

An aerial photograph of an industrial facility, likely a refinery or port, with a large oil tanker docked at a pier. The facility features several large storage tanks and complex piping. The background shows a body of water and some greenery.

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

DISCLAIMER

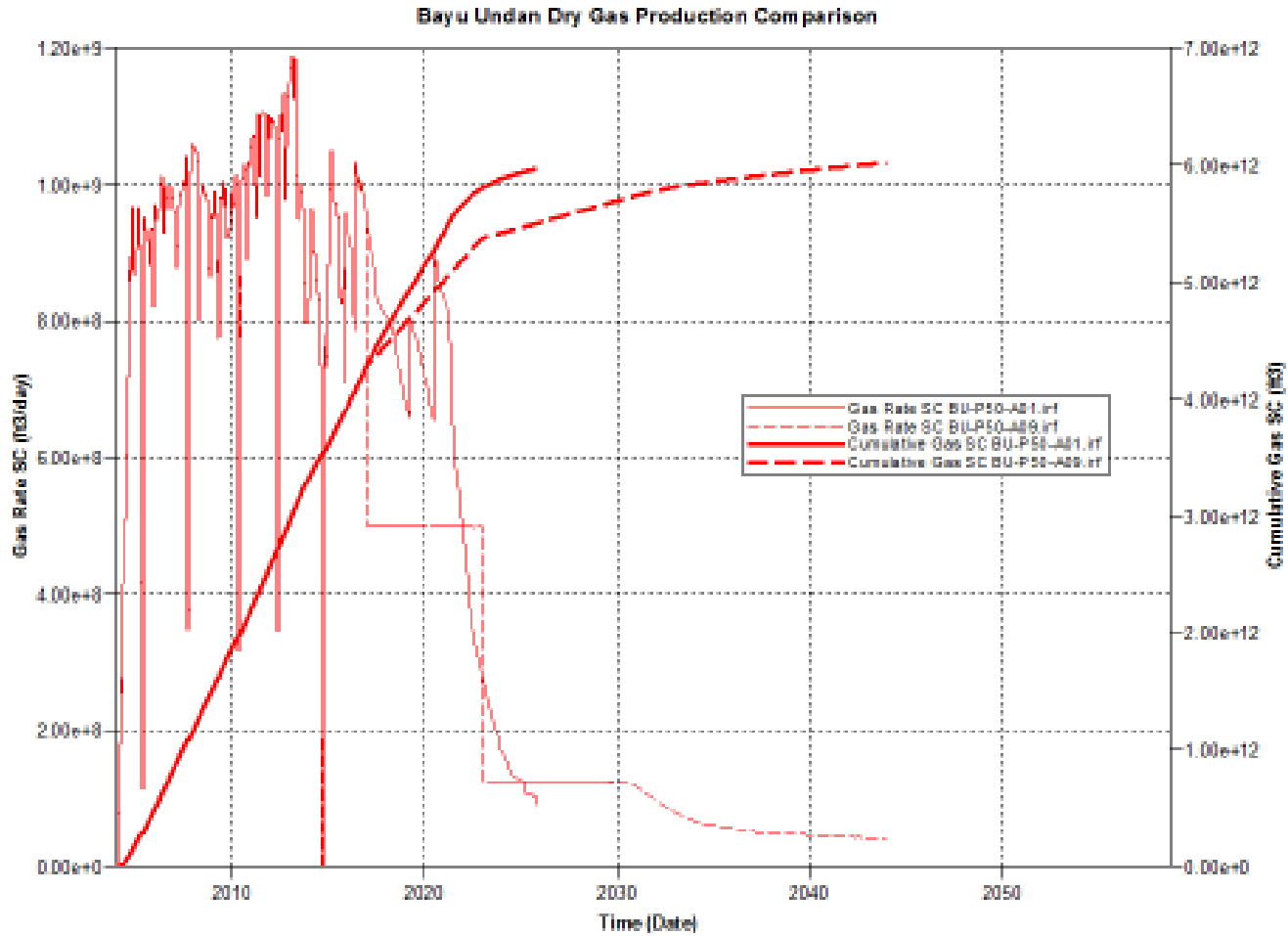
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1. PETROLEUM DEVELOPMENT TO DATE

