PETROLEUM SECTOR DEVELOPMENT

Industrialization of the Sector in the country and its impact on long term national economy

Presentation at KKFP Conference

Dili, 27 October 2016
1. Development of the Sector to date

2. The Potentials of the Petroleum Sector and its industrialization plan (Tasi Mane Project)

3. Monetary & socio-economic benefits to the country
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1. PETROLEUM DEVELOPMENT TO DATE

- Since restoration of independence, three fields have been developed: Elang Kakatua, Bayu Undan, and Kitan in JPDA.
  - Elang Kakatua – produced since 1998 to 2006
  - Bayu Undan – produced since 2004 - estimated to stop at 2022 (may be longer)
  - Kitan – produced in 2011 and suspended in 2015 (can be reproduced)
  - 2005/2006 – First Bidding round for exploration blocks JPDA & Offshore Exclusive areas
  - Onshore – no explorations

- Focus on Upstream activities (explore, produced and sold to the market)
- Revenue are received in form of royalties, profit petroleum & taxes
- No industrialization (e.g. Lack of infrastructures and capabilities)
Example: Bayu Undan Gas production decline
2. POTENTIALS OF THE SECTOR & ITS INDUSTRIALISATION

- Many potential resources are yet to be explored and developed: Greater Sunrise, Kelp Deep, Chuditch, PSC 11-106, among others.
- Explorations are currently ongoing in both JPDA and Exclusive areas (e.g. Eni Block, and TIMOR GAP Block).
- Some prospects have already been identified (to be further explored and drilled).
- Onshore is yet to be explored (e.g. TIMOR GAP block and ANPM to release others in near future).
- The Timor-Leste Government has chosen the petroleum sector as one of the pillars of the national Strategic Development Plan 2011-2030, including in it planned initiatives in the Upstream, Downstream and related Services.
UPSTREAM ACTIVITIES & POTENTIAL: ONSHORE

TIMOR-LESTE NATURAL GAS SEEPS PROSPECT MAP

- No exploration to date, but plenty of oil and gas seepages all around the country
- Some shallow wells drilled during World War II
- Geologically similar to oil producing island in Banda Arc such as Seram Island, etc.

Aimaulin Seep
Horba Seep
Holmesel Seep
Lour Seep
Aisaleuk Seep
Atalele Seep
Aliambata Seep
Badulobo Seep
UPSTREAM ACTIVITIES & POTENTIAL: EXISTING CONTRACTS

> 85% open Acreage

> 65% open Acreage

Source: Autoridade Nacional do Petroleo
YET TO MATURE PETROLEUM PROVINCES: WITH DISCOVERED FIELDS

LEGEND:
- Gas Field
- Oil Field
- Gas Pipeline
- Gas Pipeline (Proposed)
- Conventional oil platform
- Conventional gas platform
- Onshore gas plant
- Floating production storage & offloading vessel
- Abandoned field
- Petroleum exploration well oil discovery
- Petroleum exploration well gas discovery
- Petroleum exploration well oil & gas discovery

VULCAN:
- 1.3 trillion cubic feet of gas
- 1.2 trillion cubic feet undeveloped
- 31 million barrels of condensate
- 31 million barrels undeveloped
- 357 million barrels of oil
- 170 million barrels undeveloped

GREATER KELP-SUNRISE:
- 20.2 trillion cubic feet of gas
- 10.7 trillion cubic feet undeveloped
- 379 million barrels of condensate
- 54 million barrels undeveloped
- No oil

SAHUL-NANCAR-FLAMINGO:
- 3.4 trillion cubic feet of gas
- 50 billion cubic feet undeveloped
- 233 million barrels of condensate
- 4 million barrels undeveloped
- 337 million barrels of oil
- 227 million barrels undeveloped

SOURCE:
GULF OF MEXICO MATURE PETROLEUM PROVINCE: DISCOVERED & PRODUCING FIELDS

Exploring the full potential of an area requires significant investments and wells

TIMOR-LESTE PETROLEUM VALUE POTENTIAL
(to be explored & developed in the next 50 years)

- Timor-Leste’s TOTAL PETROLEUM INITIAL -IN-PLACE (PIIP) is in the range of **12-17 Billion Barrel Oil Equivalent (BOE)**

- TIMOR GAP estimates the recoverable resources will be around **6.3 Billion BOE** (as a comparison Bayu Undan reserve is ~ 1 Billion BOE)

- The monetary value of these resources at average US$ 59 /barrel in the next 50 years is **US$ 372 Billion**

- Assuming the cost per barrel = US$ 35/barrel, then a total of at **US$ 220 Billion** will go into the expenditures in exploration, engineering, simple to complex services, fabrications (small, medium to larger scale), installations/constructions, operations and maintenance.

