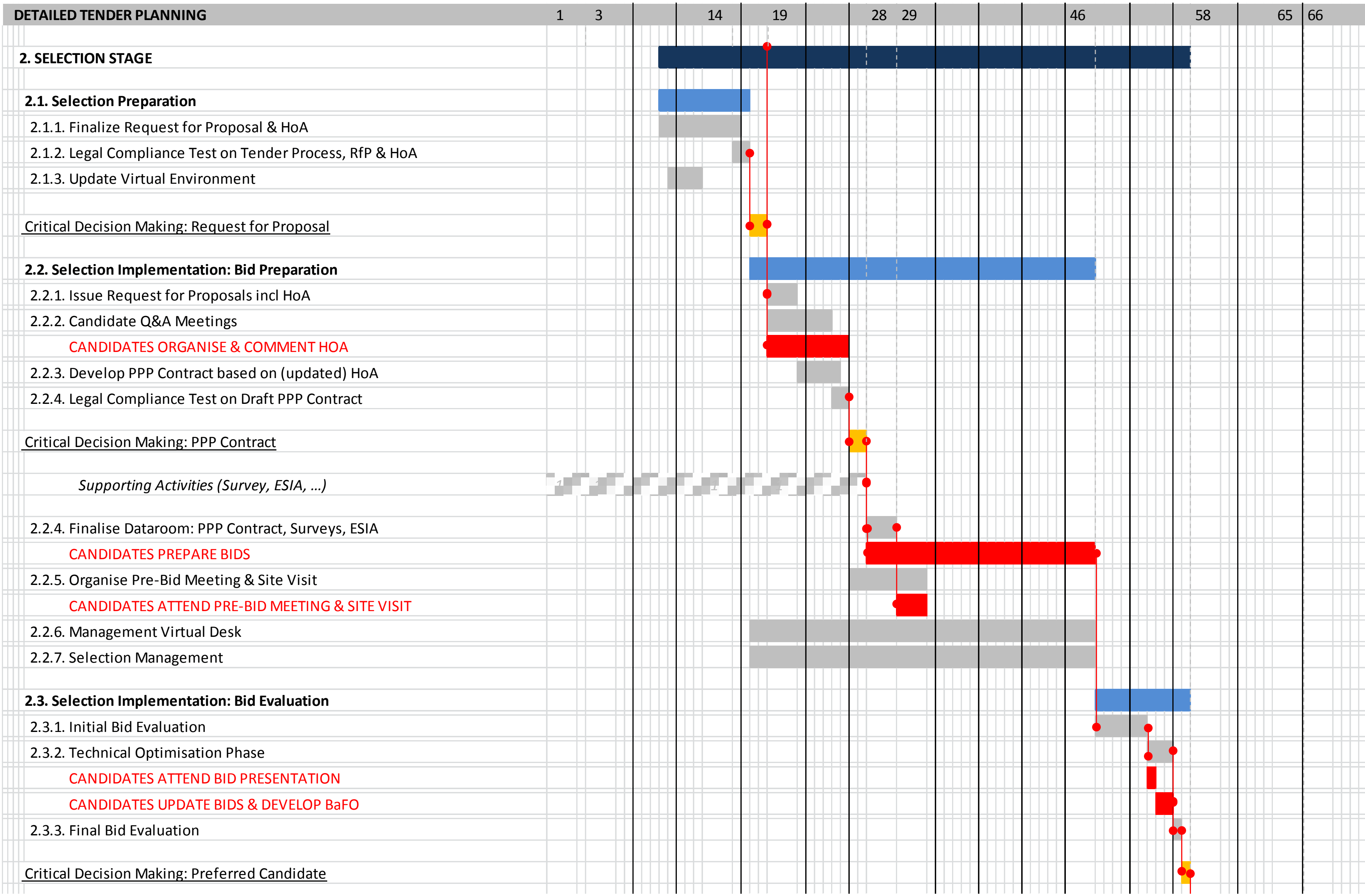
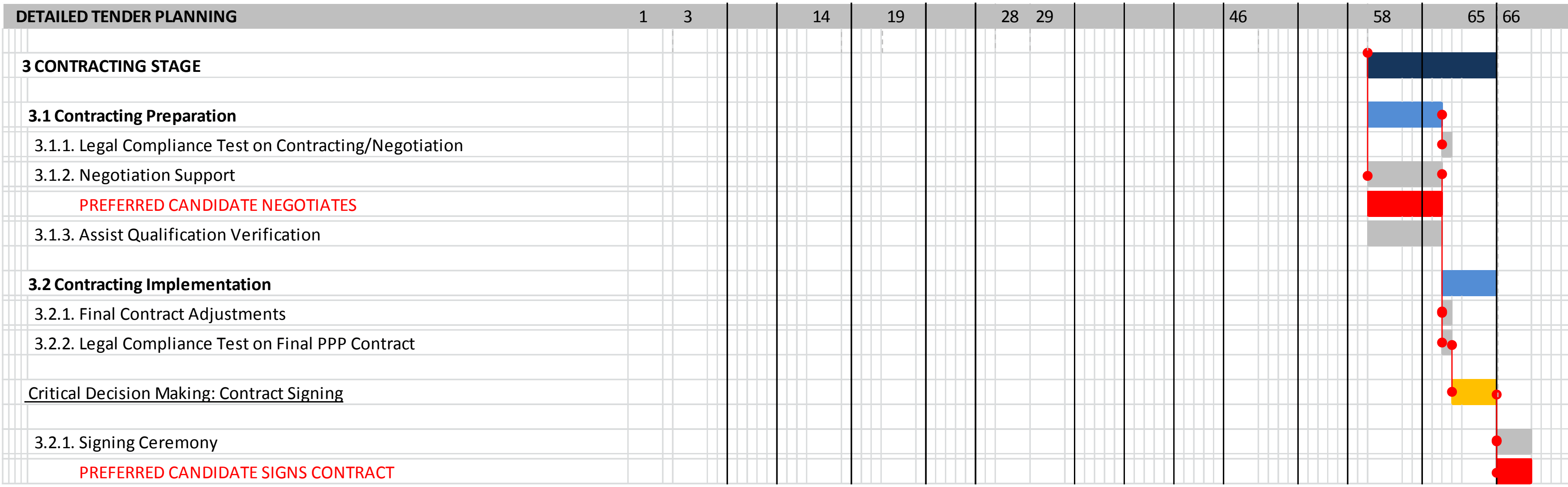
Project Milestones – Procurement – Selection Stage

Selection Stage runs for 49 weeks from preparing the RfP to formalising the Preferred Candidate



Project Milestones – Procurement – Contracting Stage

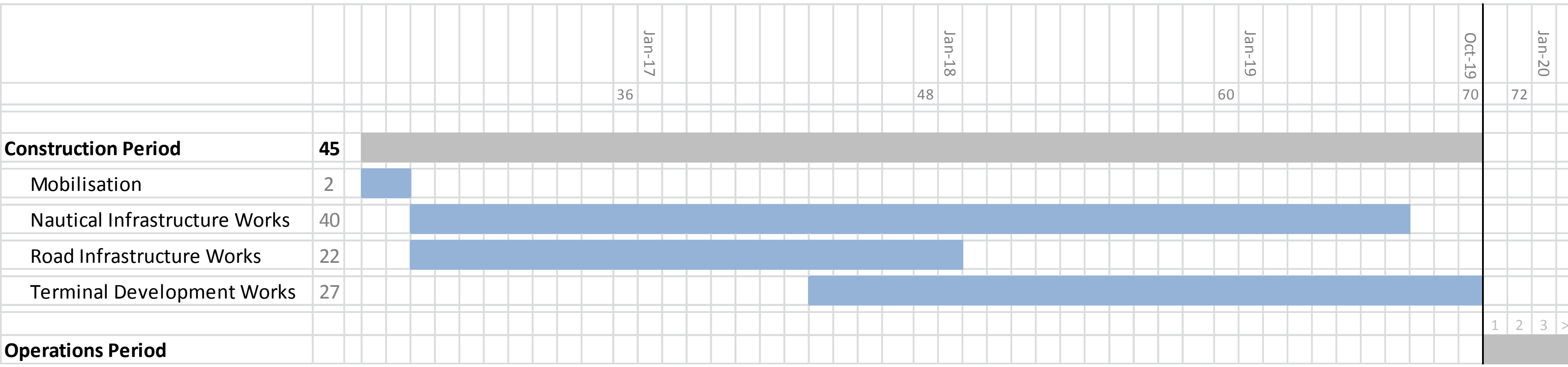
Contracting Stage runs for 8 weeks from Negotiations to Contract Signing



Project Milestones – Construction

Detailed Construction Schedule included in Outline Business Case (*Technical Options Analyses*)

Figure 7 – Overall Construction planning

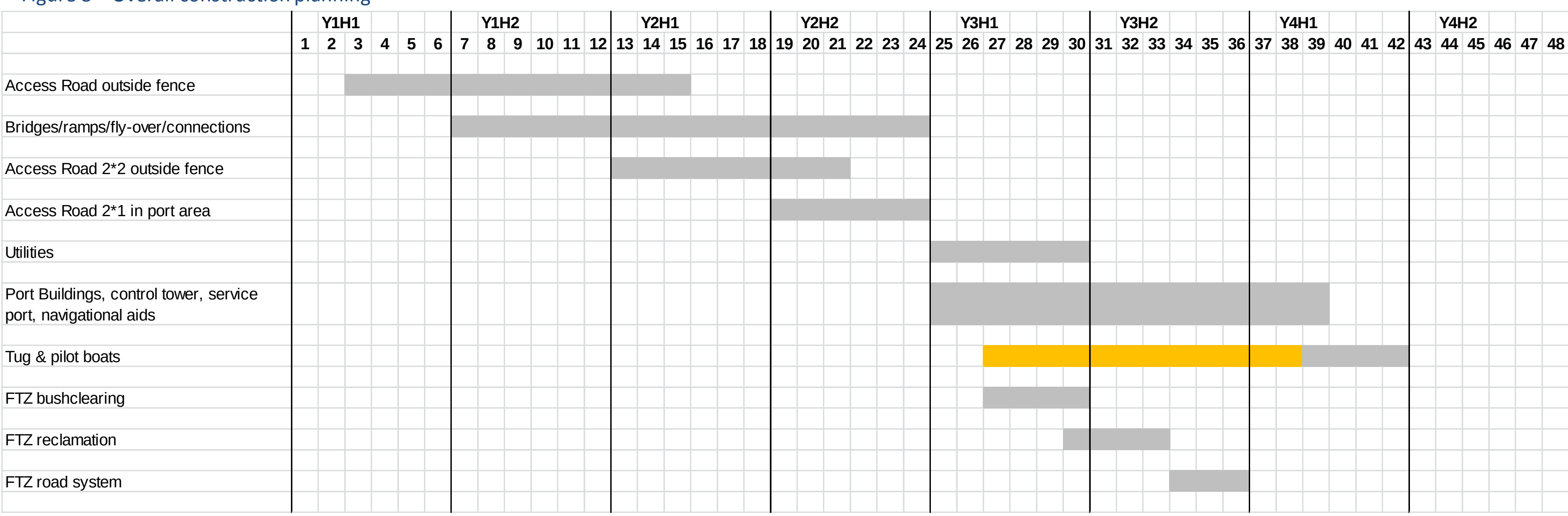


Project Milestones – Construction

Detailed Construction Schedule included in Outline Business Case (*Technical Options Analyses*)

- In 4 years construction time phase 1 can be in operation (including oil terminal).
- A fast track schedule with a single contractor for all marine and construction works is needed to achieve this.
- Financial close, environmental clearance, and all permits from state or federal governments, shall be complete at contract award date in order to meet the schedule.
- Critical path is with marine and reclamation works at first; after 1.5 year it shifts towards terminal construction and equipment commissioning *(next slide)*
- Construction of land infrastructure is a significant task but not considered to be part of the critical path towards the Phase 1 completion (*below*)

Figure 8 – Overall construction planning



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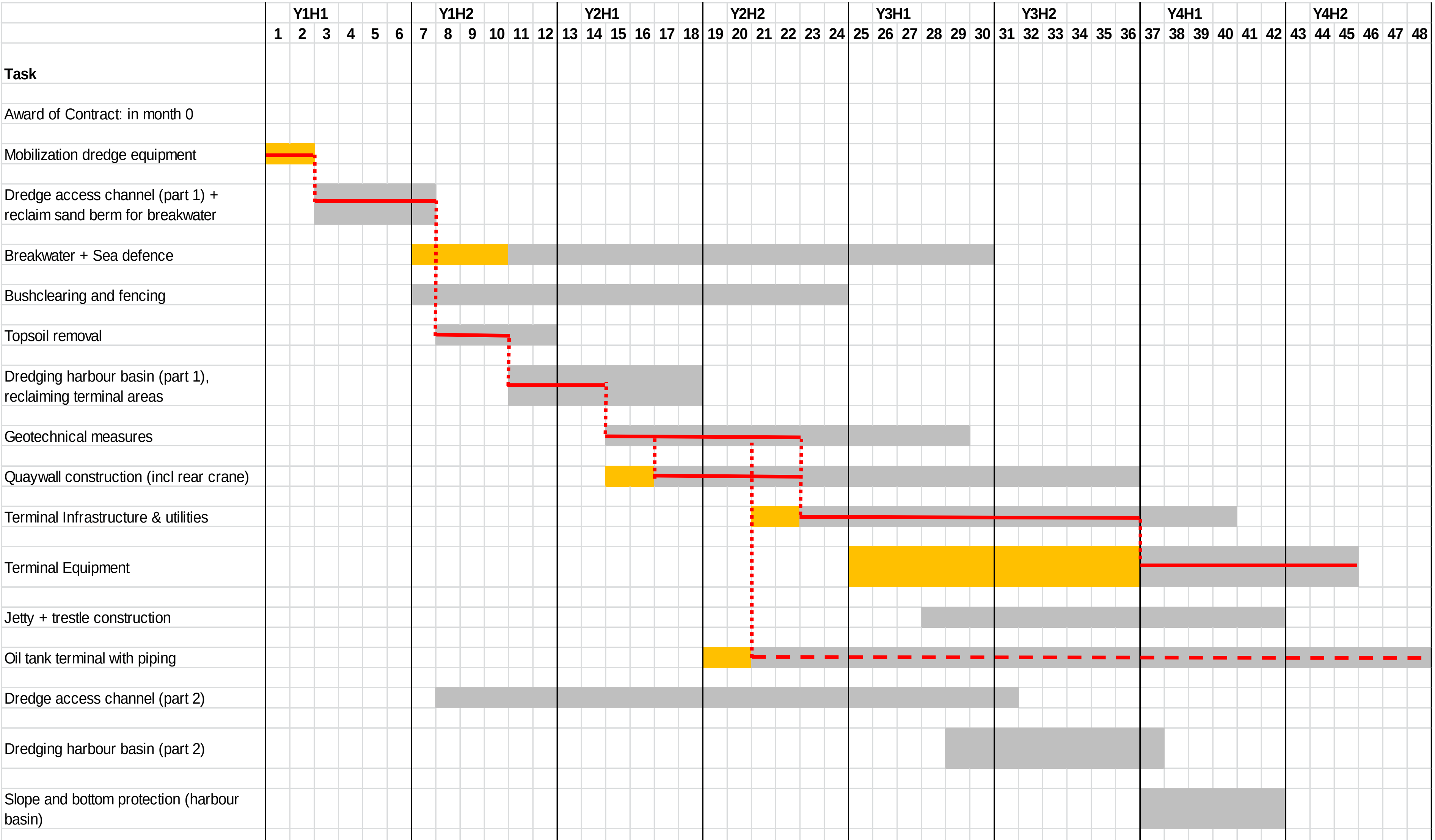
Project Milestones – Construction – Critical Path

Detailed Construction Schedule included in Outline Business Case (*Technical Options Analyses*)

Figure 9 – Detailed construction planning



Project Initiators:

Akwa Ibom

Transaction Advisors:

Felak Concept Limited

mtbs
maritime & transport
business solutions

IBOM DEEP SEA PORT AND FREE TRADE ZONE

OUTLINE BUSINESS CASE

TRAFFIC FORECAST

FINAL

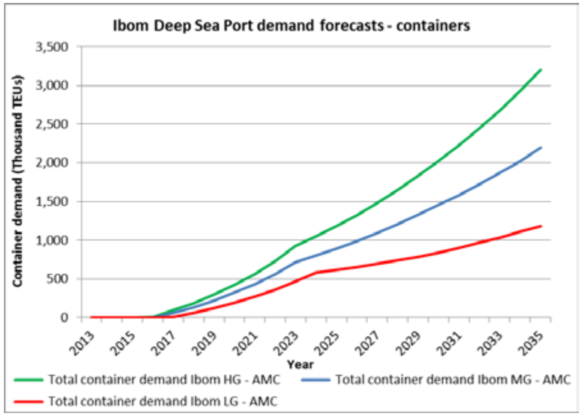
Felak Concept Limited and Maritime & Transport Business Solutions B.V. 26 May 2014

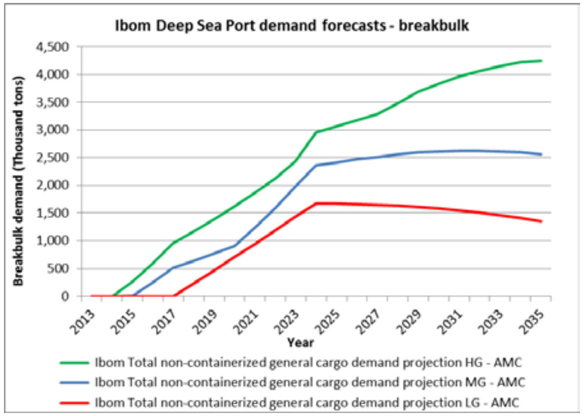
Project Initiators:

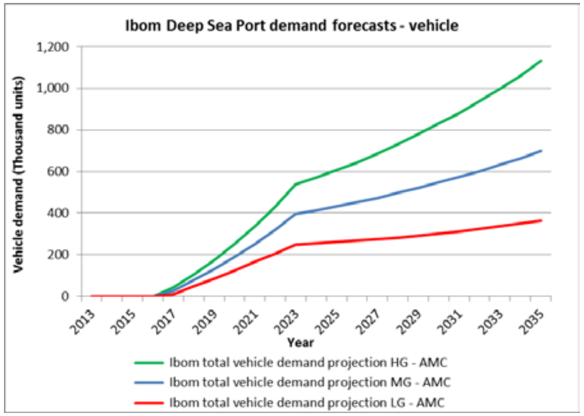
Transaction Advisors:

Project Name	Ibom Deep Sea Port and Free Trade Zone
Document Title	Outline Business Case Traffic Forecast
Document Status	Final
Companies	Felak Concept Limited and Maritime & Transport Business Solutions B.V. - MTBS
Date	26 May 2014
Client	Steering Committee on Ibom Deep Sea Port

Ibom Deep Sea Traffic Forecast: main findings

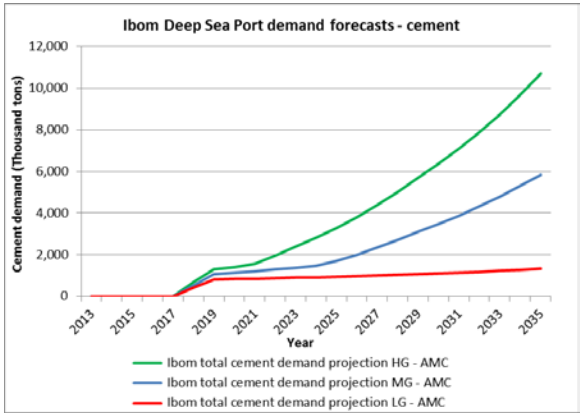






This page presents the main findings for the Ibom Deep Sea Traffic Forecast. Demand projections up to 2035 are provided for five main cargo segments. The table below presents the projected volumes for selected years. As can be seen in the figures, Ibom DSP requires a build-up period to attain market share in the first ten years of operations. After this build-up period, volumes grow at a more stable pace.

The approach, methods and assumptions that are used to project the demand figures for Ibom DSP are elaborated in this document.