- 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



Aimaulin Seep



Horba Seep



Holmesel Seep



Lour Seep



Aisaleuk Seep



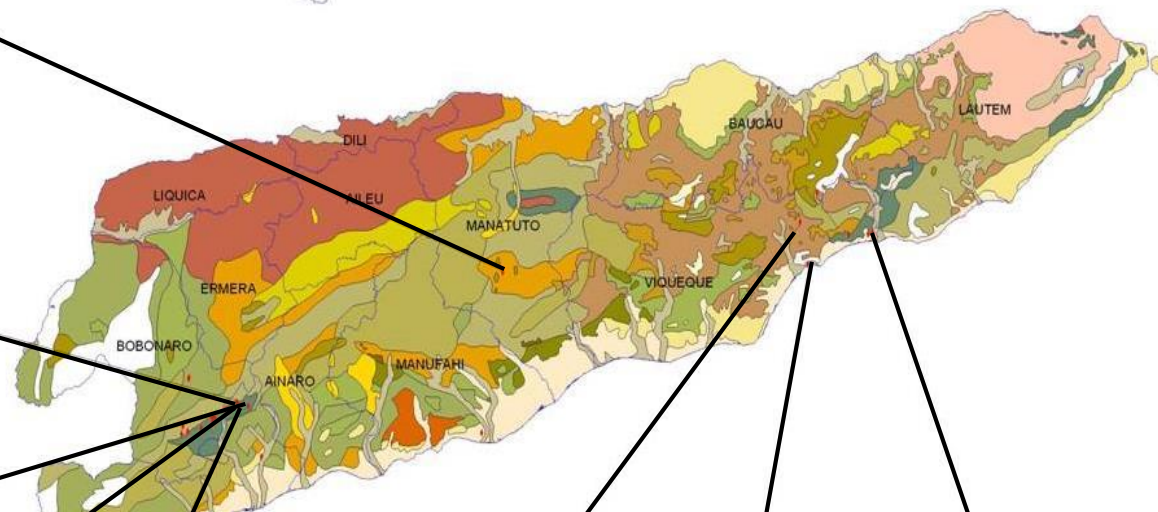
Atalele Seep



Aliambata Seep



Badulobo Seep

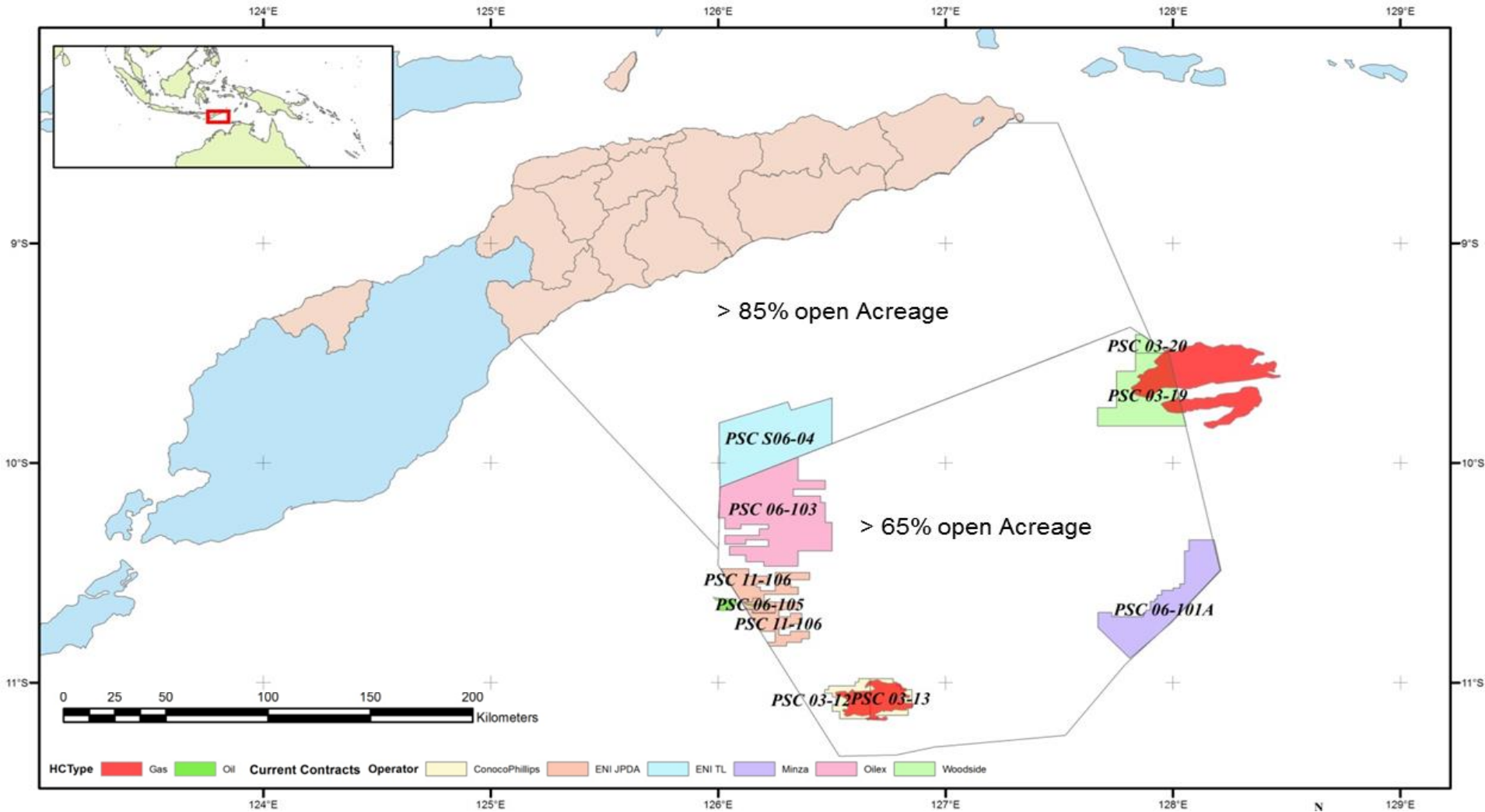


LEGEND

	TL Gas Seeps
	District boundary
TL Geological Formation	
	Aileu Formation
	Ainaro Formation
	Aitutu Formation
	Aliambata Formation
	Alluvial
	Barique Formation
	Baucau Limestone
	Bobonaro Complex
	Bobonaro Formation
	Borolalo Formation
	Cablaci Limestone