- **Therefore, the country want to develop its infrastructures, capabilities in the services, engineering and fabrications in the next decades to capture some of these expenditures in its economy.**
DIVERSIFICATION IN THE PETROLEUM SECTOR: FROM EXTRACTIVE TO TRANSFORMATIONAL INDUSTRY

Diversification in the petroleum sector means diversifying the sector’s activities which since over a decade ago has always been concentrated in *Upstream operations*, to include a more diversified and labour- & economic-intensive impact activities in *Services*, and *Downstream*.

This will move the sector from typically *extractive* to include *transformational*, ensuring the industrialization of the sector and contributing greatly to the socio-economic development of the nation, with provisions of jobs, trade, infrastructures, services & fabrications *which may last even after the end of Timor-Leste upstream operations*. 
Suai Supply Base includes a port with draught up to 9 meters and several berths of 6 meters draught, with protection by a breakwater with over 3 km.

There will be several mini-shore bases, and typical warehouses, yard and open area of up to 1000 hectares for *industries, fabrications, and services in oil and gas industries such as drilling, fuel bunkering, catering, waste management, pipe threading and repairing, storage and warehousing, wirelines, drilling mud services, seismic and drilling services, supply vessels, tug boats, compressors & pumps repairs, spare parts supplies, emergency & oil spill response services, etc.*, to name a few.
EXAMPLES OF SERVICES

**Marine Services**
- Rig Agency
- Rig/Vessel Lay-up
- Tug Boats
- Vessel Chartering
- AHTS & PSVs
- Rig Tow
- Crew Change

**Facility Rent & Management**
- Warehouse /Yard Management
- Bulk Plant Area
- Port-a-camp
- Office Space
- Equipment Rental
- Cargo Handling
- Security Services
- Waste Management
- Fuel/Water Supply

**Supply Chain Services**
- International Transportation
- Customs Clearance
- Heavy Lift Transportation
- Material Management
- Dangerous Goods Handling
- Hand-Carry & Hotshot
- Air/Sea Chartering
- Helicopter Operations

**Oilfield Support Services**
- Engineering
- Fabrications (small to big)
- CCU & Basket Rental
- Equipment Rental
- Manpower Supply
- Inspection Services
- Procurement Services
- Oil Spill Response
- Maintenance Services
- Pipe Repair & Threading
- Seismic Surveys
- Drilling Rigs Stations
- Drilling Muds
- Bunkering

Note: Activities above will naturally trigger development of agriculture, fishery, small to medium enterprises (food crops, fruits, vegetables, meat and fish required for employees and workers in the Base and oilfields)

Source: Courtesy of Altus – Modified by TIMOR GAP
Pipe racking, fuel tanks and warehouses

Oil rigs parking for supply/maintenance

Welding

Fabrication

Photos: Altus; Lamongan Shore Base; Eastern Pacific Industrial Corporation Berhad (Kemaman Supply Base)
TIMOR-LESTE AND TIMOR SEA MARKET AND SUAI SUPPLY BASE SHARE

Captured by Suai Supply Base
3. MONETARY & SOCIO-ECONOMIC IMPACT TO THE COUNTRY
UPSTREAM - TIMOR-LESTE CASH FLOWS

Net cash flows (USD MM)

Accumulated cash flows (USD MM)

Accumulated cash flow = USD 47 billion
NPV at 10% = USD 7.6 billion

Note: Does not include existing producing fields (Bayu Undan, Kitan) nor TLEA or JPDA producing fields with no TIMOR GAP participation
Source: TIMOR GAP upstream model and analysis
SERVICES - TIMOR-LESTE CASH FLOWS

Net cash flows (USD MM)

Accumulated cash flows (USD MM)

Accumulated cash flow = USD 2.1 billion
IRR = 8.3%
NPV at 10% = – USD 112 million

Note: Assumes 100% TIMOR GAP ownership
Source: TIMOR GAP Suai Supply Base model and analysis
OTHER BENEFITS/MULTIPLIER EFFECTS

- **Jobs**: 2,000+ during construction & 250 direct jobs during operation; up to 5,000 direct jobs if fabrications and services are set up. Therefore over 25,000 indirect jobs (industry ratio: 1 direct job generates up to 5 indirect jobs)