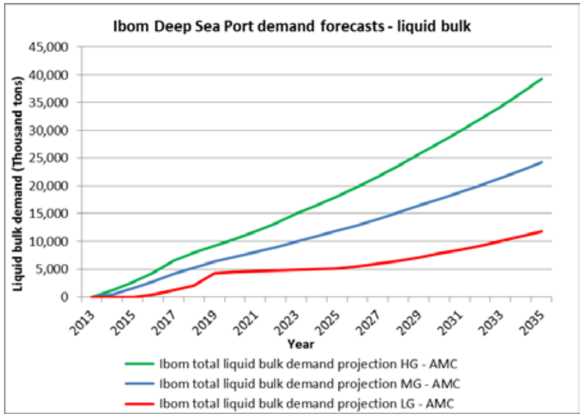
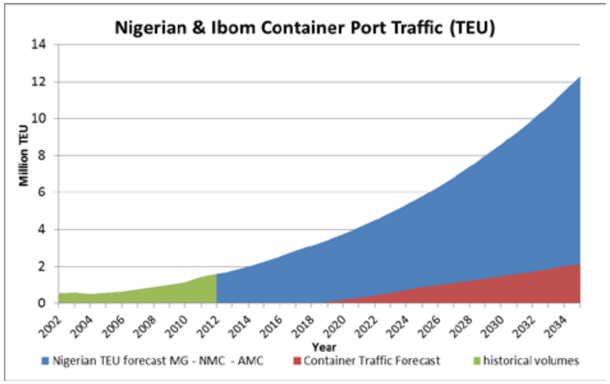
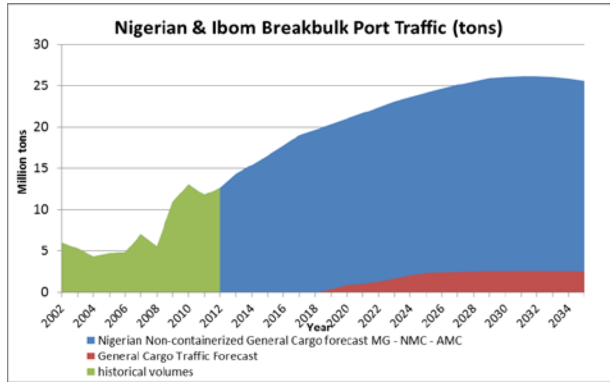


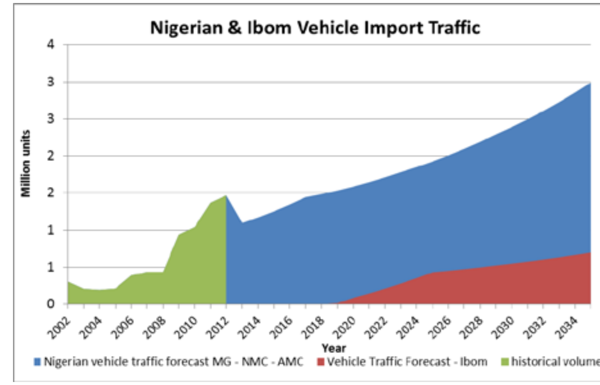
Table 1 – IDSP market forecast for selected years

Port	2018	2020	2025	2030	2035
Containers (TEU)	134,108	321,658	890,424	1,452,851	2,194,840
Breakbulk (tons)	635,849	902,177	2,418,505	2,612,479	2,565,504
Cars (units)	77,405	190,352	431,559	547,631	698,759
Cement (tons)	518,645	1,148,793	1,708,321	3,477,759	5,849,536
Liquid bulk (tons)	5,311,303	7,176,755	11,897,932	17,624,500	24,218,425

Nigeria Traffic Forecast: main findings

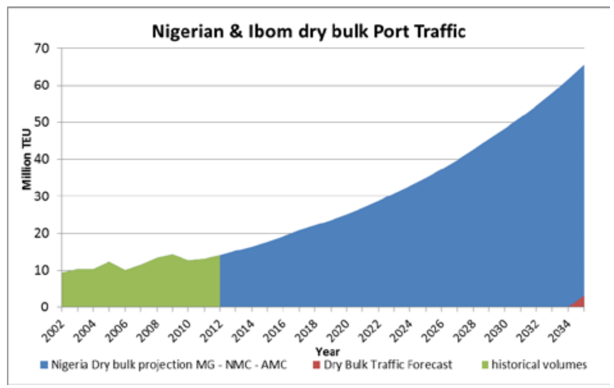






This page presents the main findings for Nigeria's Traffic Forecast. Demand projections up to 2035 are provided for five main cargo segments. The table below presents the projected volumes for selected years.

IDSP's traffic forecasts are incorporated in the graphs, displayed by the red area's. The approach, methods and assumptions that are used to project the demand figures for Nigeria are elaborated in this document.



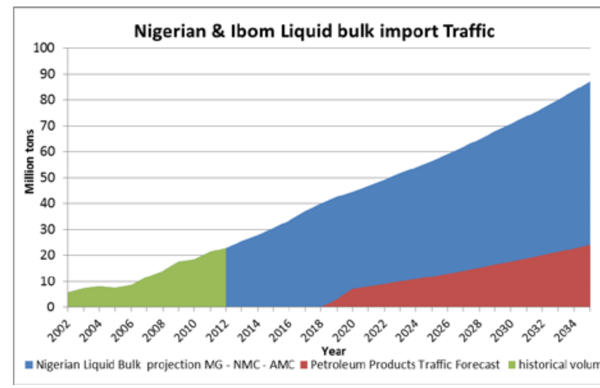


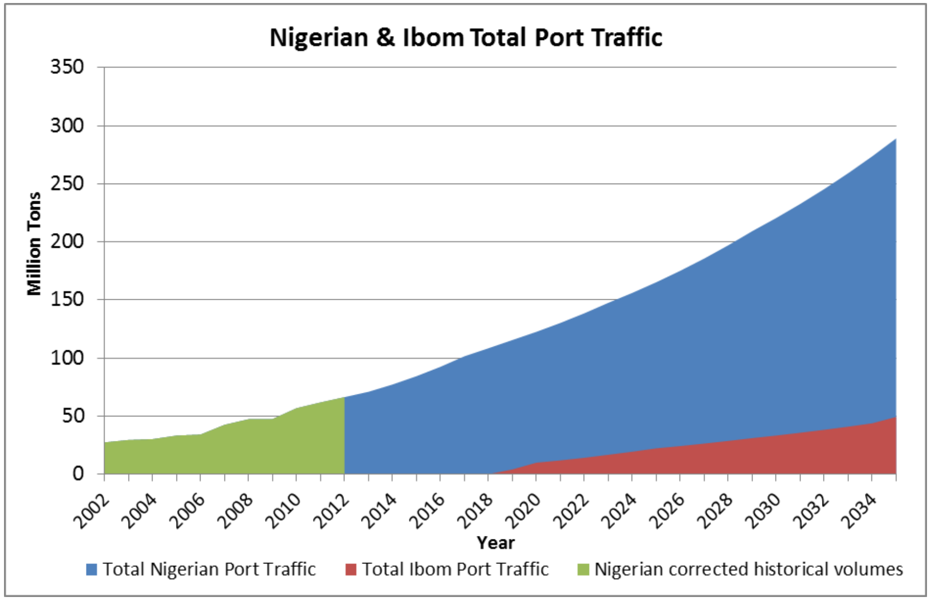
Table 2 – Nigeria market forecast for selected years

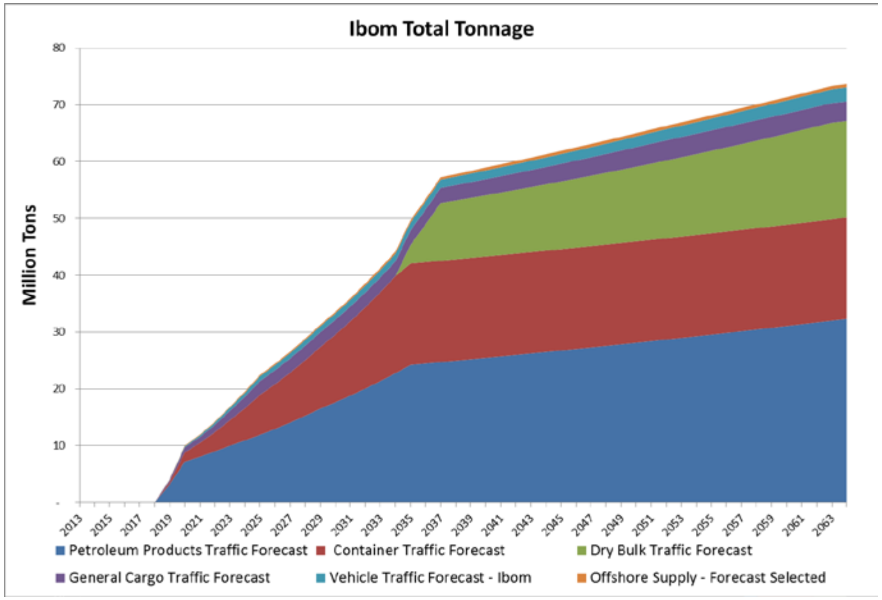
Nigeria	2018	2020	2025	2030	2035
Containers (TEU)	3,119,710	3,745,988	5,787,106	8,599,242	12,309,186
Breakbulk (tons)	19,722,034	21,050,794	24,185,048	26,124,795	25,655,036
Cars (units)	1,486,390	3,174,456	3,852,474	4,781,048	5,990,068
Dry bulk (tons)	22,131,534	25,118,174	34,944,025	48,310,313	65,519,520
Liquid bulk (tons)	40,018,985	44,682,614	56,485,558	70,801,979	87,286,792

Nigeria & Ibom Deep Sea Traffic Forecast: main findings

The figures below provide an overview of the historical and forecasted total throughput figures for Nigeria and the Ibom Deep Sea Port. The graph on the left shows the historical total throughput tonnage in Nigerian ports for the period 2002 – 2012 and forecasted throughput tonnage for Nigerian ports and IDSP. The graph on the right shows the forecasted throughput tonnage for IDSP (2013 – 2063). The graphs demonstrate that a conservative approach was used in developing the traffic forecast for Ibom Deep Sea Port: IDSP's modest share in the left graph proves this.

Demand & Capacity Development: National & Regional Demand (left) & Ibom DSP Demand (right)





Ibom Traffic Forecast Analysis: Objective & Approach

Purpose of the Traffic Forecast Report

This document contains the traffic forecast for Ibom Deep Sea port project. The traffic forecast is an appendix of the Outline Business Case, more specifically of the Strategic Needs Assessment and Service Delivery Options chapters. The Outline Business Case Document serves as the basis for decision-making on the desirability of the overall project. This appendix can be read separately from the Outline Business Case.

Objective of this Report

The objective of this report is to assess the potential demand for port handling services in Ibom DSP. The demand projections are used as input for the technical design, the financial model and the economic cost benefit analysis.

Scope of this Report

The scope of this report is defined at three levels: at a port level, at a geographic level and at a cargo level. With respect to the port-level scope: this report solely focuses on the demand projections for Ibom DSP. Other ports is Nigeria are analyzed as part of the port competitive field assessment, yet no individual demand projections are developed for individual ports other than Ibom DSP. With respect to the geographic level: all possible trade flows are assessed; domestic trade, transit trade and transshipment trade. With respect to the cargo level: five main cargo segments are analyzed: containers, breakbulk, vehicles, dry bulk and liquid bulk.

Timeframe of the Analysis

The demand projections for Ibom DSP all focus on the period 2013-2035.

Executive summary: strategic considerations for Master Planning

Strategic considerations derived from the demand projections: cargo focus

The strategic considerations form the main conclusions of the traffic forecast analysis for Ibom DSP. The strategic considerations describe what cargo segments are potentially interesting for Ibom DSP and what infrastructure characteristics should be provided in order to create unique selling points within the Nigerian port sector. The following conclusions can be drawn from the traffic forecast analysis:

General cargo handled on a common terminal during the first phase;

- Due to the ramp-up period of container demand volumes and vehicle demand volumes, these demand volumes are sufficient to sustain a specialized terminal in the first phase of operations. Hence a combined terminal for containers, breakbulk and vehicles is included in the first phase of operations in the Master Plan;
- A specialized facility for off-shore supply is included in the Master Plan for the first phase of operations. The proximity of offshore oil fields creates captive volumes from the start of the project. Demand for offshore supply is not quantified in the demand projection due to the fact that this demand is mainly supply driven;
- The breakbulk terminal is primarily focused on iron & steel products, consumables traded as breakbulk are regarded as upside potential. Capacity expansions for the breakbulk terminal are triggered by iron & steel products demand.

Dry bulk cargo handled on a specialized terminal;

- A strategic decision is made to focus at cement demand during the first phase of operations; cement demand is the largest and most stable of all commodities in the dry bulk segment. In the low economic growth scenario, the cement volumes may not be sufficient to justify a specialized terminal;
- Handling of grains/wheat, sugar and fertilizers is included in the overall Master Plan, yet not in the first phase of operations due to unstable demand (pro-active government policy on agricultural production might reduce potential) and the significantly lower volumes than cement.

Liquid bulk cargo handled on a specialized terminal;

- Significant demand volumes are projected for Ibom, primarily in the PMS-segment (petroleum products): at least one jetty shall be developed in first phase to meet the demand projection:
- Facilitation of LNG export is not included in the first phase of port development due to the strong competition of the existing facility at Bonny;
- Volumes that are the result of liquid bulk transshipment are regarded as upside potential. This is mainly dependent on the legal setting concerning liquid bulk vessels and the lightering of larger liquid bulk vessels;
- Tank-farm with proper hinterland connections behind main terminals.

Executive summary: strategic considerations for Master Planning

Strategic considerations derived from the demand projections: infrastructure requirements

An extensive market consultation campaign is conducted in order to assess the potential demand for cargo handling services at Ibom DSP. During the market consultation campaign, the required infrastructure characteristics were discussed as well. These required infrastructure characteristics are important aspects for the competitive position of Ibom DSP. The following infrastructure characteristics were mentioned on multiple occasions and can become the Unique Selling Points of Ibom DSP:

A draft of at least 15 meter required to provide an attractive alternative for Lagos ports and Delta ports. The draft of 15 meter will provide an excellent proposition for the development of economies of scale in maritime transport. Due to draft restrictions in the current ports, the global trend of deploying larger vessels on main trade routes has not materialized yet in a similar magnitude as other regions (Southern Africa, East Africa e.g.). The draft of at least 15 meters will provide economies of scale in the following three segments:

- Draft of 15 meters is required to handle LR1-tankers for petroleum import;
- Draft of 15 meters is required to handle Panamax vessels for dry bulk import;
- Draft of 15 meters is required to handle container vessels up to 8,000 TEU.

In addition to the maritime access, Ibom DSP will have to provide excellent hinterland connections in order to compete with the ports of Onne, port Harcourt and the port of Calabar (Eastern region of Nigeria) and the greenfield ports in the Lagos area (central region of Nigeria). This excellent hinterland connection is required to build on one of the core propositions of Ibom DSP: the gateway function for (East-)Nigeria. The hinterland connection is not limited to the direct connection with the port; the interregional road infrastructure requires sufficient capacity to handle the projected demand for Ibom DSP.

The demand projections for Ibom DSP assume that the above mentioned infrastructure characteristics are realized at the required point in time in Ibom DSP. Subsequently, the infrastructure requirements are also core input for the technical design, the financial model and the economic cost benefit analysis for Ibom DSP.

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Main Table of Content

Table of Content Chapter 1

1.1 Methodological Framework: Introduction

This chapter presents the methodological framework that is applied to the quantification of the demand projections for Ibom DSP. Five main cargo segments are analyzed in this report: containers, breakbulk, vehicles, dry bulk and liquid bulk. Despite the fact that there are a specific technique s for detailed quantification of the various cargo segments, there is a generic approach that is applied to all cargo segments. This approach is presented in this chapter. This chapter contains the following paragraphs:

Top-down approach

The first paragraph presents the main approach towards the demand projections: a top-down approach based on GDP developments or GDP per capita developments, depending on the availability of a statistically significant relation for historical throughput. The extrapolations on the basis of GDP multipliers are checked in the market in order to assess the accuracy of the projections.

Projection of market shares

The second paragraph presents the main approach towards the determination of market shares for East-Nigeria and Ibom DSP. Assumptions are made per cargo segment, yet the qualitative argumentation behind the assumptions is based on a generic approach. This approach is presented in the second paragraph.

Port capacity estimations

The third paragraph presents the approach towards the quantification of port capacity in East-Nigeria.

Transit potential approach

The fourth and last paragraph presents the approach that is applied towards the quantification of transit trade flows. This transit potential approach is generic: the approach applies to all cargo segments.

1.2 Methodological Framework: Top-down approach with reality-check

This paragraph presents the top-down analytical approach that is applied to the five cargo segments. The methodological framework for the traffic forecast projection of Ibom DSP consists of a step-wise top-down approach with 6 steps. The figure on the right presents the approach, which is further elaborated below:

1. Macro-economic analysis and expectations projected with support of IMF data;
2. Statistical analyses port throughput. In this stage, the relation between macro-economic variables such as GDP, GDP per capita and population on the one hand and cargo throughput on the other hand is assessed;
3. National demand projections drawn based on GDP and GDP per capita development expectations and the observed relations with cargo throughput;
4. Domestic production projections conducted primarily on the basis of current production and government policies for short-term development of industry/agricultural support programs;
5. Ibom DSP market share set per cargo segment, on the basis of historical throughput data and an assessment of the expected strength of future greenfield ports in Nigeria;
6. By combining the national demand projections and market share projections, the demand projections per cargo segment are drafted for Ibom DSP;
7. The demand projections that are derived from the top-down approach are checked during the market consultation conducted in week 17 (15th of April – 19th of April, Lagos).

After the reception of feedback during the market consultation and the interim presentation during week 20 (16th of May, Uyo), the final demand projections are conducted. In chapters 3 to 6, step 3-6 are presented for the individual cargo segments.

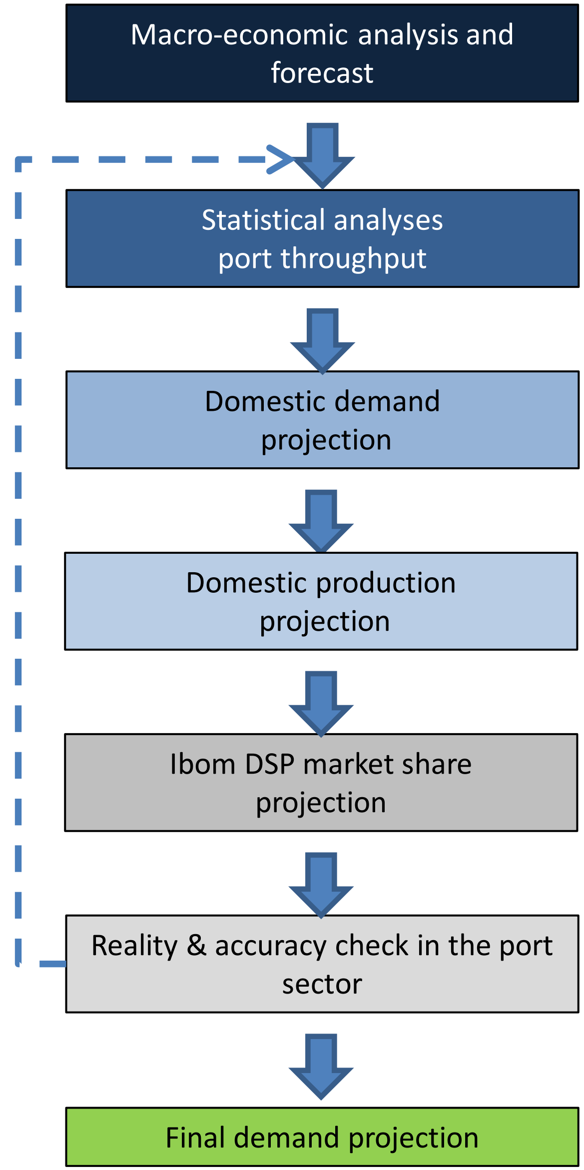

Figure 1.1 – Top-down forecasting approach

1.3 Methodological Framework: Projection of Market Shares Ibom DSP

This paragraph presents the main approach towards the determination of market shares for East-Nigeria and Ibom DSP. Assumptions are made per cargo segment, yet the qualitative argumentation behind the assumptions is based on a generic approach.

A step-wise approach is applied towards the determination of market shares for Ibom DSP. Instead of assuming a market share for each individual port, the Nigerian port sector is divided into clusters. Within its cluster, the Ibom DSP market shares are set. The full step-wise approach is presented below.

<u>Step-wise approach</u>:

- Nigeria divided into three port cluster: Lagos port cluster, West-Delta port cluster and the East-Delta port cluster. Ibom DSP located in East-Delta port cluster;
- Future relative strength assessed based on historical throughput statistics and expected greenfield developments in clusters;
- Per cargo segment, market shares are set for the East-Delta cluster in order to quantify East-Delta throughput;
- Per cargo segment, the Ibom DSP market share within East-Delta is set in order to quantify Ibom DSP throughput.

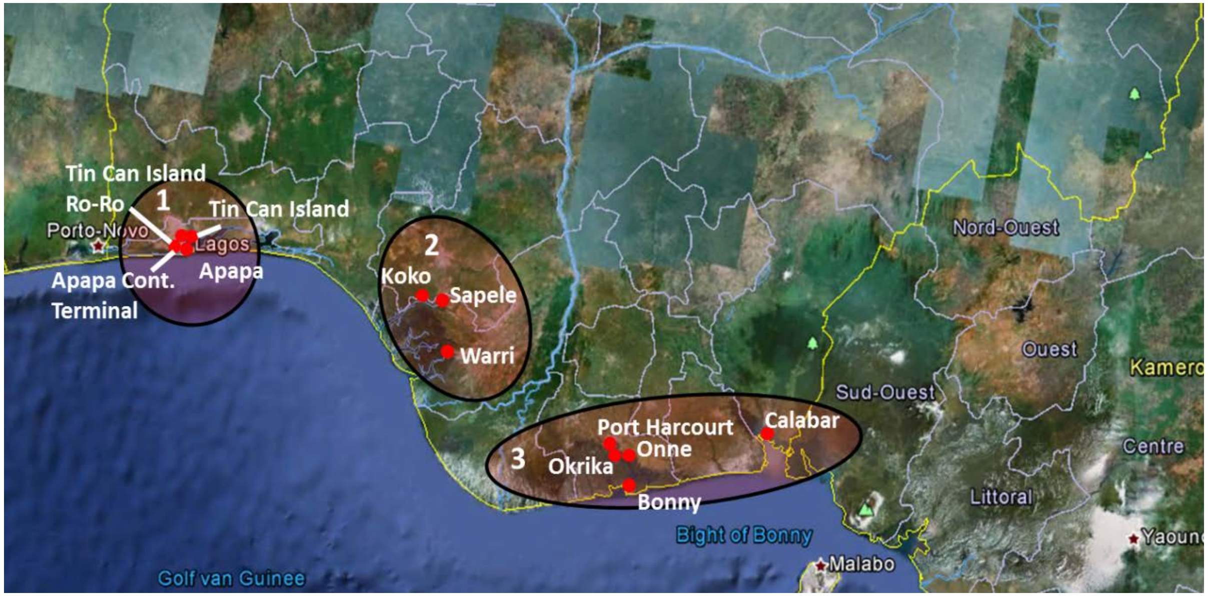

Figure 1.2 – Nigerian port clusters

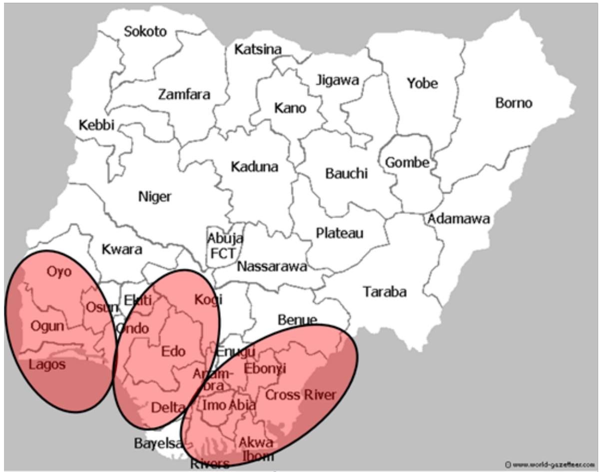

Figure 1.3 – Captive area for port clusters

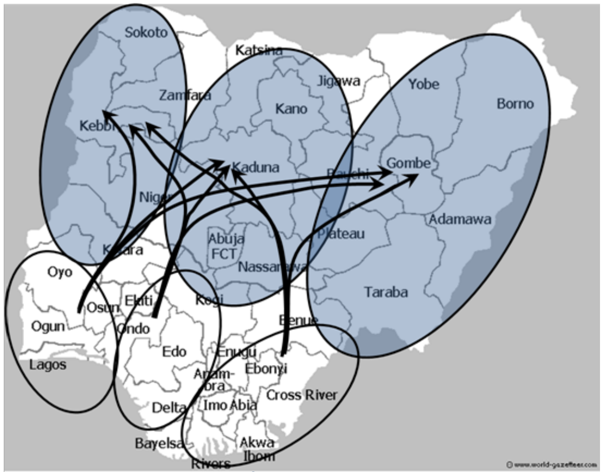

Figure 1.4 – Hinterland for port clusters

1.4 Methodological Framework: Port Capacity Estimations

This paragraph presents the port capacity assumptions for the ports in the East-Delta cluster. The port capacity assumptions are set in order to avoid unrealistically high predictions for the current Delta ports. In case no correction for port capacity would not be conducted, the demand for the current Delta ports would be equal to the extrapolation of Eastern Demand and the market share of the individual ports. This would lead to unrealistically high throughput projections for the current Delta ports and hence a underestimation of the potential for Ibom DSP. The port capacities are estimated as follows:

Methodology for containers, breakbulk and dry bulk:

1. First, the actual throughput figures for the ports are collected per cargo segment;
2. The throughput volumes for the ports are compared to the reported berth occupancy rates in order to obtain the maximum capacity of the current terminals;
3. An assessment has been made in order to set an assumption for the room for infrastructure expansion per port. For the port of Onne, an expansion of 25% is regarded as viable, for the other ports no efficient capacity expansions are assumed;
4. Per cargo segment, the room for efficiency gain has been assumed. Based on this figure, the maximum terminal capacity of the Delta ports is calculated (see bottom row of table below).

The terminal capacity for vehicles and liquid bulk are not calculated since other drivers apply to these cargo segments (liquid bulk: nr. of jetties and tanks; vehicles nr. of ramps). The liquid bulk capacity estimation is based on the current throughput in the largest liquid bulk port in East-Nigeria: port Harcourt. For the ports of Onne and Calabar it is assumed that their maximum capacity is equal to the current throughput in port Harcourt (3.3 million tons). For port Harcourt an expandable capacity of 20% is assumed . As such the total liquid bulk capacity of the Delta ports is estimated at 10.7 million tons per annum.

For the vehicle capacity, it is assumed that the port of Onne will be able to develop a small specialized ro-ro terminal (50,000 units), whereas the other ports do not develop to-to terminals. The full list of assumptions is presented in the table below.

Table 1.1 – Port Capacity Utilisation Ease-Delta Ports Cluster

Port	Containers	Breakbulk	Vehicles	Dry bulk	Liquid bulk
Throughput 2011	162,467 TEU	1,476,380 tons	4,000 units	3,557,280 tons	4,870,974 tons
Reported berth occupancy (NPA)	64%-85%	64%-85%	64%-85%	64%-85%	n/a
Current capacity ports	211,179 TEU	1,919,044 tons	n/a	5,189,172 tons	n/a
Room for terminal expansion	25% (Onne)	25% (Onne)	n/a	25% (Onne)	n/a
Maximum terminals	242,725 TEU	2,205,705 tons	n/a	5,431,599 tons	n/a
Room for efficiency gains	10%	50%	n/a	10%	n/a
Maximum terminal capacity	**266,997 TEU**	**3,308,557 tons**	**50,000 units**	**5,974,759 tons**	**10,696,291 tons**

1.5 Methodological Framework: Transit Potential Approach

This paragraph presents the outcomes of the transit potential analysis. Given the fact that there are multiple landlocked countries in the hinterland of Nigeria, it is important to assess the transit potential for ports in Nigeria.

The potential for the attraction of transit cargo demand to Ibom DSP is analyzed from a qualitative perspective. The distances to the landlocked countries and the existing corridors to landlocked countries are assessed.

As can be seen in the figure to the right, the location of Ibom DSP is not preferable for facilitating demand from Mali, Burkina Faso, Niger and Central African Republic. In potential, Ibom DSP could serve Chad, yet there is significant competition from the existing corridor between Douala (Cameroon) and Chad;

As a result of the location of Ibom DSP and the competition with existing corridors, transit demand is not considered as base case demand for the first phase of operations at Ibom DSP. Instead, it is regarded as upside potential with limited volumes given the relatively small economies of the landlocked countries.

Figure 1.5 – Transit markets West Africa

Table 1.2 – Competitive positioning for transit trade West Africa

Port	Mali	Burkina Faso	Niger	Chad	C.A.R.
Nouakchott	- - -	-	-	+	+
Dakar	- - -	-	+	+	+
Conakry	- - -	-	+	+	+
Abidjan	- - -	- - -	-	+	+
Tema	- -	- - -	- - -	+	+
Lomé	-	- - -	- - -	+	+
Cotonou	-	- - -	- - -	+	+
Lagos ports	-	- -	- -	+	+
Douala	+	+	+	- -	- -
Competitive strength Ibom DSP	**- - -**	**- - -**	**- - -**	**-**	**-**

1.6 Methodological Framework: Transshipment Potential Approach

This paragraph presents the outcomes of the transshipment potential analysis. The Ibom Deep Sea port will be able to handle vessels that are significantly larger than the current largest vessel in the West-Africa trade (4,500 TEU). As such, it is important to assess the transshipment market potential for Ibom DSP.

The potential for the attraction of transshipment cargo demand to Ibom DSP is analyzed from a qualitative perspective. As can be seen in the figure to the right, the West- African port sector is divided into three clusters: Western West-Africa (Dakar, Conakry etc.), Central West Africa (Nigerian ports, Douala) and Southern West Africa (Pointe Noire, Luanda).

At this moment, the transshipment market is relatively small in West-Africa. Most shipping lines apply a round-trip routing that includes multiple major ports. There is no central hub within West-Africa, instead the relay-ports are in the Mediterranean (Algeciras, Tanger Med etc.)

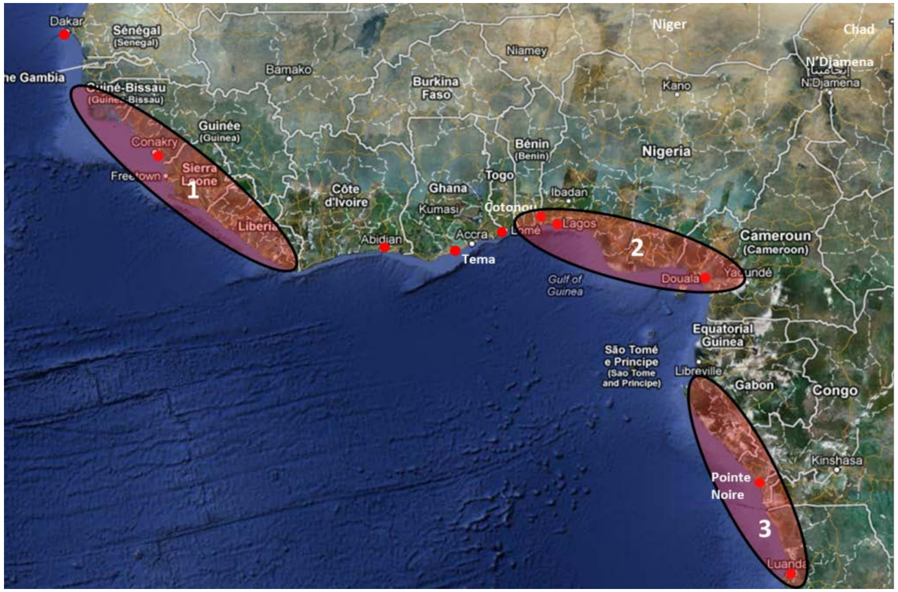

Figure 1.6 – Transshipment markets West Africa

Despite the absence of a significant transshipment pattern in West-Africa at this moment, it can be expected that a hub-and-spoke system will develop in West-Africa within the next two decades. In order to asses the transshipment potential for Ibom DSP, it is important to determine the most preferable geographic region for a hub port.

The most preferable geographic position of the hub port is primarily determined by the dominating route that is applied by shipping lines. The table below presents three possibilities: a domination of routing through the Suez Canal and the Mediterranean, a domination of routing along Cape of Good Hope or no domination of routes at all. The latter option would be preferable for the Central cluster. In the other options, either a southern port or a western port is more preferable as a gateway port due to distance advantages. In case the central cluster is the preferable region, Ibom DSP has a strong position due to its deep draft and the large home market. Since there is no clear indication of a domination of routing in the future, no clear conclusion can be drawn for the transshipment potential for Ibom DSP.

Table 1.2 – Competitive positioning for transshipment trade West Africa

Port	Suez Canal Dominated Routing	Cape of Good Hope Dominated Routing	No Significant Domination of Routes
Western West Africa (region 1)	+ +	- -	+ / -
Central West Africa (region 2)	-	-	+ +
Southern West Africa (region 3)	- -	+ +	+ / -
Competitive strength Ibom DSP	**-**	**-**	**+**

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Main Table of Content

Table of Content Chapter 2

2.1 Macro-Economic Analysis: Introduction

This chapter presents the macro-economic analysis that is used in the quantification of the demand projections for Ibom DSP. As explained in the preceding chapter, the macro-economic analysis is used to derive multipliers of the relations between GDP growth and the five cargo segments. In addition, the macro-economic analysis is used as input for the determination of market share developments per cargo segment. The macro-economic analysis consists of the following paragraphs:

GDP Forecast

The first paragraph of the chapter presents the GDP forecast for Nigeria. The GDP forecast is conducted on the basis of data provided by the World Bank and the IMF. The GDP forecast serves as the main input for the quantification of demand projections.

Regional Economic Analysis

The second paragraph of this chapter presents the regional economic analysis for the country of Nigeria. The main macro-economic factors (GDP population) are analyzed at a state-level. The regional economic analysis is used as input for the market share assumptions for East-Nigeria and Ibom DSP; these are set per cargo segment in later chapters.

Analysis of Import Volume per State

The third paragraph of this chapter presents the analysis of the import volumes on a state-level for the period 2000-2005. This analysis provides additional input for the market share assumptions for East-Nigeria and Ibom DSP; these are set per cargo segment in later chapters.

Analysis of Export Volume per State

The fourth and last paragraph of this chapter presents the analysis of the export volumes on a state-level for the period 2000-2005. This analysis provides additional input for the market share assumptions for East-Nigeria and Ibom DSP; these are set per cargo segment in later chapters.

2.2 Macro-Economic Analysis: GDP forecast

This paragraph presents the GDP forecast for Nigeria up to 2035. The GDP forecast is based on an analysis of the historical GDP development in Nigeria. In addition, the GDP projections of the IMF are taken as input for the short-term growth rate. In order to increase the accuracy and relevance of the GDP projection, three scenarios for economic growth are developed.

The medium growth case assumes a growth that is equal to the growth rates predicted by the IMF (6-7% up to 2018). After 2018, the annual GDP growth rates are subject to step-wise, periodic reductions .

The high economic growth case assumes annual growth rates that are higher than the IMF growth predictions. Subsequently, the growth rates for the period after 2018 are also higher than the medium growth case. The low growth scenario assumes lower growth rates than the medium growth case throughout the whole period. The GDP projections for a selection of years is presented in the table below.

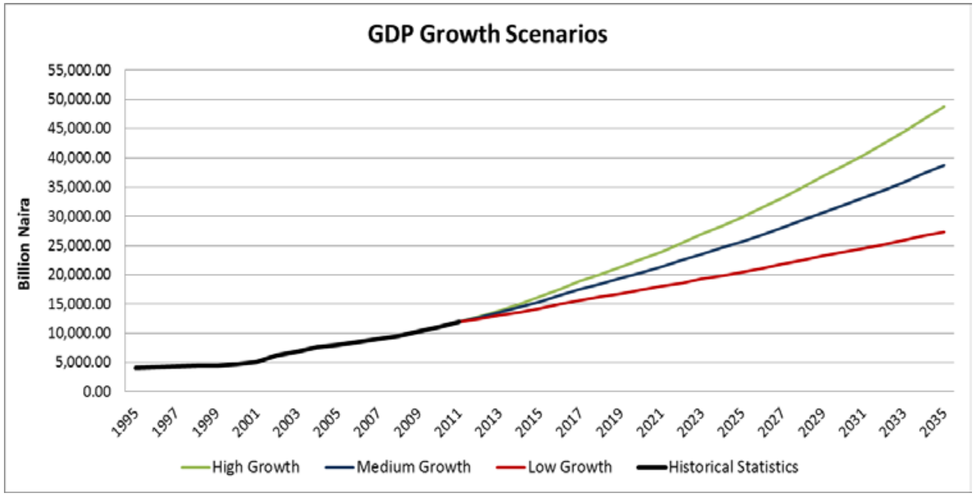

Figure 2.1 – GDP development Nigeria

Table 2.1 – GDP Estimations (IMF)

	2012	2015	2020	2025	2030	2035
High growth						
GDP (trillion Naira)	12,831	16,204	22,548	29,834	38,586	48,779
GDP growth		8.09%	6.00%	5.40%	4.80%	4.80%
Medium growth						
GDP (trillion Naira)	12,671	15,410	20,326	25,695	31,867	38,772
GDP growth		6.74%	5.00%	4.50%	4.00%	4.00%
Low growth						
GDP (trillion Naira)	12,431	14,275	17,356	20,474	23,828	27,356
GDP growth		4.72%	3.50%	3.15%	2.80%	2.80%

2.3 Macro-Economic Analysis: Regional Economic Analysis

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This paragraph presents the regional economic analysis for the country of Nigeria. The regional economic analysis for Nigeria is conducted in order to assess the main economic centers of Nigeria. The information that is derived from the regional economic analysis is used as input for the Ibom DSP market share projections.

As can be seen in the figures on the right, there is a relatively uneven spread of economic activity in the country of Nigeria. The inequality in the distribution amongst states is largest for GDP: most economic activity is concentrated in the Southern part of Nigeria. Lagos state is the consumption center of Nigeria, while most liquid bulk-related activity is located in South-East Nigeria. The North-Eastern states are lagging behind with respect to GDP size. This division of GDP suggests that the demand generated in the Eastern states is lower than demand generated in Western states.

GDP distribution (2011)

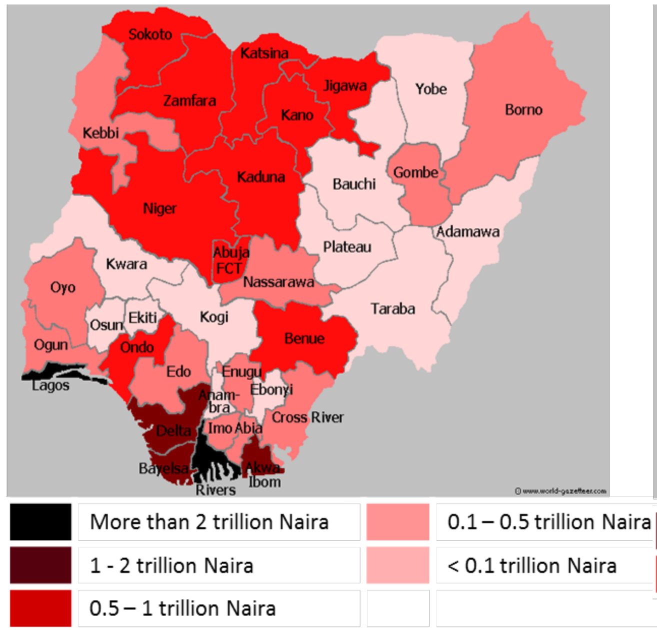


Figure 2.2 – GDP distribution Nigeria 2011

Population distribution (2011)

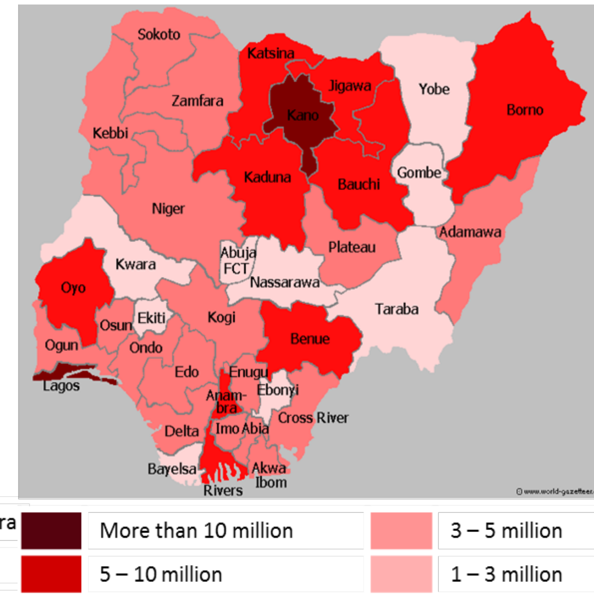


Figure 2.3 – Population distribution Nigeria 2011

The right figure shows the population distribution: a more even spread amongst the 37 states of Nigeria can be observed. Based on population distribution, a more even spread of economic activity and import/export can be expected in the future. This is important input for the Ibom DSP market share projection: the Ibom DSP and FTZ project could enhance the economic potential in East-Nigeria that is currently not utilized to its full potential. The impact of the Ibom DSP and FTZ project is then twofold:

- More demand for port handling services in the Eastern ports (traffic forecast effect);
- More economic activity in East-Nigeria (economic CBA effect)

2.4 Macro-Economic Analysis: analysis of import volumes per state

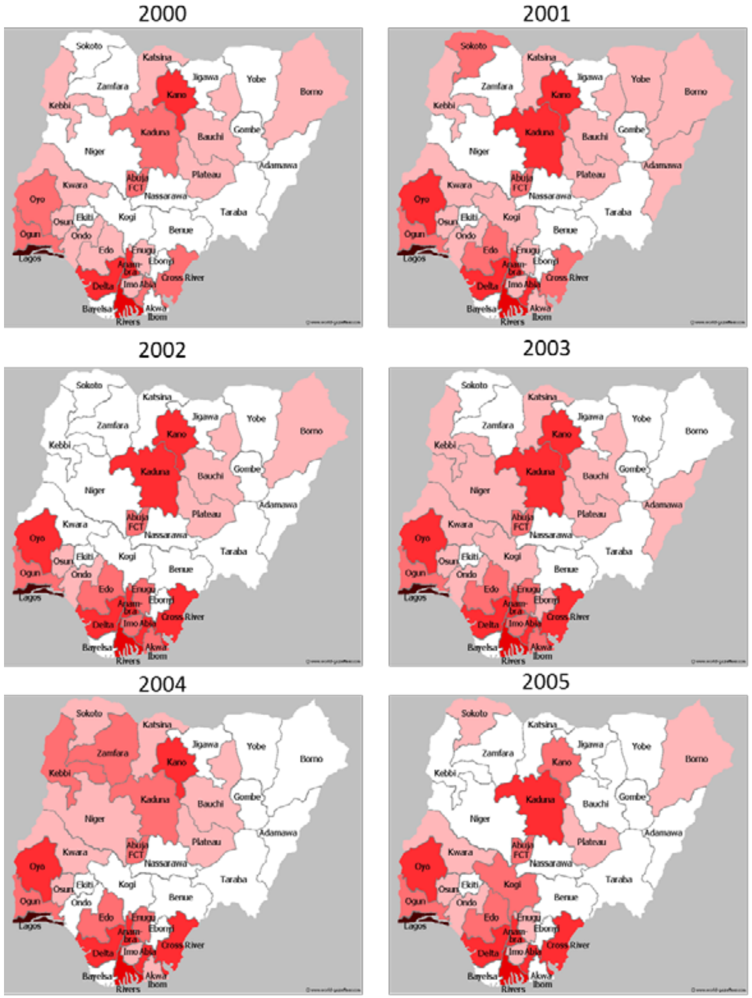
This paragraph presents the analysis of import volumes specified per individual state in Nigeria. The analysis of the import volume per state is conducted in order to assess the main import centers of Nigeria. The information derived from this analysis is used as input for the Ibom DSP market share projections.

The figures to the right present the import volume per state for the period 2000-2005; unfortunately no recent information is available. As can be seen in the figures to the right, the main import destinations are formed by the southern and central states. Throughout the observation period, there is a strong domination of Lagos in overall import volumes.

A second observation in the figures is the relatively high volatility in import volumes per state across the years in the selected period. The import demand is most stable in Lagos, the central states and south eastern states.

The third observation is that the (North)-Eastern states report relatively low volumes and a relatively high volatility across the years. This observation is in line with the GDP distribution amongst the states that was presented in the preceding paragraph.

The observations of the import analysis suggest that a ramp-up period is required in order to create new demand in the eastern states of Nigeria. The population division in the preceding paragraph indicated latent economic potential, yet at this moment the traded volumes per capita are relatively low in East-Nigeria. As such, the market has to be developed slowly: Ibom DSP can contribute to the development of these markets as an Eastern gateway for Nigeria.



	More than 10,000,000 tons		20,000 tons – 100,000 tons
	5,000,000 tons – 10,000,000 tons		1,000 tons – 20,000 tons
	1,000,000 tons – 5,000,000 tons		Less than 1,000 tons
	100,000 tons – 1,000,000 tons		

Figure 2.4 – Import volumes per state (2000-05)

Macro-Economic Analysis: Analysis of export volume per state

This paragraph presents the analysis of the export volume per individual state. The analysis is conducted in order to assess the main export centers of Nigeria. The information derived from this analysis is used as input for the Ibom DSP market share projections.