- Timor-Leste businesses & locals can compete to supply goods and services for upstream **exploration & development** of over $4 billion (25 years) – **not generated without SSB**

- Timor-Leste businesses & locals can compete to supply goods and services for upstream **operations & maintenance** of over $15 billion (25 years) – **not generated without SSB**

- **New businesses** such as maintenance, engineering, small fabrications, repairing, specialised weldings, specialised equipment cleaning, transport, gardening, cleaning, security guard services, chemical supplies, crude tanker business, product tanker business, tug boats, electricity usage, offices and accommodation, hotels and entertainment, food, fruit and vegetable supplies, etc. – **all of which will generate thousands of indirect jobs, and stimulate economic activities around Suai and Timor-Leste at large, paying taxes and contributing to GDP growth**

- **Trade and commerce** – Timor-Leste can be active in world trade and known as SSB

- Build **geopolitical influence** in supply chain

- **Reduce trade imbalance** by increasing exports

- **Increase hard currency** into Timor-Leste economy

- **Infrastructure**: set the basis for future expansions

- **Education**: science & technology exposure, experience and transfer

- **Help negotiation** on securing the pipeline & LNG - plant to Timor-Leste, and the industry in general
In the downstream, Timor-Leste would like to build, among others:

• Refineries

• Petrochemical complexes

• LNG Plants

• Pipelines and LNG Tankers

To implement these plans, the Government has commissioned several studies including Pipeline FEED, LNG Pre-FEED, Refinery FEED. All these studies are performed by reputable international engineering companies such as JP Kenny, Foster Wheeler and Worley Parsons.
BETANO REFINERY & PETROCHEMICAL COMPLEX

Entrance

Landfill
DEMAND FORECAST

Average annual growth rate

Asia

Naphtha (million tonnes)

+1.5% p.a.

Diesel/Gasoil (million tonnes)

+3.2% p.a.

Gasoline (kbpd*)

+6% p.a.

Diesel (kbpd*)

+6% p.a.


*kbpd = thousand barrels per day
TOTAL TIMOR-LESTE CASH FLOWS: FROM REFINERY TO PETROCHEMICALS (30 to 100k bpd)

Net cash flows (USD MM)

Accumulated cash flows (USD MM)

30k bpd in 2020, expanding to 60k in 2030, 100k with Aromatics in 2040

Note: Assumes 100% TIMOR GAP ownership
Source: TIMOR GAP Refinery model and analysis

Accumulated cash flow = USD 2.7 billion
IRR = 11.4%
NPV at 10% = USD 70 million
**OTHER BENEFITS/MULTIPLIER EFFECTS**

- **Jobs**: 2,000+ during construction & 250 direct jobs during operation; up to 1,000 direct jobs if fabrications and services are set up (possibly 2-5 years from the start of operation). Therefore over 6,000 indirect jobs (industry ratio: 1 direct job generates up to 5 indirect jobs).

- Timor-Leste businesses & locals can compete to supply fabrications, services and work worth around **$2 billion in capex** (25 years) – **not generated without the project**

- Timor-Leste businesses & locals can compete to supply services and goods for refinery operations worth almost **$1 billion** (25 years) – **not generated without the project**

- **New businesses** such as maintenance, engineering, small fabrications, repairing, specialised weldings, specialised equipment cleaning, transport, gardening, cleaning, security guard services, chemical supplies, crude tanker business, product tanker business, tug boats, electricity usage, offices and accommodation, hotels and entertainment, food, fruit and vegetable supplies, etc. – **all of which will generate thousands of indirect jobs, and stimulate economic activities around Betano and Timor-Leste at large, paying taxes and contributing to GDP growth**

- **Trade and commerce** – Timor-Leste can be more active in world trade

- **Reduce trade imbalance** by increasing exports

- **Eliminate fuel import** worth $3+ billion (20 years)

- **Reduce hard currency** exports

- **Infrastructure**: set the basis for future expansions

- **Education**: science & technology exposure, experience and transfer
REFINERY & PETROCHEMICAL FINANCING PLAN

Financiers
- e.g., ECAs, Exim banks
- Commercial Bank(s)

Guarantee

Project Cash Flow
or other Asset Guarantees

EPC Contractor
- TIMOR GAP sourced condensate & crude supply

Project Financing

JV Partners
- Equity 1 – X%
- Dividends
- Domestic Sales
- Contingent Condensate Sales

Timor Gap JV Co.
- Contingent Condensate Offtake for Export
- Domestic Offtake for Export
- Sales Proceeds paid by Offtaker/TIMOR GAP

Export
- Offtakers
- Timor Gap

Domestic

Sales Proceeds

Sales Proceeds (Balance)

Escrow A/C

Repayment

Commercial Bank(s)

Equity X%

Dividends
The Beaço LNG Plant & Marine Facility will be the area where the natural gas pipeline reaches Timor-Leste land and where the LNG plant will process the gas. This cluster will incorporate the LNG Plant Complex.