The figures to the right present the export volume per state for the period 2000-2005; unfortunately no recent information is available. As can be seen in the figures to the right, a small selection of states are involved in producing exports, most states do not report significant export volumes during the selected period.

Throughout the observation period, the Rivers state has a dominant position in overall export volumes due to the facilitation of LNG export through the port of Bonny. The Eastern part of Nigeria reports relatively low export volumes compared to central Nigeria and South-Nigeria. No significant export volumes are reported for the Akwa Ibom state during the selected period.

The Regional export analysis suggests that Ibom DSP should primarily focus at facilitation of import throughput in the first phase of operations. As such, it is assumed that Ibom DSP will handle primarily import cargo flows in the first period of operations.

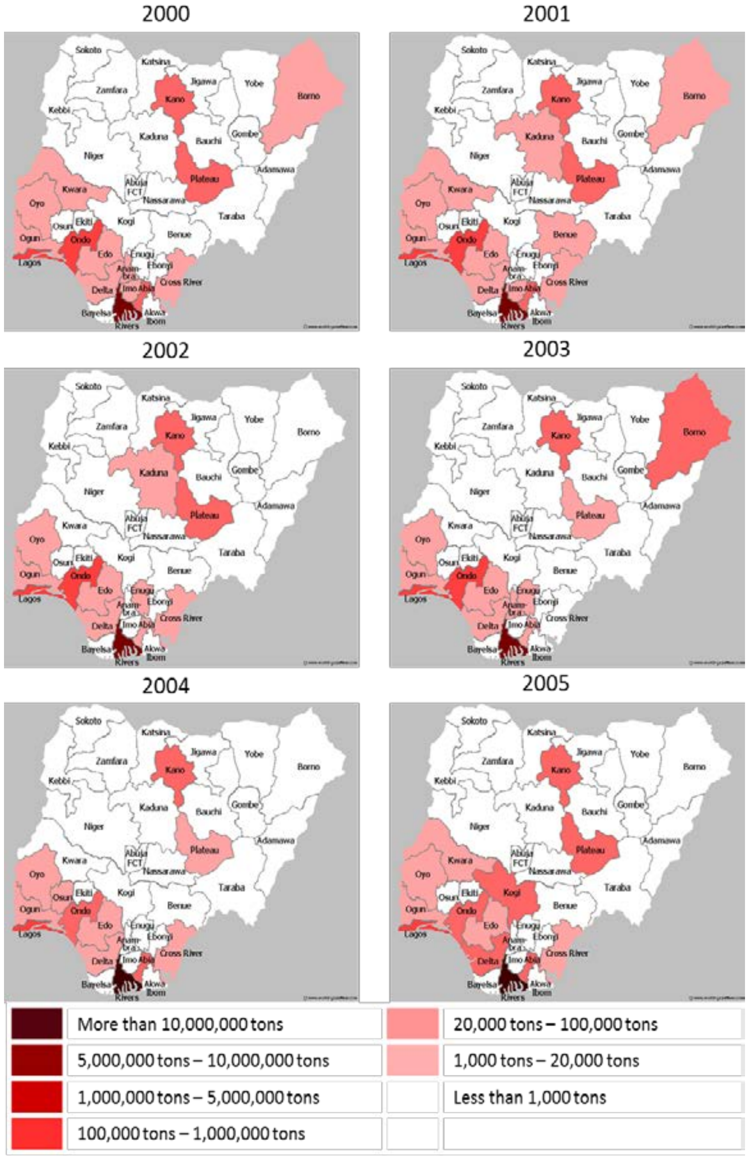


Figure 2.5 – Export volumes per state (2000-05)

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Main Table of Content

Table of Content Chapter 3

3.1 General Cargo Demand Projection: Introduction

This chapter presents the general cargo demand projection. The general cargo demand projection comprises two cargo segments: the container segment and the breakbulk segment. Since there is a significant overlap in the commodities that are handled in both cargo segments, a combined multiplier with GDP growth was derived: the general cargo multiplier. The general cargo demand projection is divided into a container demand projection and a breakbulk demand projection. In addition, a qualitative assessment is conducted of the additional segments that can be categorized as general cargo. This chapter consists of the following paragraphs:

General Cargo Demand Projection

The first paragraph presents the general cargo demand projection. This paragraph consists of two sections. In the first section, the Nigerian general cargo demand projection is presented. The second presents the breakdown of the general cargo demand projection into the container demand projection and the breakbulk demand projection.

Container Demand Projection

The second paragraph presents the container demand projection. This paragraph consists of four sections. In the first section, the Nigerian container demand is presented. The second section presents the Nigerian container goods production projection. The third section presents the market share assumptions for the container segment. The fourth and last section presents the container demand projection for Ibom DSP.

Breakbulk Demand Projection

The third paragraph presents the breakbulk demand projection. This paragraph consists of five sections. In the first section, the Nigerian breakbulk demand is presented. The second section presents the Nigerian breakbulk r goods production projection. The third section presents the market share assumptions for the breakbulk segment. The fourth section presents the breakbulk demand projection for Ibom DSP. The fifth and last section presents the commodity-breakdown of the breakbulk demand projection for Ibom DSP.

Additional Segments

The fourth and last paragraph of this chapter presents the qualitative assessment of demand potential for the additional segments: the project cargo segment and the offshore supply base segment.

3.2.1 General Cargo Demand Projection: Nigerian Demand Forecast

The general cargo demand projection includes both containers and breakbulk-cargo. Since both cargo groups have overlap in the commodities that are handled, the multiplier for quantifying container demand and breakbulk demand should be derived from the analysis with the historical general cargo volumes. The multiplier that was found is equal to 1.54. This implies that for every 1% of GDP growth, the demand for general cargo grows with approximately 1.54.

The Nigerian Port Authority also includes vehicles in their general cargo statistics. In this demand forecast, the vehicles are not included. This is due to the fact that the drivers for vehicle demand are significantly different from drivers for container/breakbulk demand.

The presented demand figures are solely focused on Nigerian demand; the demand forecast for containers and general cargo does not include transit volumes and transshipment volumes. As explained before, transit volumes and transshipment volumes are considered as upside potential for Ibom DSP. This is primarily based on the location of Ibom DSP vis-à-vis other corridors and the competition in the West-African port sector.

The presented figures do not include increased production of commodities and products that are handled in containers and breakbulk. The quantification and results of increased production capacity is presented hereafter.

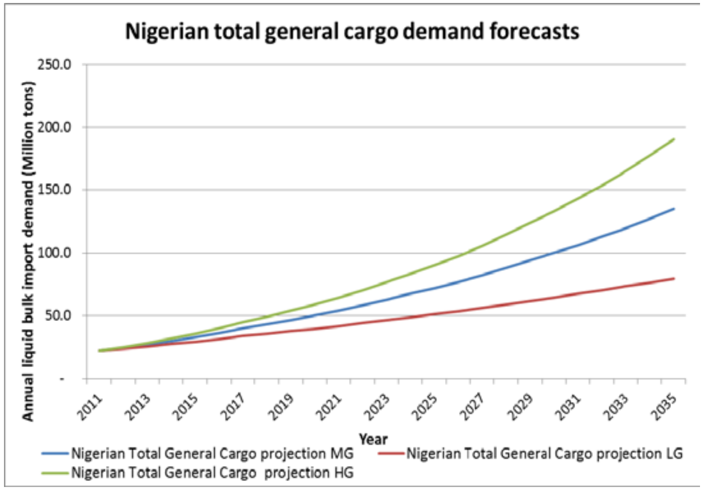

Figure 3.1 – Nigerian General Cargo Demand forecast 2012-35

Table 3.1 – Market forecast General Cargo for selected years

Volumes in tons	2011	2015	2020	2025	2035
High growth	22,316,219	35,716,797	58,925,393	90,175,371	190,607,977
Medium growth	22,316,219	33,147,823	50,483,992	72,146,538	135,132,471
Low growth	22,316,219	29,557,350	39,827,429	51,271,936	79,881,640

3.2.2 General Cargo Demand Projection: Containers & Breakbulk

As mentioned before, the demand forecast for general cargo included container volumes and breakbulk volumes. This approach is supported by the fact that both cargo groups have overlap in the commodities that are handled. Nevertheless, the container volumes and breakbulk volumes do not report similar growth figures in latest years.

The difference in growth rates is primarily created by the containerization rate. The containerization rate defines the percentage of general cargo that is handled in containers. As economies develop their logistic chains are becoming more efficient: as a result the containerization rate increases. Whereas most developed economies already have a containerization rate of more than 80%, Nigeria still reported a containerization rate of 44%. This suggests that there is lot to gain in efficiency in the overall transport chain and that the demand for container handling services will increase rapidly in the near future.

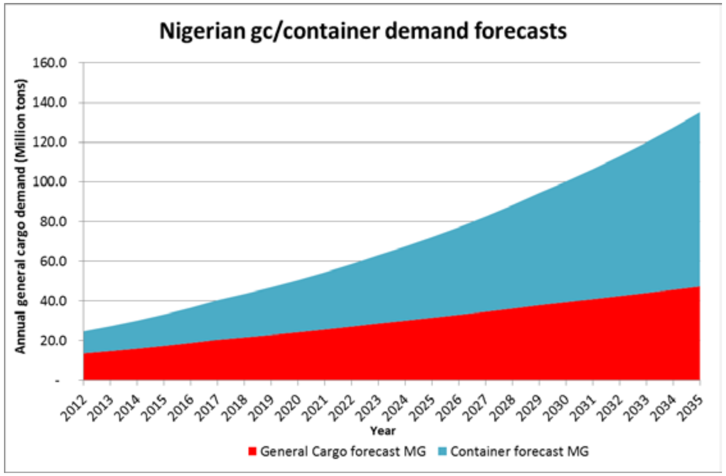

Figure 3.2 – Nigerian General Cargo & Container demand forecast 2012-35

In order to project the demand forecast for containers and breakbulk, For the development of the containerization rate of Nigeria up to 2035 assumptions are made. The containerization rate for 2011 is set at 44%: this is equal to the containerization rate observed in the NPA statistics. The containerization rate in 2035 is set at 78%; this containerization rate compares to the containerization rate of developed economies.

The table below presents the effect of the containerization rate in a clear way: whereas the overall tonnage of container is still below the tonnage of breakbulk in 2015, the container volume has surpassed the breakbulk volume significantly by 2035.

Table 3.2 – Breakdown of market forecast General Cargo for selected years

Volumes in tons	2012	2015	2020	2025	2035
Containerized	11,258,264	16,544,360	28,742,120	46,141,624	105,403,328
Non-containerized	13,378,248	16,603,464	21,741,872	26,004,914	29,729,144

3.3.1 Container Demand Projection: Nigerian Demand Projection

The figure on the right and the table below present the container demand forecast for Nigeria, without production increase. The presented figures are the result of the earlier mentioned GDP multiplier for overall general cargo and the containerization rate assumption.

The next assumption that has to be made in order to translate the derived tonnages into a TEU forecast concerns the ton/TEU ratio. At this moment, the ton/TEU ratio is estimated at 7.14 tons/TEU. This ratio is relatively low in comparison to other economies; the low ratio is explained by the relatively high inequality of imports and export. At this moment, approximately all imported containers are full, whereas approximately all exported containers are empty.

It is expected that the inequality in the import/export pattern of Nigeria container trade will reduce in the next two decades. As a result of this, the ton/TEU ratio will increase. It is assumed that the ton/TEU ratio will increase from 7.14 ton/TEU to 8.5 ton/TEU in 2035.

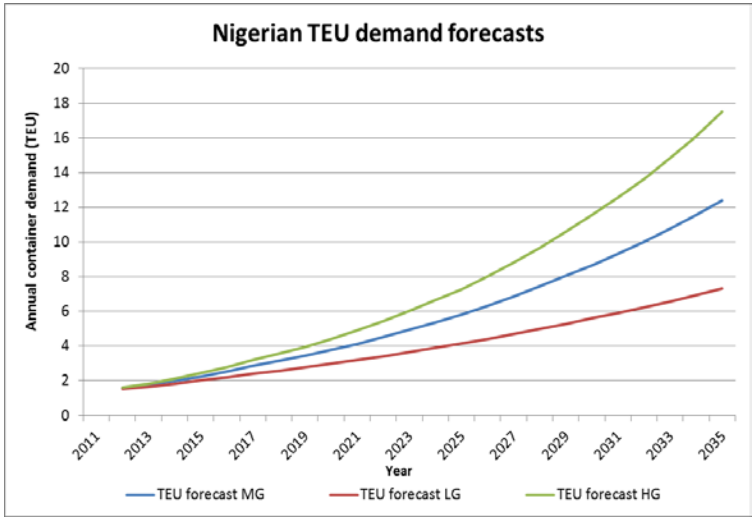

Figure 3.3 – Nigerian Container demand forecast 2012-35

Table 3.3 –Nigerian demand forecast containers for selected years

Volumes in TEU	2011	2015	2020	2025	2035
High growth	1,413,276	2,436,190	4,406,657	7,292,232	17,491,085
Medium growth	1,413,276	2,260,964	3,775,378	5,834,290	12,400,391
Low growth	1,413,276	2,016,063	2,978,441	4,146,219	7,330,315

3.3.2 Container Demand Projection: Container Goods Production

The figure on the right (top) presents the production capacity assumption for containerized products in Nigeria. As can be seen in the figure, a linear development of the production capacity in Nigeria is assumed. The build-up period of production capacity starts in 2013 and ends in 2035. The final production capacity in Nigeria is estimated at an equivalent of 700,000 TEU (approximately 6 million tons of containerized goods).

The figure on the right (bottom) and the table below present the production capacity in comparison to the demand projection. At then end of the forecast period, the production capacity accounts for approximately 5.5% of the Nigerian demand. The production capacity growth outpaces the growth of demand in containerized products; the production capacity in 2015 still accounts for approximately 3% of the Nigerian demand for containerized goods.

Although the production capacity growth outpaces the demand growth, the effect on the total throughput in Nigerian ports is limited. This can be explained by the total size of the market in Nigeria; with a population of 170 million people it is the potentially largest consumer market in Africa. Although the outlook for Nigerian production capacity is optimistic, significant excess demand for consumer products will remain in the future.

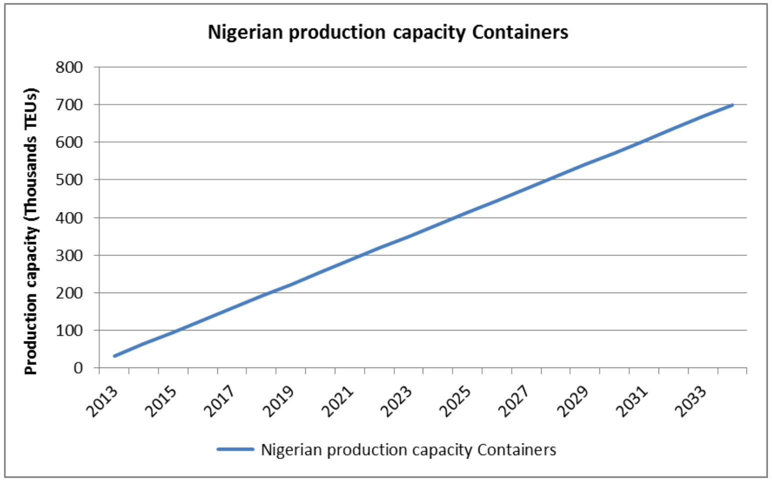

Figure 3.4 – Nigerian assumed production capacity containerized products

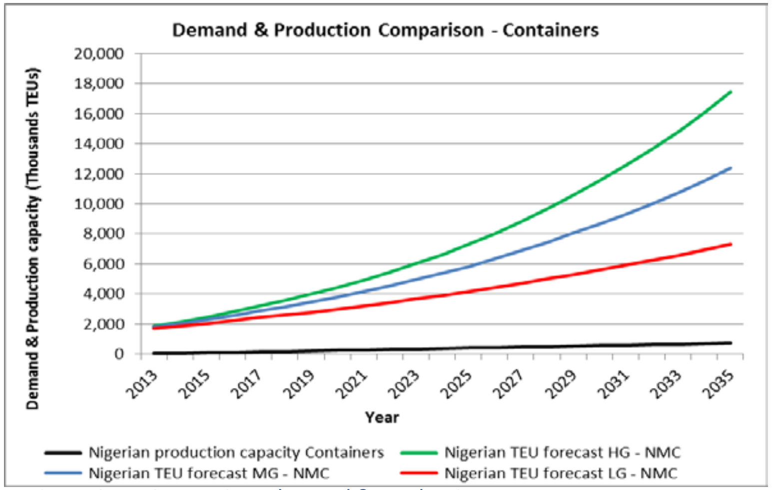

Figure 3.5 – Comparison demand & production

Table 3.4 –Adjustment of demand forecast for domestic production

Volumes in TEU	2011	2015	2020	2025	2035
Medium growth	1,413,276	2,260,964	3,775,378	5,834,290	12,400,391
Production	-	63,636	222,727	350,000	700,000

3.3.3 Container Demand Projection: Market Share Assumptions

The figure on the right (top) presents the development of Nigerian vehicles demand (medium growth scenario) and the development of the East-Delta share. Consistent with the NPA port statistics, the East-Delta vehicle market share is set at 10% for the pre-Ibom DSP period. The terminals in Lagos currently handles 88% of the container demand in Nigeria.

The market domination of Lagos ports suggests that there is room to attract a significant market share to East-Nigeria, yet it will be hard to re-locate all container-related business to the East. The final market share for East-Nigeria is set at 20%. This market share can be supported by the significant share of the population and latent economic potential in East-Nigeria.

The figure on the right (bottom) presents the development of East-Delta container demand and the Ibom DSP market share. At this moment, the ports of Onne, port Harcourt and Calabar handle approximately 10% of the total Nigerian demand. Ibom DSP will significantly increase the marine infrastructure capacity in the East-Delta port, hence it can be expected that Ibom DSP will attain market domination within the East-Delta port sector.

It is assumed that the ports of Onne, port Harcourt and Calabar will be able to attract 25% of the total East-Delta demand; the remaining 75% of the East-Delta demand is handled by Ibom DSP. Since it is estimated that the total capacity of the current ports in the East-Delta at 267,000 TEU per year, Ibom DSP will attract spill-over volumes after 2020 and hence attain a higher market share.

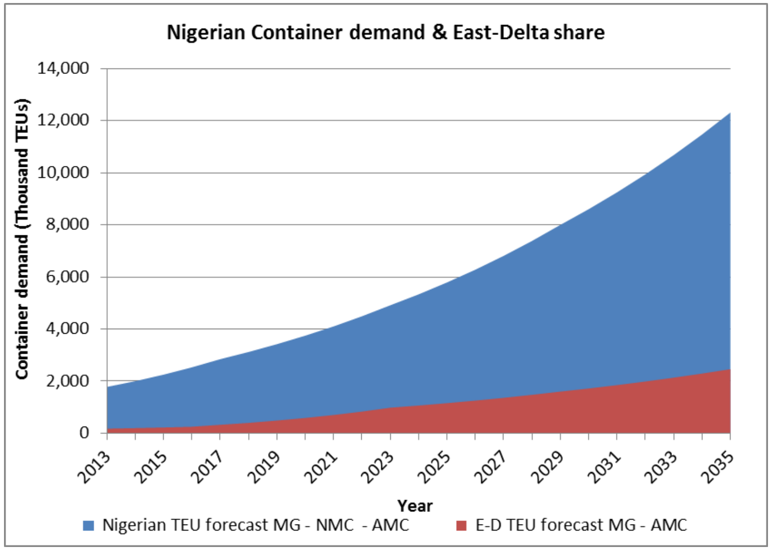

Figure 3.6 – Nigerian container demand – East Delta share

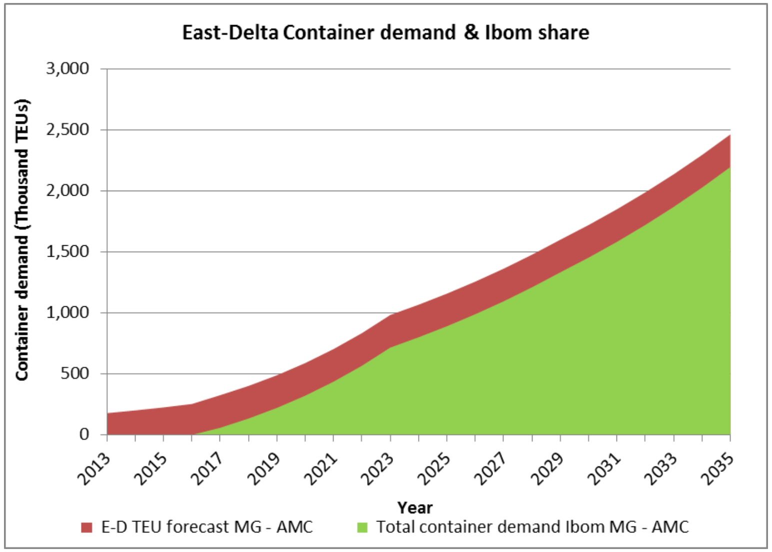

Figure 3.7 – East Delta container demand – Ibom DSP share

3.3.4 Container Demand Projection: Ibom DSP Demand Projection

The figure on the right and the table on the bottom of this sheet present the demand forecast for containers for Ibom DSP. The demand projection includes an assumption for production of containerized goods in Nigeria: it is assumed that an equivalent of 700,000 TEU will be produced in Nigeria by 2025. Additional assumptions are made for the containerization rate and the ton/TEU ratio. The containerization rate increases from 44% in 2011 to 78% in 2035. The ton/TEU ratio is expected to increase from 7.14 ton/TEU in 2011 to 8.5 ton/TEU in 2035.

This assumption for production has no significant effect on the demand projection in the low growth scenario; a growth from 615,000 TEU in 2025 to 1.2 million TEU in 2035 is attained nevertheless. The growth in the other two scenarios are significantly higher, as are the volumes: the medium growth scenario assumes a container demand of 2.2 million TEU in 2035 whereas the high growth scenario assumes a volume of 3.2 million TEU in 2035.

The container volume projections suggest that a container terminal can be financially feasible, as the volume build-up is relatively robust. The volumes for 2035 differ significantly: this suggests that the phasing should be relatively flexible and in accordance with demand development.

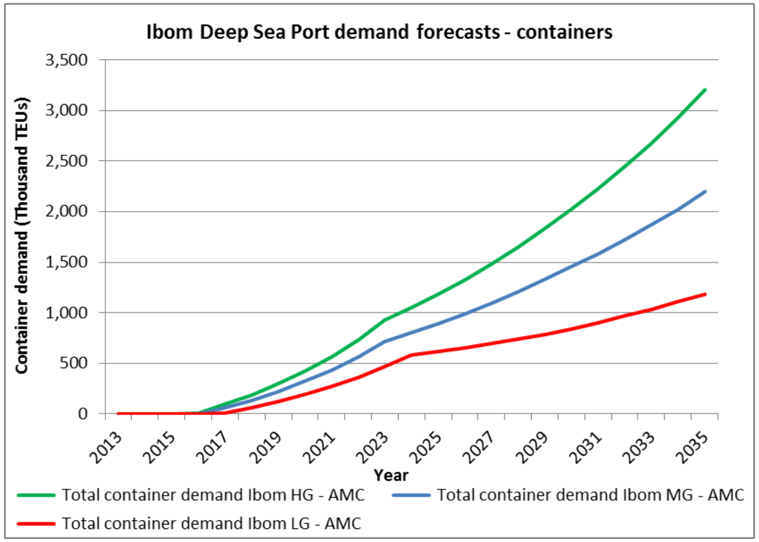

Figure 3.8 – Ibom DSP demand forecasts - containers

Table 3.5 – Ibom DSP Demand Projection Containers

Volumes in TEUs	2018	2020	2025	2030	2035
High growth	188,321	420,609	1,181,115	2,025,131	3,208,853
Medium growth	134,108	321,658	890,424	1,452,851	2,194,840
Low growth	63,119	196,713	615,549	840,257	1,184,389

3.4.1 Breakbulk Demand Projection: Nigerian Demand Projection

The figure on the right and the table below present the breakbulk demand forecast for Nigerian ports. The presented figures do not include production assumptions; the figures are the result of the overall general cargo forecast and the containerization rate assumption.

The effect of the containerization rate assumption is clearly visible in the figure and in the table. For the low growth scenario, the volumes reduce in the period 2025-2035. This is due to the fact that the downward containerization rate effect is larger than the upward effect of economic growth. In the medium growth scenario, the upward economic growth effect is marginally stronger than the downward pressure of the containerization rate effect. In the high growth scenario, the containerization rate has only a small effect on the volume growth.

The projected breakbulk demand figures suggest that a breakbulk terminal can be viable and feasible in the first phase of operations. However in contrast to the container terminal, the breakbulk terminal may not require expansions after the first phase of operations depending on the development of economic growth.

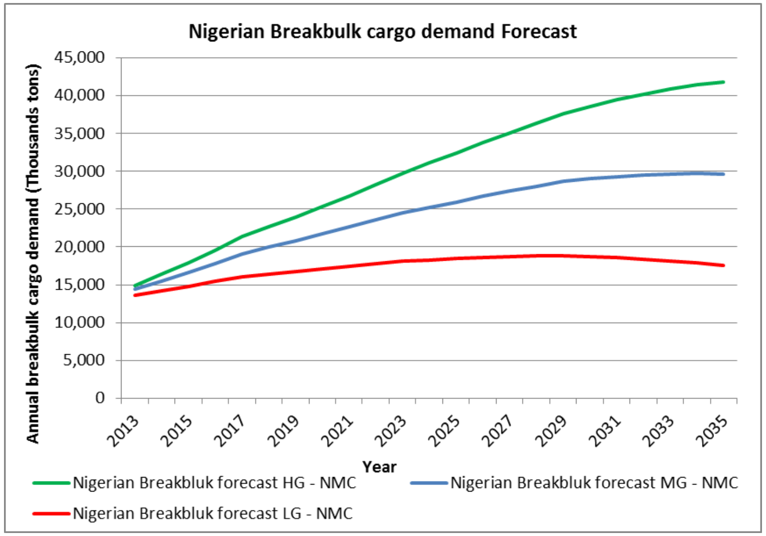

Figure 3.9 – Nigerian breakbulk forecasts, without domestic production

Table 3.6 – Nigerian market forecast breakbulk cargoes

Volumes in tons	2011	2015	2020	2025	2035
High growth	11,823,838	17,890,241	25,377,319	32,503,330	41,933,755
Medium growth	11,823,838	16,603,464	21,741,872	26,004,914	29,729,144
Low growth	11,823,838	14,805,026	17,152,425	18,480,752	17,573,961

3.4.2 Breakbulk Demand Projection: Breakbulk Goods Production

The figure on the right (top) presents the production capacity assumption for breakbulk products in Nigeria. As can be seen in the figure, it is assumed a linear development of the production capacity in Nigeria. The build-up period of production capacity starts in 2016 and ends in 2035. The final production capacity in Nigeria is estimated at 4 million tons of breakbulk goods.

The figure on the right (bottom) and the table below present the production capacity in comparison to the demand projection. At then end of the forecast period, the production capacity accounts for approximately 13% of the Nigerian demand. The production capacity growth outpaces the growth of demand for breakbulk products; the production capacity in 2020 still accounts for approximately 3% of the Nigerian demand for breakbulk goods.

Since the growth in overall demand for breakbulk products is limited after 2025, the effect of production of breakbulk products on the total throughput in Nigerian ports is significant yet small. The increased production capacity further increases the pressure on breakbulk demand volumes in the port sector.

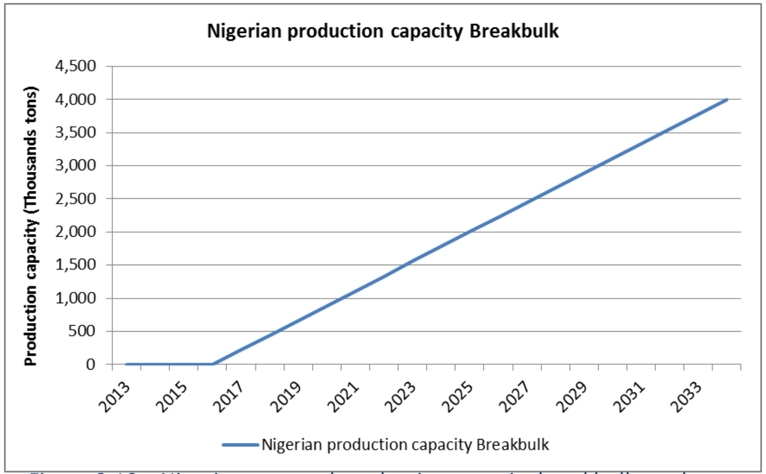

Figure 3.10 – Nigerian assumed production capacity breakbulk products

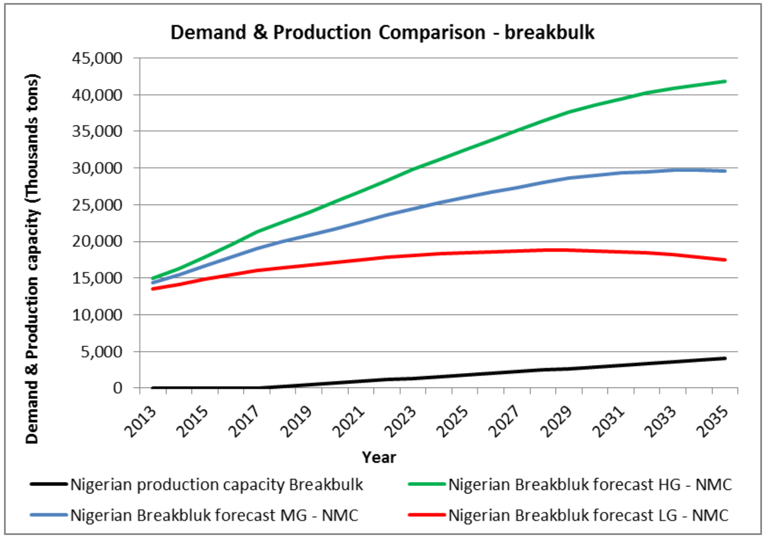

Figure 3.11 – Comparison demand & production

Table 3.7 – Adjustment of demand forecast for domestic production

Volumes in tons	2011	2015	2020	2025	2035
Medium growth	11,823,838	16,603,464	21,741,872	26,004,914	29,729,144
Production		-	666,667	1,555,556	4,000,000

3.4.3 Breakbulk Demand Projection: Market Share Assumptions

The figure on the right (top) presents the development of Nigerian cement demand (medium growth scenario) and the development of the East-Delta share. Consistent with the NPA port statistics, the East-Delta vehicle market share is set at 20% for the pre-Ibom DSP period.

In contrast to the container market and vehicle market, the breakbulk market is characterized by a relatively even spread of volumes across the different port clusters. As a result, the start of operations at Ibom DSP will not lead to a similar significant market shift as observed in the container market and vehicle market. This is mainly due to the fact that the Lagos port sector will also increase in strength due to the start of operations of the greenfield ports. As a result, the final market share for East-Nigeria is set at 20%.

The figure on the right (bottom) presents the development of East-Delta vehicle demand and the Ibom DSP market share. At this moment, the port of Onne, port Harcourt and the port of Calabar handle approximately 20% of the total Nigerian demand (approximately 2.8 million tons of breakbulk goods).

Since the current ports in the East-Delta handle significant breakbulk volumes at this moment, it is expected that the market share of Ibom DSP in the cement market will be lower than the market shares for the container market and the vehicle market. The current ports in the East-Delta have a captive market due to their current client base: it will be hard for Ibom DSP to attract these captive volumes to the port.

The final market share for Ibom DSP in the East-Delta cement market is set at 50%. However, the limited capacity and expansion possibilities of the current ports in the East-Delta will create excess demand: this demand will be handled by Ibom DSP. As a result, the overall market share of Ibom DSP at the end of the period is higher than 50%.

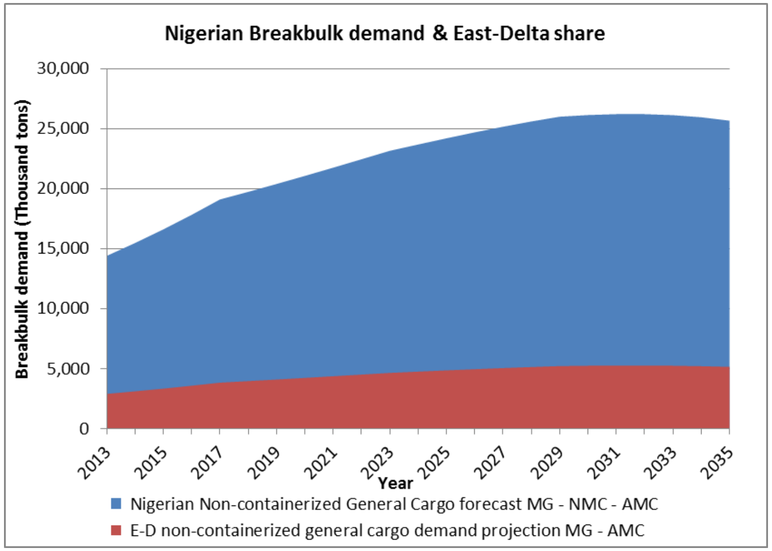

Figure 3.12 – Nigerian breakbulk demand – East Delta share

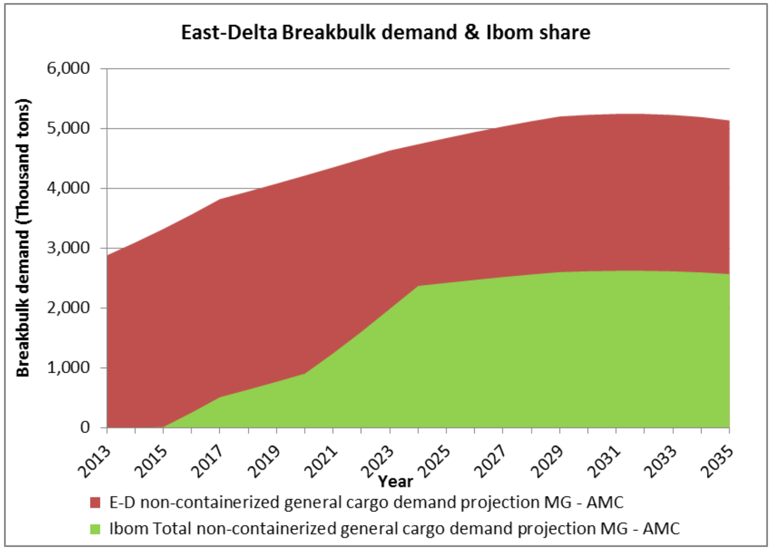

Figure 3.13 – East Delta breakbulk demand – Ibom DSP share

3.4.4 Breakbulk Demand Projection: Ibom DSP Demand Projection

The figure on the right and the table on the bottom of this sheet present the demand forecast for breakbulk for Ibom DSP. The demand projection includes an assumption for production of breakbulk goods in Nigeria: it is assumed that an equivalent of 4 million tons will be produced in Nigeria by 2025. Additional assumptions are made for the containerization rate: the containerization rate increases from 44% in 2011 to 78% in 2035.

This assumption for production has a significant effect on the demand projection in the low growth scenario; a reduction from 1.7 million tons in 2025 to 1.4 million tons in 2035 is projected. This reduction is also partly created by the assumed containerization rate: the containerization rate also limits the growth potential for the medium growth scenario and high growth scenario after 2025.

The container volume projections suggest that a container terminal can be financially feasible, as the volume build-up is relatively robust: a demand of 1.7 million tons is projected by 2025 even in the low growth scenario. The requirements for expansion are primarily dependent on the GDP development and as such, the options for expansion of the breakbulk terminal should be relatively flexible.

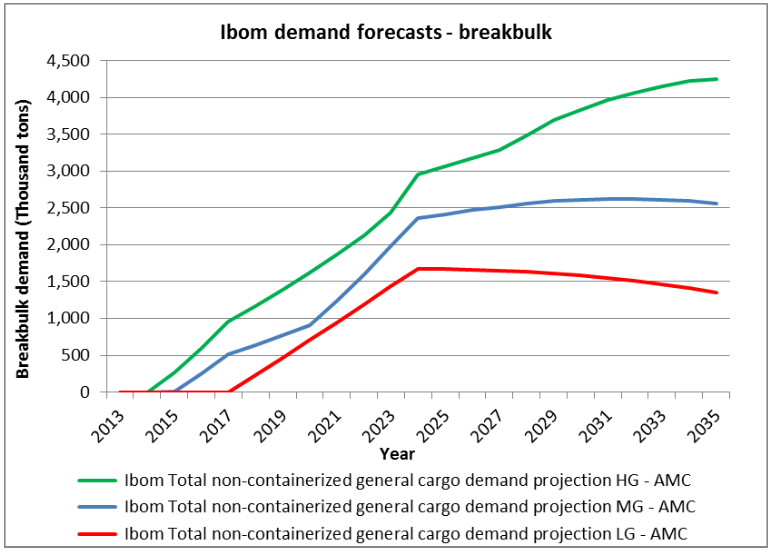

Figure 3.14 – Ibom DSP demand forecasts - breakbulk

Table 3.8 – Ibom DSP Demand Projection Breakbulk cargoes

Volumes in tons	2018	2020	2025	2030	2035
High growth	1,171,567	1,626,854	3,066,346	3,836,228	4,253,481
Medium growth	635,849	902,177	2,418,505	2,612,479	2,565,504
Low growth	231,636	705,939	1,668,150	1,584,945	1,354,258

3.4.5 Breakbulk Demand Projection: Breakdown of Demand

The figure on the right and the table below present the breakdown of the breakbulk demand forecast for Ibom DSP. The breakbulk demand projection is divided into two segments: iron & steel products and other products. Since iron & steel products cannot be containerized, the volumes of this group are not affected by assumptions in the containerization rate: iron & steel products will remain to be handled as breakbulk whereas the other commodities will be containerized at a high pace.

As a result of the increased containerization rate, the share of iron & steel products in total breakbulk demand volumes increase rapidly. Whereas the share of iron & steel in total breakbulk is estimated at 44% in 2018, the share of iron & steel increased to 90% by 2035.

The increasing importance of iron & steel in overall breakbulk volumes is important input for the technical design of Ibom DSP. Since iron & steel are handled in large quantities (high number of tons in one ship-to-shore handling), the productivity and hence the capacity of the breakbulk terminal in Ibom DSP can increase in parallel with the increase of iron & steel products.

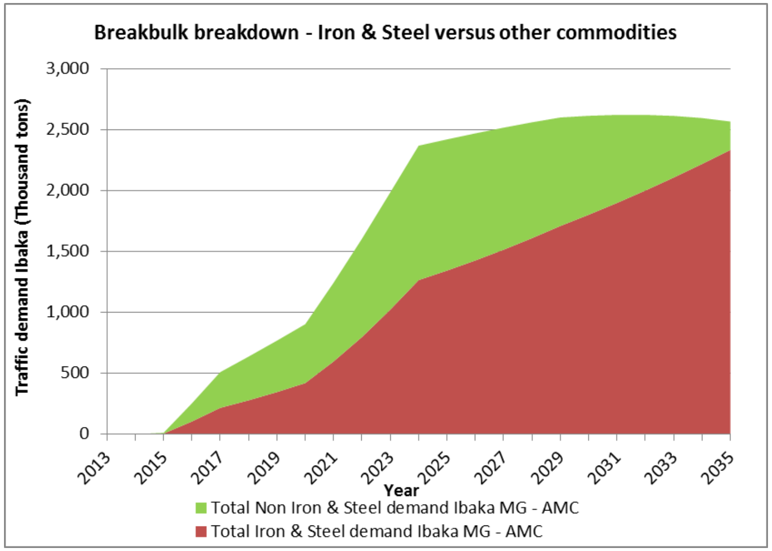

Figure 3.15 – Breakdown of breakbulk demand forecast

Table 3.9 – Breakdown of breakbulk demand forecast

Volumes in tons	2018	2020	2025	2030	2035
Total Breakbulk	635,849	902,177	2,418,505	2,612,479	2,565,504
Iron & Steel	277,205	418,966	1,341,952	1,800,326	2,332,276
Others	358,645	483,211	1,076,553	812,153	233,228

3.5 General Cargo Demand Projection: Additional Segments

This paragraph presents the qualitative analysis of the additional segments within the general cargo segment: the off-shore supply segment and the project cargo segment. Due to specific characteristics of these segments, the demand potential cannot be quantified in a similar way as the container segment and the breakbulk segment. Hence the qualitative approach towards the assessment of potential of these segments.

Off-Shore Supply base:

The off-shore supply base is regarded as a potentially attractive cargo segment for Ibom DSP and a facility for off-shore supply activities is included in the Master Plan. The attractiveness of the off-shore supply base is based on three main arguments. First, the off-shore supply base is a valuable trade; profits in the offshore supply relatively high compared to the cargo volumes and the number of vessel movements. As such, an off-shore supply base generates significant incomes on a relatively small piece of land. Second, the off-shore supply base is expected to have provide an attractive proposition for investors due to the location of the port within a Free Trade Zone. Third, the off-shore supply base is expected to have provide an attractive proposition for investors due to the proximity to major off-shore oil fields.

The potential for the off-shore supply base is solely based on a qualitative assessment; the demand for the off-shore supply base is not quantified. This is due to two main arguments. First, the demand for offshore supply is supply driven: number of users (oil rigs) determines the demand for the offshore supply facility. Second, it is difficult to determine the origin of offshore supplies; multiple cargo segments used to import offshore supplies: container and breakbulk.

Project Cargo:

The project cargo segment is regarded as a potentially attractive cargo segment for Ibom DSP. The project cargo segment does not have an individual terminal in the port Master Plan, yet the quay wall and cranes on the breakbulk terminal are able to handle heavy loads. The attractiveness of the project cargo segment is based on two arguments. First, there is strong demand in Nigeria for a terminal that is able to handle heavy-weight project cargo since most current ports are not able to handle heavy loads. Second, the development of the Free Trade Zone and the Ibom Industrial city suggests a significant captive demand for heavy-load operations in the first years of operations.

There is no separate quantification of demand for project cargo-related activities. Instead, it is assumed that project cargo is part of the breakbulk demand projection since both segments are handled on the same terminal . The share assumption of project cargo in overall breakbulk demand is similar to shares observed in the NPA statistics.

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4.1 Vehicle Demand Projection: Introduction

This chapter presents the vehicle demand projection for Ibom DSP. The vehicle demand projection is quantified in five steps; every step is presented in a paragraph. The following paragraphs are included in this chapter:

Nigerian Demand Projection

The first paragraph presents the Nigerian demand projection for vehicles. In contrast to the other cargo segments, the vehicle demand projection is quantified on the basis of GDP per capita development instead of GDP development.

Nigerian Vehicle Production

The second paragraph presents the quantification of Nigerian vehicle production capacity. The vehicle production capacity projection corrects for an overstatement of the port throughput potential with respect to vehicle throughput. Given the abundance of production factors in Nigeria, it can be expected that a significant share of the overall vehicle demand can be produced within Nigeria.

Nigerian Port Throughput Projection

The third paragraph presents the port throughput projection of the Nigerian port sector, with respect to vehicle throughput. This port throughput projection is the result of the combination for the two analyses presented in the first two paragraphs: the Nigerian demand projection and the Nigerian production projection.

Vehicle Market Share Assumptions

The fourth paragraph presents the market share assumptions for East-Nigeria and Ibom DSP with respect to the vehicle market. The assumptions presented in this paragraph are based on historical throughput statistics and the macro-economic analyses presented in chapter 2.

Ibom DSP Vehicle Demand Projection

The fifth and last paragraph presents the vehicle demand projection for Ibom DSP. This paragraph serves as the conclusion of this chapter: all results of the preceding analyses are combined in this demand projection.