- PIPELINE AND DETAILED MARINE SURVEY (DMS), FEED LEVEL
- MARINE FACILITY (LNG PORT), FEED
- LNG PLANT – CONCEPTUAL/FEASIBILITY
GAP BETWEEN LNG SUPPLY & DEMAND

Global LNG demand vs. LNG supply by region (mtpa*)

* mtpa = million tonnes per annum
Source: Santos (from Wood Mackenzie LNG Tool 2014 Q3 data)
TOTAL TIMOR-LESTE CASH FLOWS

Net cash flows (USD MM)

Accumulated cash flow (USD MM)

Accumulated cash flow = USD 13 billion
IRR = 14.4%
NPV at 10% = USD 916 million

Note: Assumes 70% TIMOR GAP ownership
Source: TIMOR GAP LNG Plant model and analysis
OTHER BENEFITS/MULTIPLIER EFFECTS

• **Jobs**: 5,000+ during construction & 300 direct jobs during operation; over 1,500 indirect jobs (industry ratio: 1 direct job generates up to 5 indirect jobs)

• Timor-Leste businesses & locals can compete to supply **fabrications, services and work** worth almost **$5 billion in capex** (before production) – **not generated without the project**

• Timor-Leste businesses & locals can compete to supply **services and goods** for LNG, pipeline and tanker operations worth over **$1.5 billion** (25 years) – **not generated without the project**

• **New businesses** such as maintenance, engineering, small fabrications, repairing, specialised weldings, specialised equipment cleaning, transport, gardening, cleaning, security guard services, chemical supplies, LNG tanker business, tug boats, electricity usage, offices and accommodation, hotels and entertainment, food, fruit and vegetable supplies, etc. – **all of which will generate thousands of indirect jobs, and stimulate economic activities around Beaço and Timor-Leste at large, paying taxes and contributing to GDP growth**

• **Trade and commerce** – Timor-Leste can be more active in world trade and known as LNG supplier

• Build **geopolitical energy influence**

• **Reduce trade imbalance** by increasing exports

• **Increase hard currency** into Timor-Leste economy

• **Infrastructure**: set the basis for future expansions

• **Education**: science & technology exposure, experience and transfer
EXAMPLE: BINTULU LNG COMPLEX (MALAYSIA)
LNG PLANT & PIPELINE FINANCING PLAN

Financers
- e.g., ECAs, Exim banks
- Commercial Bank(s)

Equity 1 – X%
- Timor LNG JV Co.

Project Financing

Equity X%

Project Cash Flow

Guarantee

EPC Contractor
- Greater Sunrise & other upstream gas suppliers

TIMOR LNG JV Co.

JV Partners

Dividends

Domestic
- Sales
- Domestic Sales

Sales Proceeds
- Products Long term offtake for Export

Sales Proceeds
- Export LNG Offtakers

Export LNG Offtakers

Domestic

Commercial Bank(s)
- e.g., ECAs, Exim banks

Financers

Sales Proceeds

EPC Contract
SUMMARY OF
PETROLEUM SECTOR DEVELOPMENT

• Potential $372 billion dollars worth of resources yet to be monetized in the next 50 years.
• This requires exploration, development and maintenance worth $222 billion in the coming 50 years.
• When fully explored, approximately $31 billion worth of Government take through taxes and profit oil (upstream take), plus TIMOR GAP dividends of around $16 billion.
• However, to capture the full value, Timor-Leste should move from an upstream, extractive-oriented industry to more transformational industry by way of developing services, fabrications and goods – e.g., establishing Suai Supply Base, refineries/petrochemicals, and LNG plant.
• This will ensure around 27 % of the $100 billion is captured in Timor-Leste’s economy with additional multiplier effects of thousands of jobs, trade, commerce, SME development, and general GDP growth in the 20 years or so.
• Government take from downstream and services will be around $16 billion, including TIMOR GAP dividends.
• Requires State Investment up to US$ 2.2 Billion (in Suai Airport, Suai Supply Base, Highway), the rest by commercial entities.
Thank You