4.2 Vehicle Demand Projection: Nigerian Demand Forecast

The figure on the right (top) and the table below present the vehicle import demand projection for the Nigerian port sector. The presented figures do not include assumptions for production capacity of vehicles within Nigeria at this moment.

In contrast to the method of quantification of the other cargo segment, the method of quantification for vehicle demand is not based on GDP development. Instead, the vehicle demand projection is based on GDP per capita development. A strong relation between GDP per capita levels and the car stock in a country can be observed in a cross-section analysis (see figure on the bottom).

The relation between GDP per capita levels and the car stock in a country is evident and strong; a formula to estimate the car stock in a country can be derived from the presented scatterplot. The formula uses GDP per capita as an input; the GDP per capita levels are projected on the basis of GDP development and population development expectations.

The formula is used to project the expected car stock in Nigeria up to 2035. Two types of demand can be calculated with the help of the car stock. First, the annual new demand can be calculated by taking the year-on-year difference in car stock. Second, the replacement demand can be calculated by assuming the replacement rate of cars. In order to estimate the replacement demand, it is assumed that Nigerians replace their cars once every 12 year on average.

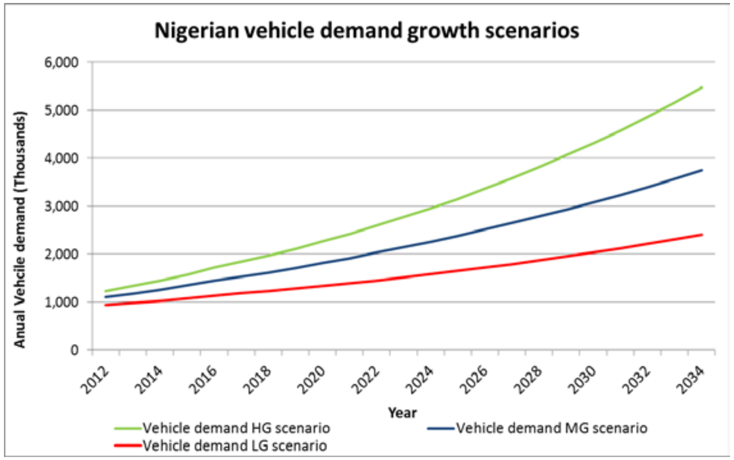

Figure 4.1 – Nigerian vehicle demand growth scenarios

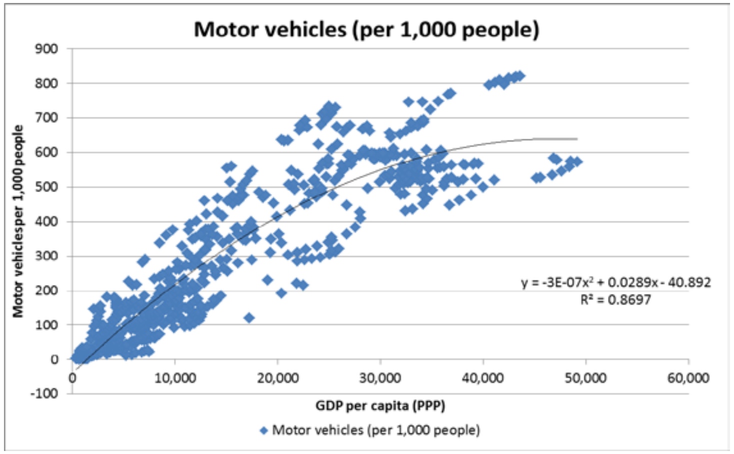

Figure 4.2 – Number of motor vehicles per 1,000 people

Table 4.1 – Nigerian vehicle demand growth scenarios

Volumes in units	2011	2015	2020	2025	2035
High growth	1,150,250	1,449,731	2,112,124	2,956,565	5,477,340
Medium growth	1,150,250	1,253,883	1,712,228	2,259,570	3,745,034
Low growth	1,150,250	1,027,824	1,280,828	1,578,278	2,410,671

4.2 Vehicle Demand Projection: Nigerian Production Projection

The figure on the right (top) presents the production capacity assumption for vehicles in Nigeria. As can be seen in the figure, a linear development of the production capacity in Nigeria is assumed. The build-up period of production capacity starts in 2016 and ends in 2035. The final production capacity in Nigeria is estimated at 700,000 vehicles per annum.

The figure on the right (bottom) and the table below present the production capacity in comparison to the demand projection. At then end of the forecast period, the production capacity accounts for approximately 20% of the Nigerian demand. The production capacity growth outpaces the growth of demand in vehicles; the production capacity in 2020 still accounts for approximately 8% of the Nigerian demand for vehicles.

Due to the rapid growth of vehicle production in Nigeria, there is pressure on the vehicle throughput volumes in Nigerian ports after 2025. Potentially, the vehicle production could result in the export of cars as well: this has an upside effect on the port throughput. Given the fact that the Nigerian vehicle market still faces significant excess demand in 2035, it is not assumed that there will be significant export flows from Nigeria to other African countries. Nevertheless, the possibility of vehicle exports is identified as upside potential.

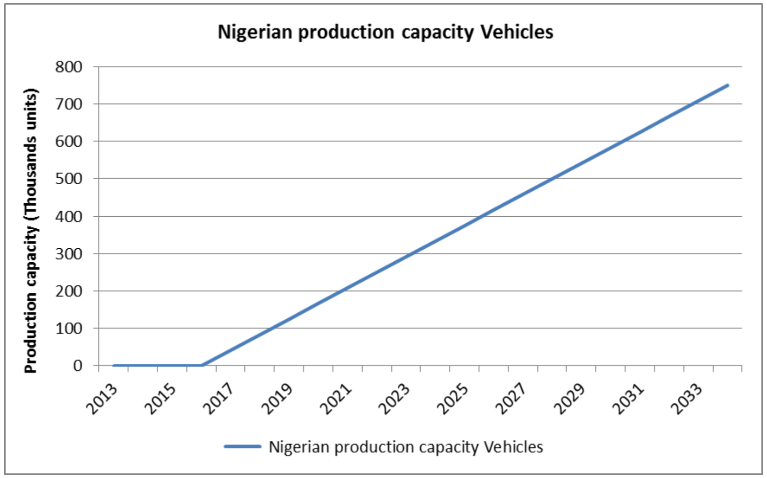

Figure 4.3 – Nigerian assumed production capacity vehicles

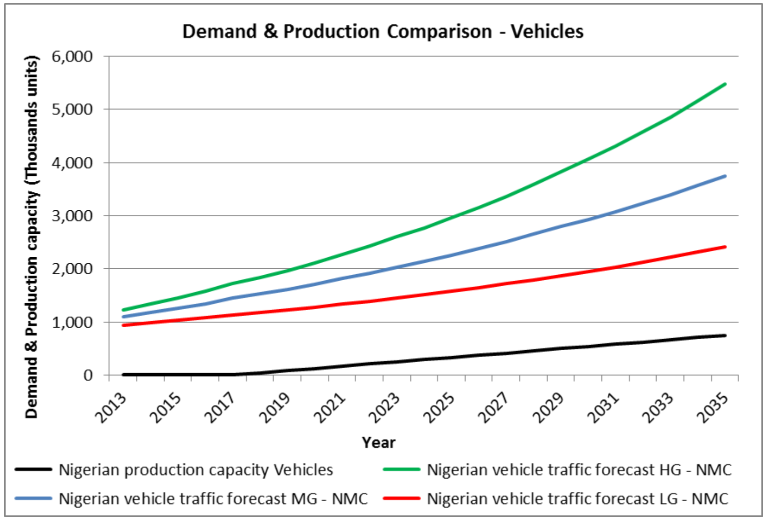

Figure 4.4 – Comparison demand & production

Table 4.2 – Adjustment of demand forecast for domestic production

Volumes in units	2011	2015	2020	2025	2035
Medium growth	1,150,250	1,253,883	1,712,228	2,259,570	3,745,034
Production		-	125,000	291,667	750,000

4.3 Vehicle Demand Projection: Port Throughput Projection

The figure on the right and the table on the bottom present the Nigerian port throughput projections for vehicle imports. The figures are corrected for the production capacity that is assumed to be developed up to a number of 700,000 vehicles in the next two decades in Nigeria.

As can be seen in the figure, the production capacity has a significant effect on the growth potential of vehicle import volumes in the low economic growth scenario. As a result of the production capacity assumption, a growth of 60% in the period 2015-2035 is projected for the vehicle import throughput in Nigerian ports in the low growth scenario.

The projected figures suggest that the vehicle import volumes are not as robust as the volumes for other cargo segments. In the medium and high economic growth scenario, the Nigerian port sector will need additional port capacity to handle the full demand for vehicle handling activities, yet in the low growth scenario the overall handling capacity for cement could be significantly higher than the Nigerian demand of vehicle import.

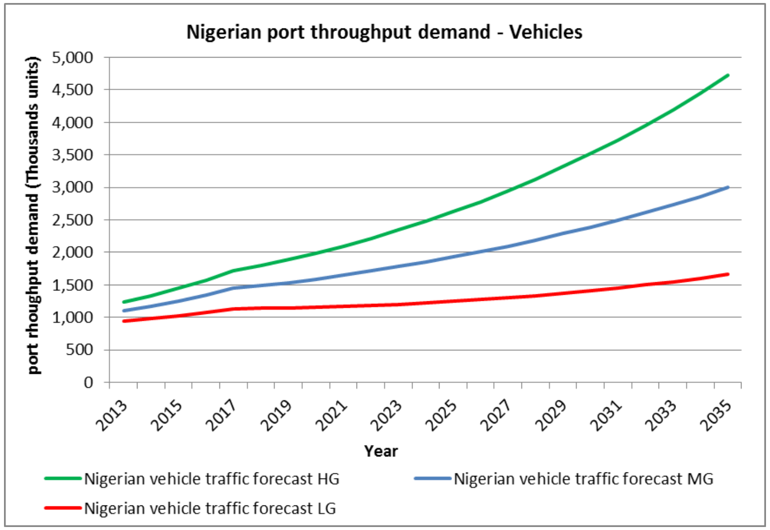

Figure 4.5 – Nigerian vehicle throughput demand forecast

Table 4.3 – Nigerian vehicle throughput demand forecast

Volumes in tons	2012	2015	2020	2025	2035
High growth	1,151,914	1,449,731	1,987,124	2,480,458	4,727,340
Medium growth	1,039,363	1,253,883	1,587,228	1,851,365	2,995,034
Low growth	908,814	1,027,824	1,155,828	1,221,628	1,660,671

4.4 Vehicle Demand Projection: Market Share Assumptions

The figure on the right (top) presents the development of Nigerian vehicles demand (medium growth scenario) and the development of the East-Delta share. Consistent with the NPA port statistics, the East-Delta vehicle market share is set at 2% for the pre-Ibom DSP period. The Tin-Can Island terminal in Lagos currently handles 95% of the vehicle import in Nigeria.

The market domination of Tin Can Island suggests that there is room to attract a significant market share to East-Nigeria, yet it will be hard to re-locate all vehicle-related business to the East. The final market share for East-Nigeria is set at 25%. This market share can be supported by the significant share of the population and latent economic potential in East-Nigeria.

The figure on the right (bottom) presents the development of East-Delta vehicle demand and the Ibom DSP market share. At this moment, the port of Onne handles approximately 2% of the total Nigerian demand (approximately 4,000 cars). The remaining ports in the East-Delta do not handle vehicle demand.

Although the current volumes at the port of Onne are merely significant, it is expected that the opening of Ibom DSP can have a positive effect on the attractiveness of the port of Onne for car imports. Onne will profit from the re-location of car import-related businesses to Ibom DSP, due to proximity and network-effects.

It is assumed that the port of Onne will be able to attract 20% of the total East-Delta demand; the remaining 80% of the East-Delta demand is handled by Ibom DSP. Since it is estimated that the total capacity of the port of Onne at 50,000 cars per year, Ibom DSP will attract spill-over volumes after 2020 and hence attain a higher market share.

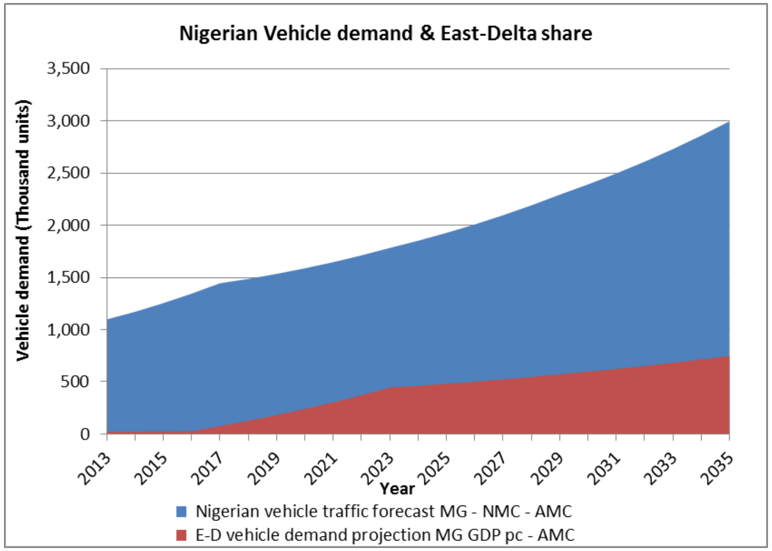

Figure 4.6 – Nigerian vehicle demand – East Delta share

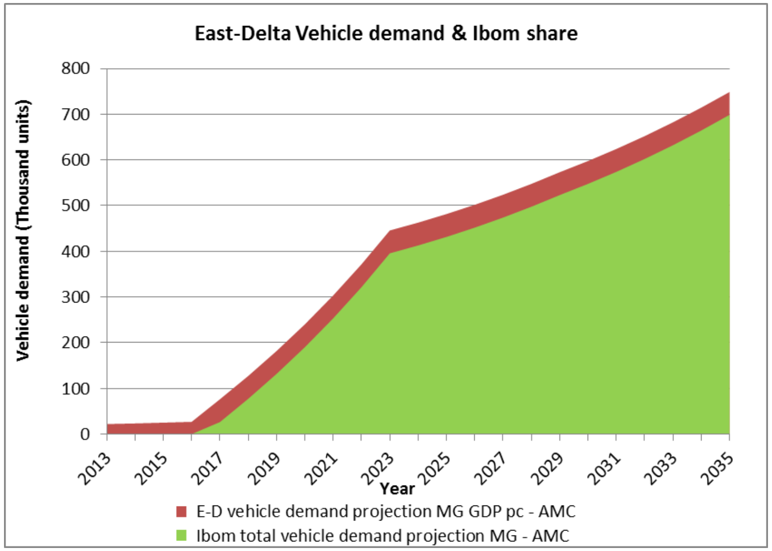

Figure 4.7 – East Delta vehicle demand – Ibom DSP share

4.5 Vehicle Demand Projection: Ibom DSP Demand Projection

The figure on the right and the table on the bottom of this sheet present the demand forecast for vehicles for Ibom DSP. The demand projection includes an assumption for production of vehicles in Nigeria: it is assumed that a total number of 700,000 cars will be produced in Nigeria by 2025.

This assumption for production has significant effect on the demand projection in the low growth scenario; a limited growth from 260,000 vehicles in 2025 to 365,000 vehicles in 2035 is projected. The other two scenarios project significantly higher growth rates; in these two scenarios the growth of production is significantly outpaced by the overall increase in demand.

Although the production capacity assumption puts significant downward pressure on the vehicle demand development in Ibom DSP, the volumes are nevertheless relatively robust. Due to the required build-up period, the market share of Ibom DSP and the market share of the East-Delta need to reach their final level, the vehicle import demand can be combined with breakbulk volumes on one terminal in the first phase of operations.

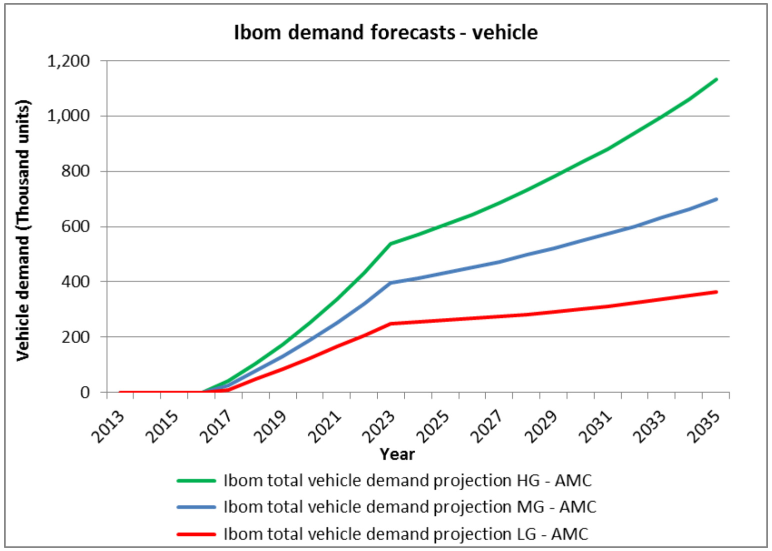

Figure 4.8 – Ibom DSP demand forecasts - vehicles

Figure 4.4 – Ibom DSP demand forecasts - vehicles

Volumes in units	2018	2020	2025	2030	2035
High growth	104,083	250,907	605,808	829,371	1,131,835
Medium growth	77,405	190,352	431,559	547,631	698,759
Low growth	47,586	125,025	261,236	301,982	365,168

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5.1 Dry Bulk Demand Projection: Introduction

This chapter presents the dry bulk demand projection for Ibom DSP. The dry bulk demand projection is quantified in five steps; every step is presented in a paragraph. In contrast to the other cargo segments, it is required to conduct the final demand projection at a commodity-level. This is due to the fact that an industrial-sized dry bulk terminal can only handle one commodity; a grain-terminal cannot handle cement e.g. As such, one commodity (cement) is analyzed in more detail and its output is used to establish the entire dry bulk market. The following paragraphs are included in this chapter:

Nigerian Demand Projection

The first paragraph presents the Nigerian demand projection for dry bulk. Similar to the general cargo segment, the dry bulk demand projection is quantified on the basis of GDP development. In addition to the overall dry bulk demand projection, a breakdown of the commodities handled as dry bulk is presented. On the basis of this breakdown, the cement commodity is analysed in more detail. The breakdown shares derived from this are used to establish the overall dry bulk forecast for Ibom DSP.

Nigerian Cement Production

The second paragraph presents the quantification of Nigerian cement production capacity. The cement production capacity projection corrects for an overstatement of the port throughput potential with respect to cement throughput. Given the abundance of production factors in Nigeria, it can be expected that a significant share of the overall cement demand can be produced within Nigeria.

Nigerian Port Throughput Projection

The third paragraph presents the port throughput projection of the Nigerian port sector, with respect to cement throughput. This port throughput projection is the result of the combination for the two analyses presented in the first two paragraphs: the Nigerian demand projection and the Nigerian production projection.

Cement Market Share Assumptions

The fourth paragraph presents the market share assumptions for East-Nigeria and Ibom DSP with respect to the cement market. The assumptions presented in this paragraph are based on historical throughput statistics and the macro-economic analyses presented in chapter 2.

Ibom DSP Dry Bulk Demand Projection

The fifth and last paragraph presents the cement demand projection for Ibom DSP. This paragraph serves as the conclusion of this chapter: all results of the preceding analyses are combined in this demand projection. This section also includes an overall forecast, for the other dry bulk commodities.

5.2 Dry Bulk Demand Projection: Nigerian Demand Projection

The figure on the right (top) and the table on the bottom present the Nigerian dry bulk demand projection. The projected figures do not include production capacity assumptions at this stage. The quantification of the dry bulk demand figures is conducted on the basis of a GDP multiplier method; a statistical significant multiplier of 1.54 was found in the analysis of historical NPA-data.

The figure on the right (bottom) presents the commodity breakdown of the dry bulk demand forecast. The projection of the commodity breakdown is conducted on the basis of commodity volume shares in recent years. As such, it is assumed that a 50%-share for cement, 30% for grains/wheat, 8% for sugar and 5% for fertilizer.

Since a dry bulk terminal is specialized for one commodity, it is important to assess what commodity is most interesting for Ibom DSP from a volume-point of view. The commodity breakdown projection suggests that a terminal for cement trade could be supported by the most robust volumes. The second big commodity traded as dry bulk, grains/wheat, is subject to a rather volatile demand pattern: import demand for grains/wheat is strongly dependent on annual agricultural production.

Based on this assessment, focus resides on cement volumes in the remaining analyses for the dry bulk segment. The market share assessment and production capacity assessment will not include the other three main commodities.

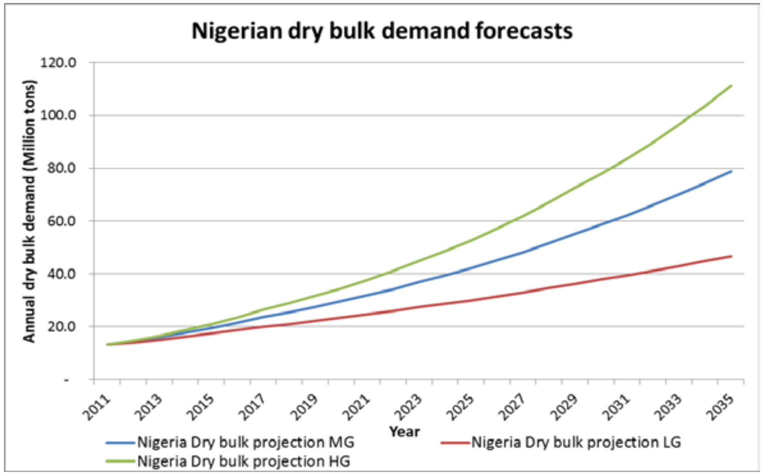

Figure 5.1 – Nigerian dry bulk demand forecasts

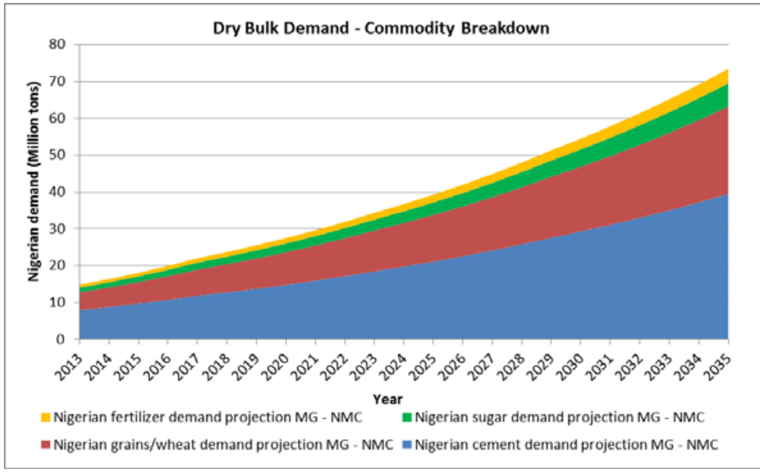

Figure 5.2 – Breakdown of dry bulk demand forecast

Table 5.1 – Nigerian dry bulk demand forecasts

Volumes in tons	2011	2015	2020	2025	2035
High growth	13,104,864	20,944,188	34,500,670	52,728,123	111,195,325
Medium growth	13,104,864	19,441,948	29,571,569	42,213,762	78,912,769
Low growth	13,104,864	17,341,940	23,345,847	30,030,494	46,722,163

5.3 Dry Bulk Demand Projection: Nigerian Cement Production

The figure on the right (top) presents the production capacity assumption for cement in Nigeria. As can be seen in the figure, it is assumed that a linear development of the production capacity in Nigeria. The build-up period of production capacity starts in 2013 and ends in 2035. The final production capacity in Nigeria is estimated at 10 million tons of cement per annum.

The figure on the right (bottom) and the table below present the production capacity in comparison to the demand projection. At then end of the forecast period, the production capacity accounts for approximately 13% of the Nigerian demand. The production capacity growth outpaces the growth of demand for cement; the production capacity in 2015 still accounts for approximately 5% of the Nigerian demand for cement.

The rapid growth of cement production is supported by the latent natural reserves of Nigeria. Although it is assumed that the production of cement will increase rapidly as a result of the natural reserves, the Nigerian economy is not expected to become self-sufficient. Nevertheless, the production capacity of cement creates significant downward pressure on the port throughput volume projection.

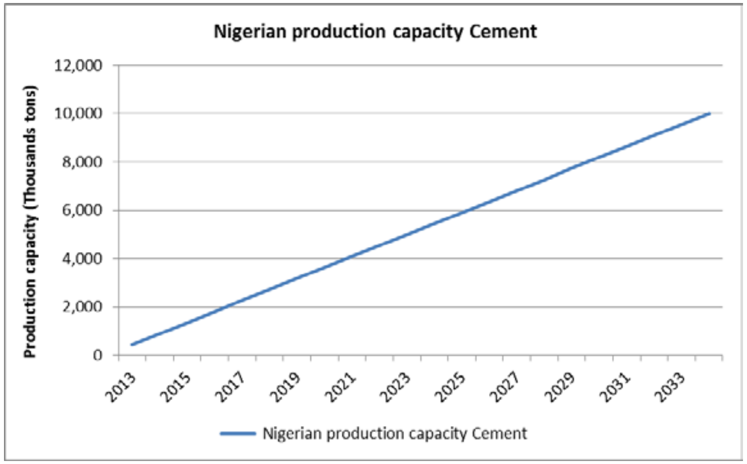

Figure 5.3 – Nigerian assumed production capacity cement

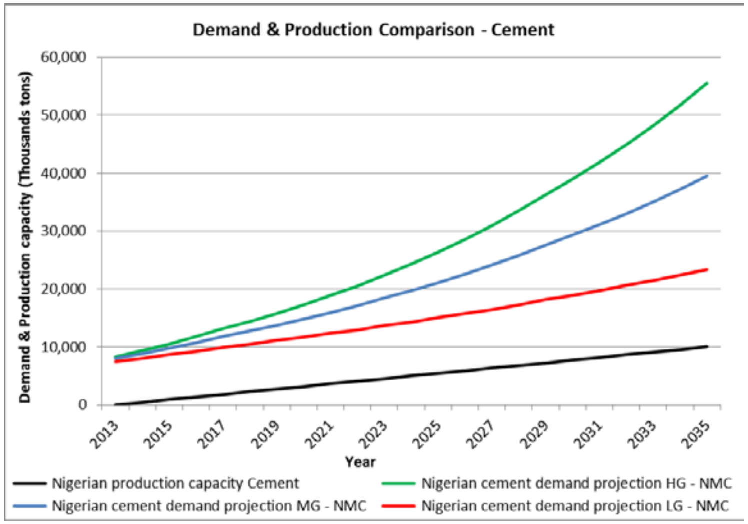

Figure 5.4 – Comparison demand & production

Table 5.2 – Adjustment of demand forecast for domestic production

Volumes in tons	2011	2015	2020	2025	2035
Medium growth	13,104,864	19,441,948	29,571,569	42,213,762	78,912,769
Low growth	-	909,091	3,181,818	5,000,000	10,000,000

5.4 Dry Bulk Demand Projection: Port Throughput Projection

The figure on the right and the table on the bottom present the Nigerian port throughput projections for cement. The figures are corrected for the production capacity that is assumed to be developed in the next two decades in Nigeria.

As can be seen in the figure, the production capacity has a significant effect on the growth potential of cement import volumes in the low economic growth scenario. A growth of 72% in the period 2015-2035 is projected for the cement throughput in Nigerian ports in the low growth scenario, whereas the medium growth scenario assumes a growth of 234% in the same period .

The projected figures suggest that the cement volumes are not as robust as the volumes for other cargo segments. In the medium and high economic growth scenario, the Nigerian port sector will need additional port capacity to handle the full demand for cement handling activities, yet in the low growth scenario the overall handling capacity for cement could be significantly higher than the Nigerian demand of cement import.

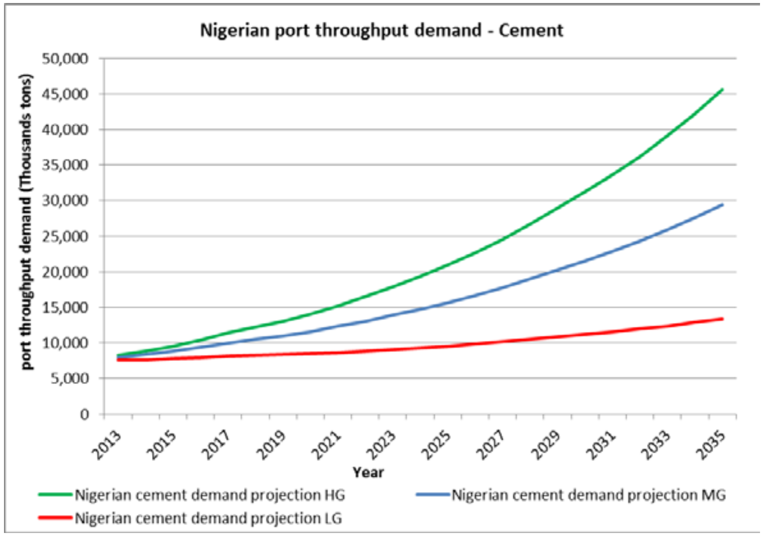

Figure 5.5 – Nigerian cement throughput demand forecast

Table 5.3 – Nigerian cement throughput demand forecast

Volumes in tons	2012	2015	2020	2025	2035
High growth	7,367,333	9,563,003	14,068,517	19,343,284	45,597,663
Medium growth	7,231,516	8,811,883	11,603,967	14,741,252	29,456,384
Low growth	7,027,791	7,761,879	8,491,105	9,321,739	13,361,081

5.5 Dry Bulk Demand Projection: Market Share Assumptions

The figure on the right (top) presents the development of Nigerian cement demand (medium growth scenario) and the development of the East-Delta share. Consistent with the NPA port statistics, the East-Delta vehicle market share is set at 30% for the pre-Ibom DSP period.

In contrast to the container market and vehicle market, the dry bulk market is characterized by a relatively even spread of volumes across the different port clusters. As a result, the start of operations at Ibom DSP will not lead to a similar significant market shift as observed in the container market and vehicle market. This is mainly due to the fact that the Lagos port sector will also increase in strength due to the start of operations of the greenfield ports. As a result, the final market share for East-Nigeria is set at 30%.

The figure on the right (bottom) presents the development of East-Delta vehicle demand and the Ibom DSP market share. At this moment, the port of Onne, port Harcourt and the port of Calabar handle approximately 30% of the total Nigerian demand (approximately 2.3 million tons of cement).

Since the current ports in the East-Delta handle significant cement volumes at this moment, it is expected that the market share of Ibom DSP in the cement market will be lower than the market shares for the container market and the vehicle market. The current ports in the East-Delta have a captive market due to their current client base: it will be hard for Ibom DSP to attract these captive volumes to the port.

The final market share for Ibom DSP in the East-Delta cement market is set at 33%. However, the limited capacity and expansion possibilities of the current ports in the East-Delta will create excess demand: this demand will be handled by Ibom DSP. As a result, the overall market share of Ibom DSP at the end of the period is higher than 33%.

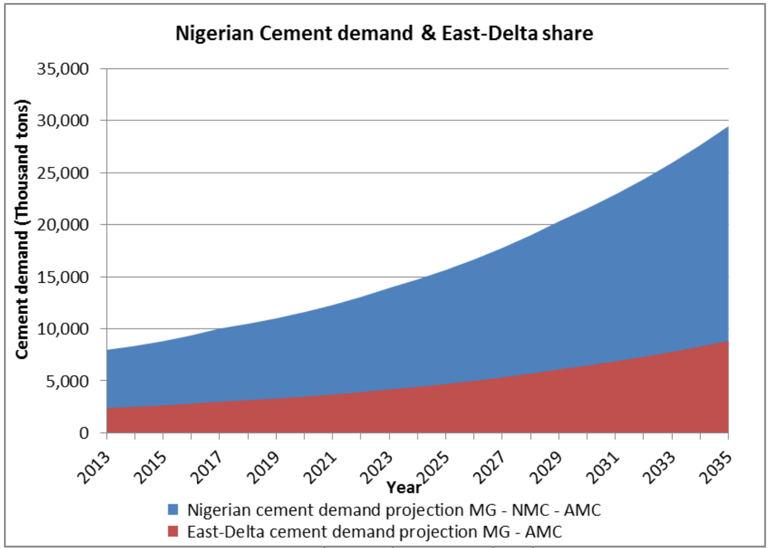

Figure 5.6 – Nigerian cement demand – East Delta share

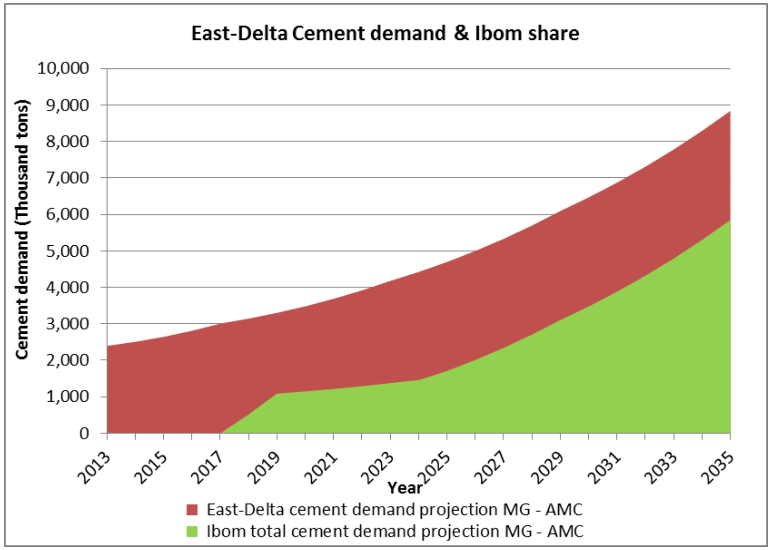

Figure 5.7 – East Delta cement demand – Ibom DSP share

5.6 Dry Bulk Demand Projection: Ibom DSP Demand Projection

The figure on the right and the table on the bottom of this sheet present the demand forecast for cement for Ibom DSP. The demand projection includes an assumption for production of cement in Nigeria: it is assumed that a total number of 10 million tons will be produced in Nigeria by 2035.

This assumption for production has significant effect on the demand projection in the low growth scenario; a limited growth from 945,000 tons in 2025 to 1.3 million tons in 2035 is projected. The other two scenarios project significantly higher growth rates; in these two scenarios the growth of production is significantly outpaced by the overall increase in demand.

The outcomes for the cement demand projection in Ibom DSP suggest that it is important to attract a strong player in the cement market before decided to invest in a cement terminal. The cement production in Nigeria has significant potential and as such, it is important to attract committed volumes to the terminal. Although cement is the most significant commodity in the dry bulk segment, it is not ensured that a cement terminal will be financially feasible as volumes may be under pressure in the future.

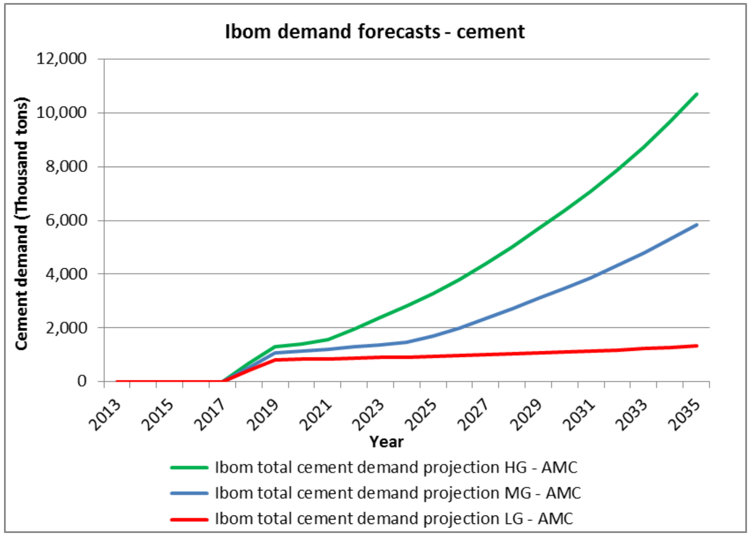

Figure 5.8 – Ibom DSP demand forecasts - cement

Table 5.4 – Ibom DSP demand forecasts - cement

Volumes in tons	2018	2020	2025	2030	2035
High growth	668,771	1,392,783	3,285,475	6,378,255	10,691,919
Medium growth	518,645	1,148,793	1,708,321	3,477,759	5,849,536
Low growth	407,814	840,619	946,509	1,108,341	1,322,747

5.6 Dry Bulk Demand Projection: Ibom DSP Demand Projection

The figure on the right and the table on the bottom of this sheet present the demand forecast for the entire dry bulk segment for Ibom DSP. The overall demand is established by using the commodity breakdown which has been established earlier in this chapter: 50%-share for cement, 30% for grains/wheat, 8% for sugar and 5% for fertilizer.

Parallel to the conclusions with respect to cement trade, the outcomes for the overall dry bulk demand projection in Ibom DSP suggest that it is important to attract a strong player in each of the markets before deciding to invest in a specific terminal. The dry bulk market in Nigeria has significant potential and as such, it is important to attract committed volumes to the terminal.

The breakdown as presented here does not imply no other industrial dry bulk trade may be attracted to Ibom DSP. Especially industrial developments in the region (e.g. in Ibom Industrial City) may require the development of a dedicated facility for some type of dry bulk commodity not taken into account in this analysis.

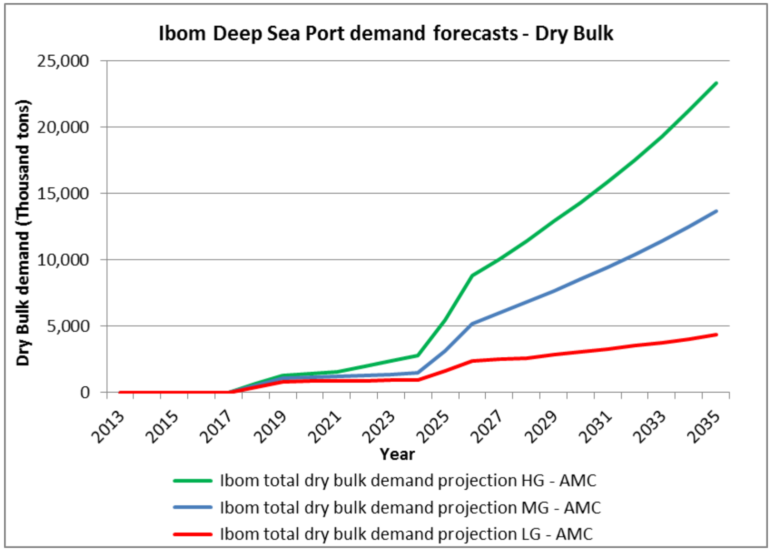

Figure 5.9 – Ibom DSP demand forecasts – dry bulks

Table 5.5 – Ibom DSP demand forecasts – dry bulks

Volumes in tons	2018	2020	2025	2030	2035
High growth	668,771	1,392,783	5,474,116	14,319,327	23,365,864
Medium growth	518,645	1,148,793	3,108,385	8,518,335	13,681,097
Low growth	407,814	840,619	1,602,060	3,042,388	4,325,717

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6.1 Liquid Bulk Demand Projection: Introduction

This chapter presents the liquid bulk demand projection for Ibom DSP. The liquid bulk demand projection is quantified in five steps; every step is presented in a paragraph. The liquid bulk demand projection focuses solely on the import of liquid bulk. Nigeria has substantial export volumes as well (primarily LNG), yet the export of these volumes is primarily facilitated through dedicated facilities such as Bonny. For the first phase of operations in Ibom, it will be difficult to compete with the port of Bonny for these volumes, hence the focus on liquid bulk imports. The following paragraphs are included in this chapter:

Nigerian Demand Projection

The first paragraph presents the Nigerian demand projection for liquid bulk. Similar to the general cargo segment and the dry bulk segment, the liquid bulk demand projection is quantified on the basis of GDP development.

Nigerian Liquid Bulk Production

The second paragraph presents the quantification of Nigerian liquid bulk production capacity. The liquid bulk production capacity projection corrects for an overstatement of the port throughput potential with respect to liquid bulk throughput. Given the abundance of production factors in Nigeria, it can be expected that a significant share of the overall liquid bulk demand can be produced within Nigeria. The liquid bulk production projection focuses on petroleum products.

Nigerian Port Throughput Projection

The third paragraph presents the port throughput projection of the Nigerian port sector, with respect to liquid bulk throughput. This port throughput projection is the result of the combination for the two analyses presented in the first two paragraphs: the Nigerian demand projection and the Nigerian production projection.

Liquid Bulk Market Share Assumptions

The fourth and paragraph presents the market share assumptions for East-Nigeria and Ibom DSP with respect to the liquid bulk market. The assumptions presented in this paragraph are based on historical throughput statistics and the macro-economic analyses presented in chapter 2.

Ibom DSP Liquid Bulk Demand Projection

The fifth and last paragraph presents the liquid bulk demand projection for Ibom DSP. This paragraph serves as the conclusion of this chapter: all results of the preceding analyses are combined in this demand projection.

6.2 Liquid Bulk Demand Projection: Nigerian Demand Projection

The figure on the right (top) and the table on the bottom present the Nigerian liquid bulk import demand projection. The projected figures do not include production capacity assumptions at this stage. The quantification of the liquid bulk demand figures is conducted on the basis of a GDP multiplier method; an average multiplier of 1.8 was found in the analysis of historical NPA-data. However, the annual multipliers showed a relatively high volatility.

As a result of the high volatility, the multiplier method is applied with caution: a straight-forward extrapolation on the basis of GDP projections may lead to unrealistically high projections. In order to avoid too high predictions, the demand for liquid bulk is capped by the vehicle stock that was projected in order to quantify the vehicle demand projection. Since car usage is the main driver for liquid bulk import, it is important to establish a link between the vehicle demand forecast and the liquid bulk import forecast. In order to cap the liquid bulk demand projection, it is assumed that the average car in Nigeria consumes 4 ton of petroleum products per year.

As can be seen in the figure, the cap for liquid bulk import demand results in a small break of annual growth figures around 2018. Despite the cap on liquid bulk import demand, the medium growth demand projection for liquid bulk assumes a demand of 107 million tons per annum in 2035.

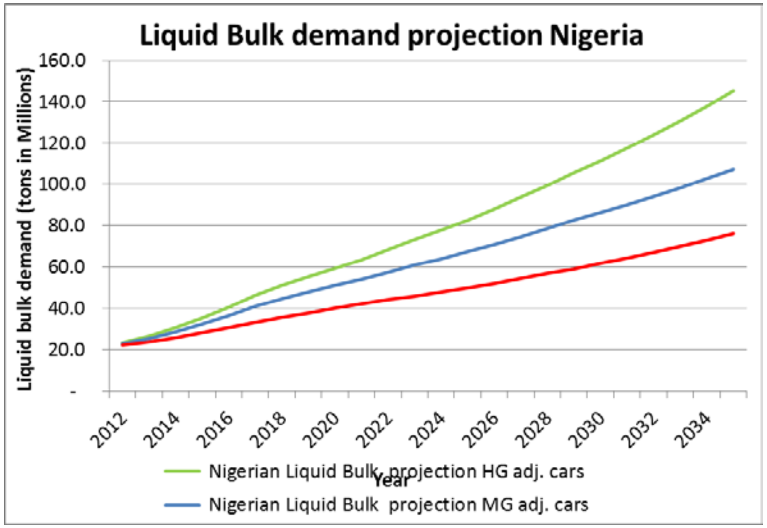

Figure 6.1 – Petroleum products demand projection Nigeria

Table 6.1 – Petroleum products demand projection Nigeria

Volumes in tons	2011	2015	2020	2025	2035
High growth	20,303,338	35,284,450	59,262,359	82,822,626	145,125,145
Medium growth	20,303,338	32,345,475	51,046,251	67,394,649	107,286,792
Low growth	20,303,338	28,286,093	40,227,442	50,034,658	76,163,986

6.3 Liquid Bulk Demand Projection: Nigerian Production Projection

The figure on the right (top) presents the production capacity assumption for liquid bulk (petroleum products) in Nigeria. As can be seen in the figure, it is assumed that a linear development of the production capacity in Nigeria. The build-up period of production capacity starts in 2013 and ends in 2035. The final production capacity in Nigeria is estimated at 20 million tons of petroleum products per annum.

The figure on the right (bottom) and the table below present the production capacity in comparison to the demand projection. At then end of the forecast period, the production capacity accounts for approximately 18% of the Nigerian demand. The production capacity growth outpaces the growth of demand for petroleum products; the production capacity in 2015 still accounts for approximately 6% of the Nigerian demand for petroleum products.

The rapid growth of cement production is supported by the latent natural reserves of Nigeria. Although it is assumed that the production of petroleum products will increase rapidly as a result of the natural reserves, the Nigerian economy is not expected to become self-sufficient. Nevertheless, the production capacity of petroleum products creates downward pressure on the port throughput volume projection.

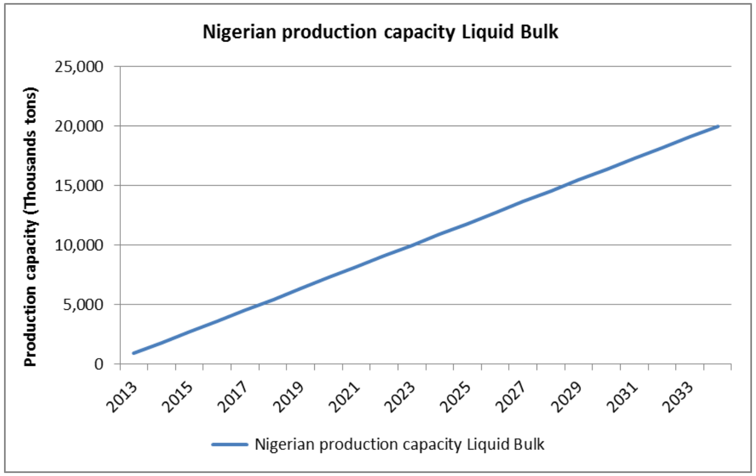

Figure 6.3 – Nigerian assumed production capacity petroleum products

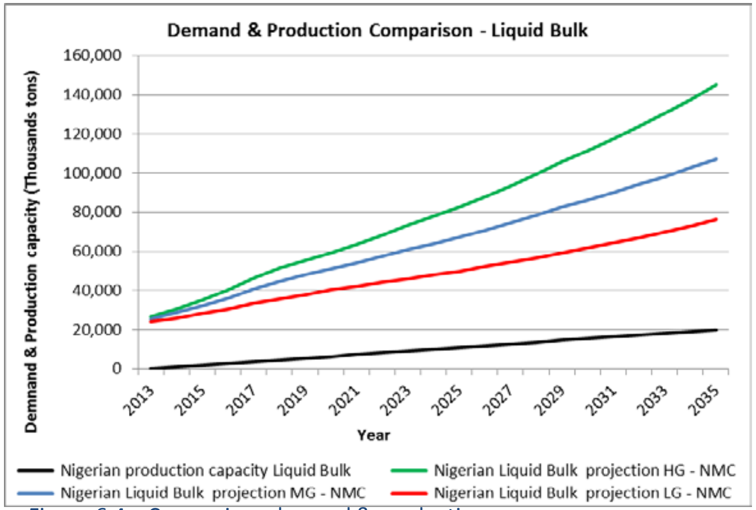

Figure 6.4 – Comparison demand & production

Table 6.2 – Adjustment of demand forecast for domestic production

Volumes in tons	2011	2015	2020	2025	2035
Medium growth	20,303,338	32,345,475	51,046,251	67,394,649	107,286,792
Production		1,818,182	6,363,636	10,000,000	20,000,000

6.4 Liquid Bulk Demand Projection: Port Throughput Projection

The figure on the right and the table on the bottom present the Nigerian port throughput projections for liquid bulk imports. The figures are corrected for the production capacity that is assumed to be developed in the next two decades in Nigeria.

As can be seen in the figure, the production capacity has a significant yet small effect on the growth potential of liquid bulk import volumes in the low economic growth scenario. Despite the production capacity assumption, a growth of 171% in the period 2015-2035 is projected for the liquid bulk import throughput in Nigerian ports in the low growth scenario.

The projected figures suggest that the liquid bulk import volumes are relatively robust. In all economic growth scenarios, the Nigerian port sector will require additional handling demand for liquid bulk imports in order to be able to handled all demand.

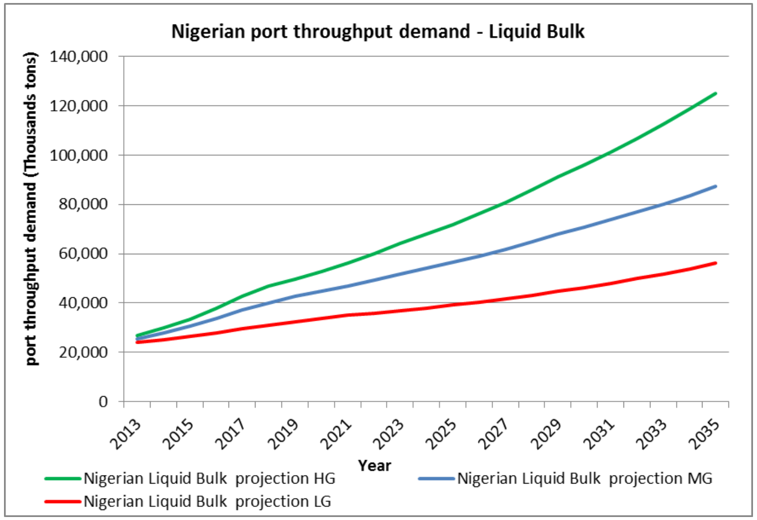

Figure 6.5 – Nigerian port throughput demand forecast petroleum products

Table 6.3 – Nigerian port throughput demand forecast petroleum products

Volumes in tons	2012	2015	2020	2025	2035
High growth	23,311,565	35,284,450	59,262,359	77,872,933	145,125,145
Medium growth	22,810,193	32,345,475	51,046,251	64,038,828	107,286,792
Low growth	22,058,137	28,286,093	40,227,442	47,975,893	76,163,986

6.5 Liquid Bulk Demand Projection: Market Share Assumptions

The figure on the right (top) presents the development of Nigerian liquid bulk import demand (medium growth scenario) and the development of the East-Delta share. Consistent with the NPA port statistics, the East-Delta vehicle market share is set at 40% for the pre-Ibom DSP period.

In contrast to the container market and vehicle market, the liquid bulk import market is characterized by a relatively even spread of volumes across the different port clusters. As a result, the start of operations at Ibom DSP will not lead to a similar significant market shift as observed in the container market and vehicle market. This is mainly due to the fact that the Lagos port sector will also increase in strength due to the start of operations of the greenfield ports. As a result, the final market share for East-Nigeria is set at 40%.

The figure on the right (bottom) presents the development of East-Delta vehicle demand and the Ibom DSP market share. At this moment, the port of Onne, port Harcourt and the port of Calabar handle approximately 40% of the total Nigerian demand (approximately 10 million tons of cement).

Since the current ports in the East-Delta handle significant liquid bulk import volumes at this moment, it is expected that the market share of Ibom DSP in the liquid bulk import market will be lower than the market shares for the container market and the vehicle market. The current ports in the East-Delta have a captive market due to their current client base: it will be hard for Ibom DSP to attract these captive volumes to the port.

The final market share for Ibom DSP in the East-Delta liquid bulk import market is set at 33%. However, the limited capacity and expansion possibilities of the current ports in the East-Delta will create excess demand: this demand will be handled by Ibom DSP. As a result, the overall market share of Ibom DSP at the end of the period is higher than 33%.

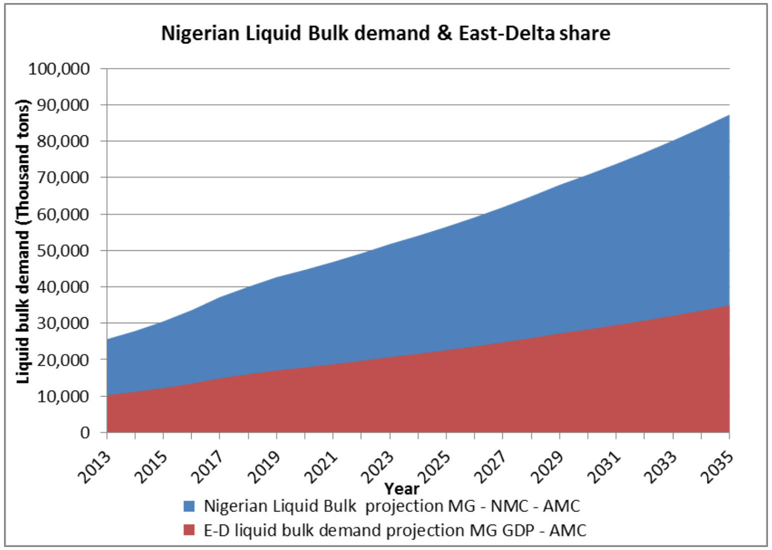

Figure 6.6 – Nigerian petroleum products demand – East Delta share

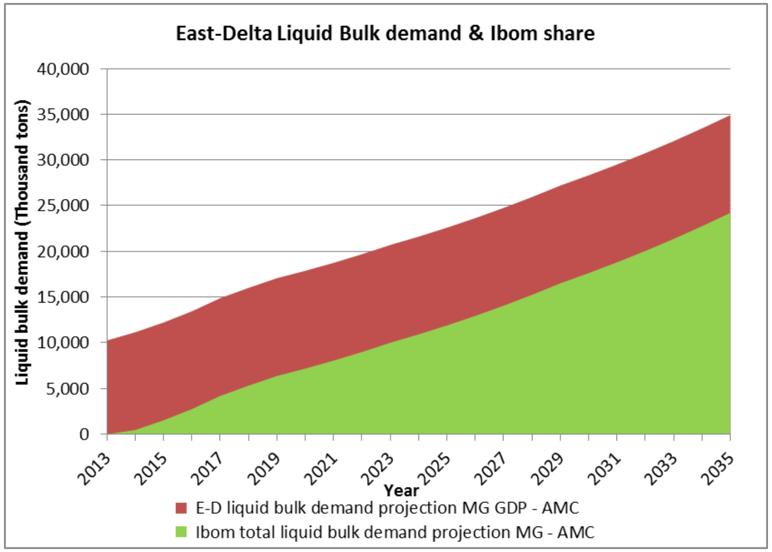

Figure 6.7 – East Delta petroleum products demand – Ibom DSP share

6.6 Liquid Bulk Demand Projection: Ibom DSP Demand Projection

The figure on the right and the table on the bottom of this sheet present the demand forecast for liquid bulk import for Ibom DSP. The demand projection includes an assumption for production of liquid bulk in Nigeria: it is assumed that a total number of 20 million tons will be produced in Nigeria by 2025. In addition, the demand is capped on the number of cars that are projected to be in Nigeria by 2035. Since cars are the main driver for liquid bulk import, the vehicle stock has a direct relation with liquid bulk import.

This assumption for production has significant effect on the demand projection in the low growth scenario; a limited growth from 4.5 million tons in 2020 to 5.2 million tons in 2025 is projected. After 2025, the low growth scenario develops at a significantly higher growth rate. The other two scenarios are less affected by the assumed production capacity in Nigeria.

Although the low growth scenario is affected by the assumption of production capacity, the projected volumes suggest that a liquid bulk terminal can be financially feasible. Nevertheless, the phasing of the liquid bulk terminal is highly dependent on the GDP-scenario.

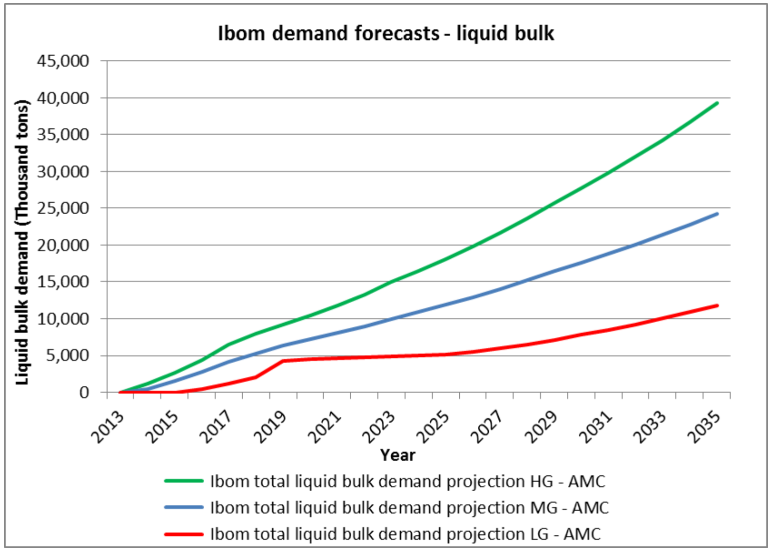

Figure 6.8 – Ibom DSP demand forecasts – petroleum products

Table 6.4 – Ibom DSP demand forecasts – petroleum products

Volumes in tons	2018	2020	2025	2030	2035
High growth	8,028,978	10,463,198	18,069,123	27,718,848	39,353,767
Medium growth	5,311,303	7,176,755	11,897,932	17,624,500	24,218,425
Low growth	2,044,779	4,470,022	5,164,575	7,814,688	11,769,303

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Main Table of Content

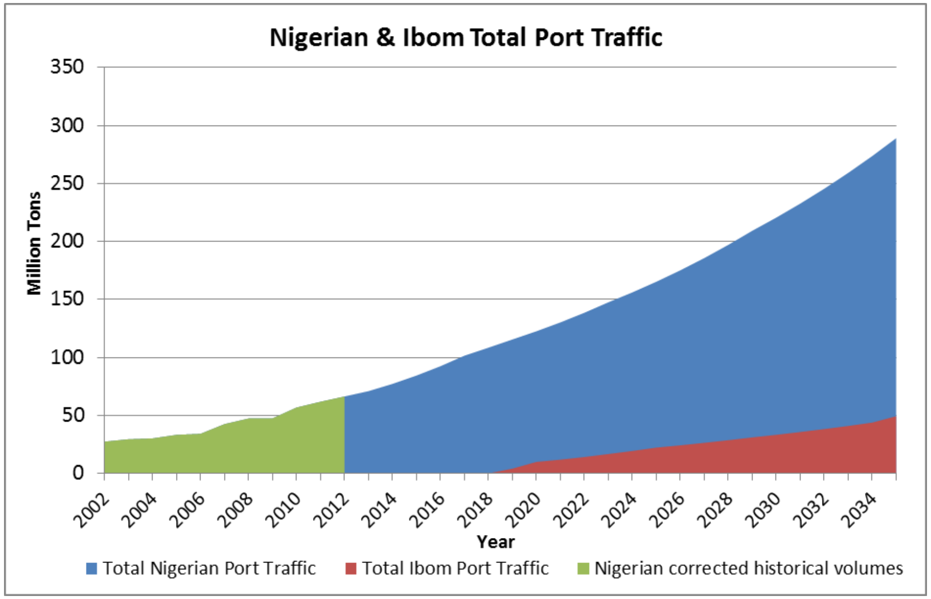
Executive summary: reflection on results

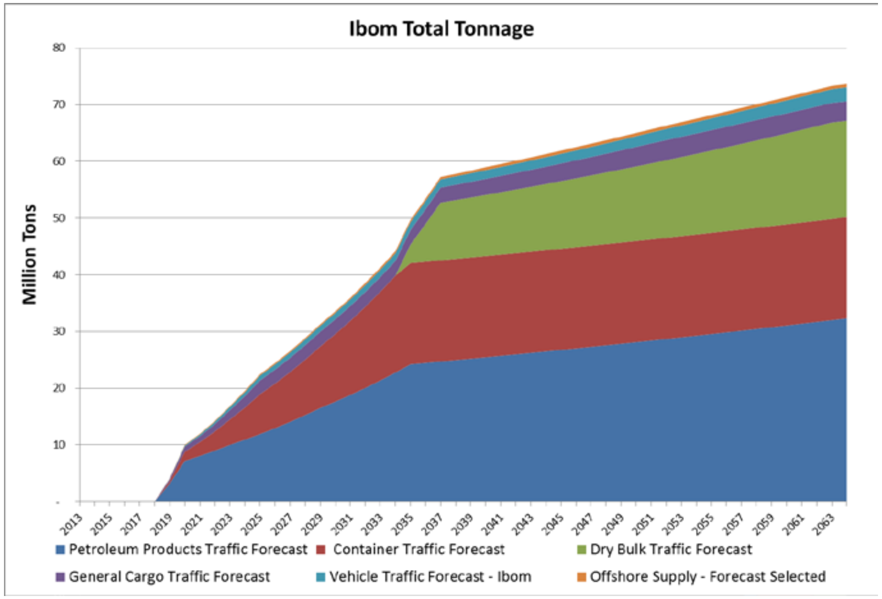
The figures below provide an overview of the historical and forecasted total throughput figures for Nigeria and the Ibom Deep Sea Port. The graph on the left shows the historical throughput tonnage in Nigerian ports for the period 2002 – 2012 and forecasted throughput tonnage for Nigerian ports and IDSP. The graph on the right shows the forecasted throughput tonnage for IDSP (2013 – 2063).

The graphs demonstrate that a conservative approach was used in developing the traffic forecast for Ibom Deep Sea Port: IDSP's modest share in the left graph proves this. The launch of operations at IDSP is not regarded to displace demand from current ports to IDSP: it is merely a strategic need for the country and the region, that will not interfere with growth opportunities and requirements for other ports.

The graphs furthermore provide evidence that the traffic forecasts are in line with historic growth figures and the economic outlook for Nigeria. The historical volumes for Nigeria connect to the total forecasted Nigerian port traffic.

Demand & Capacity Development: National & Regional Demand (left) & Ibom DSP Demand (right)





Executive summary: strategic considerations for Master Planning

Strategic considerations derived from the demand projections: cargo focus

The strategic considerations form the main conclusions of the traffic forecast analysis for Ibom DSP. The strategic considerations describe what cargo segments are potentially interesting for Ibom DSP and what infrastructure characteristics should be provided in order to create unique selling points within the Nigerian port sector. The following conclusions can be drawn from the traffic forecast analysis:

General cargo handled on a common terminal during the first phase;

- Due to the ramp-up period of container demand volumes and vehicle demand volumes, these demand volumes are sufficient to sustain a specialized terminal in the first phase of operations. Hence a combined terminal for containers, breakbulk and vehicles is included in the first phase of operations in the Master Plan;
- A specialized facility for off-shore supply is included in the Master Plan for the first phase of operations. The proximity of offshore oil fields creates captive volumes from the start of the project. Demand for offshore supply is not quantified in the demand projection due to the fact that this demand is mainly supply driven;
- The breakbulk terminal is primarily focused on iron & steel products, consumables traded as breakbulk are regarded as upside potential. Capacity expansions for the breakbulk terminal are triggered by iron & steel products demand.

Dry bulk cargo handled on a specialized terminal;

- A strategic decision is made to focus at cement demand during the first phase of operations; cement demand is the largest and most stable of all commodities in the dry bulk segment. In the low economic growth scenario, the cement volumes may not be sufficient to justify a specialized terminal;
- Handling of grains/wheat, sugar and fertilizers is included in the overall Master Plan, yet not in the first phase of operations due to unstable demand (pro-active government policy on agricultural production might reduce potential) and the significantly lower volumes than cement.

Liquid bulk cargo handled on a specialized terminal;

- Significant demand volumes are projected for Ibom DSP, primarily in the PMS-segment (petroleum products): at least one jetty shall be developed in first phase to meet the demand projection:
- Facilitation of LNG export is not included in the first phase of port development due to the strong competition of the existing facility at Bonny;
- Volumes that are the result of liquid bulk transshipment are regarded as upside potential. This is mainly dependent on the legal setting concerning liquid bulk vessels and the lightering of larger liquid bulk vessels;
- Tank-farm with proper hinterland connections behind main terminals.

Executive summary: strategic considerations for Master Planning

Strategic considerations derived from the demand projections: infrastructure requirements

An extensive market consultation campaign is conducted in order to assess the potential demand for cargo handling services at Ibom DSP. During the market consultation campaign, the required infrastructure characteristics were discussed as well. These required infrastructure characteristics are important aspects for the competitive position of Ibom DSP. The following infrastructure characteristics were mentioned on multiple occasions and can become the Unique Selling Points of Ibom DSP:

A draft of at least 15 meter required to provide an attractive alternative for Lagos ports and Delta ports. The draft of 15 meter will provide an excellent proposition for the development of economies of scale in maritime transport. Due to draft restrictions in the current ports, the global trend of deploying larger vessels on main trade routes has not materialized yet in a similar magnitude as other regions (Southern Africa, East Africa e.g.). The draft of at least 15 meters will provide economies of scale in the following three segments:

- Draft of 15 meters is required to handle LR1-tankers for petroleum import;
- Draft of 15 meters is required to handle Panamax vessels for dry bulk import;
- Draft of 15 meters is required to handle container vessels up to 8,000 TEU.

In addition to the maritime access, Ibom DSP will have to provide excellent hinterland connections in order to compete with the ports of Onne, port Harcourt and the port of Calabar (Eastern region of Nigeria) and the greenfield ports in the Lagos area (central region of Nigeria). This excellent hinterland connection is required to build on one of the core propositions of Ibom DSP: the gateway function for (East-)Nigeria. The hinterland connection is not limited to the direct connection with the port; the interregional road infrastructure requires sufficient capacity to handle the projected demand for Ibom DSP.

The demand projections for Ibom DSP assume that the above mentioned infrastructure characteristics are realized at the required point in time in Ibom DSP. Subsequently, the infrastructure requirements are also core input for the technical design, the financial model and the economic cost benefit analysis for Ibom DSP.

Project Initiators:

Transaction Advisors:

Felak Concept Limited

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