	Cribas Formation
	Dartolu Limestone
	Dilor Formation
	Lariguti Formation
	Lolotoi Formation
	Maubisse Formation
	Suai Formation
	Surobeco Formation
	Viqueque Formation
	Waibua Formation
	Wailuli Formation

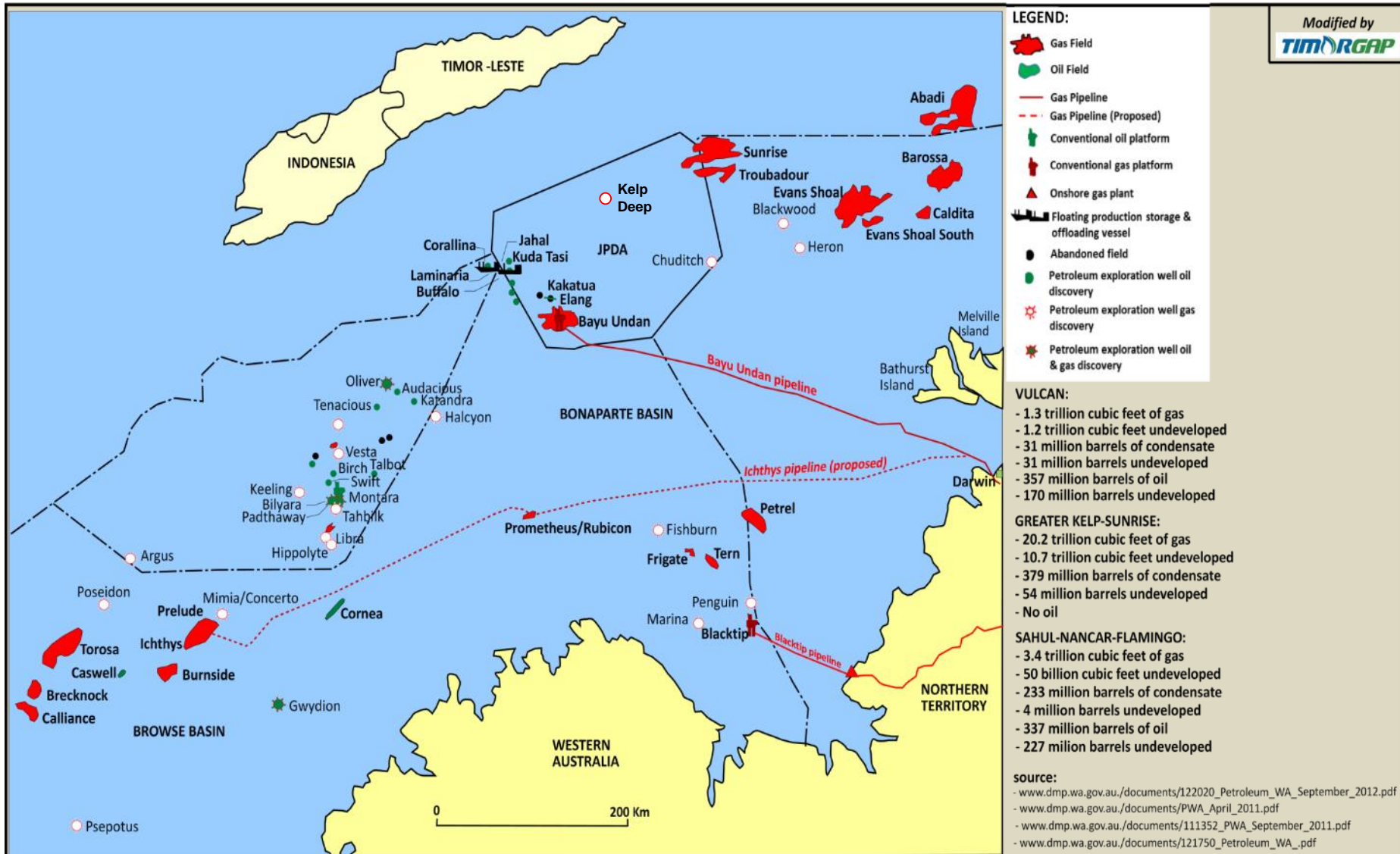
- No exploration to date, but plenty of oil and gas seepages all around the country
- Some shallow wells drilled during World War II
- Geologically similar to oil producing island in Banda Arc such as Seram Island, etc.

UPSTREAM ACTIVITIES & POTENTIAL: EXISTING CONTRACTS

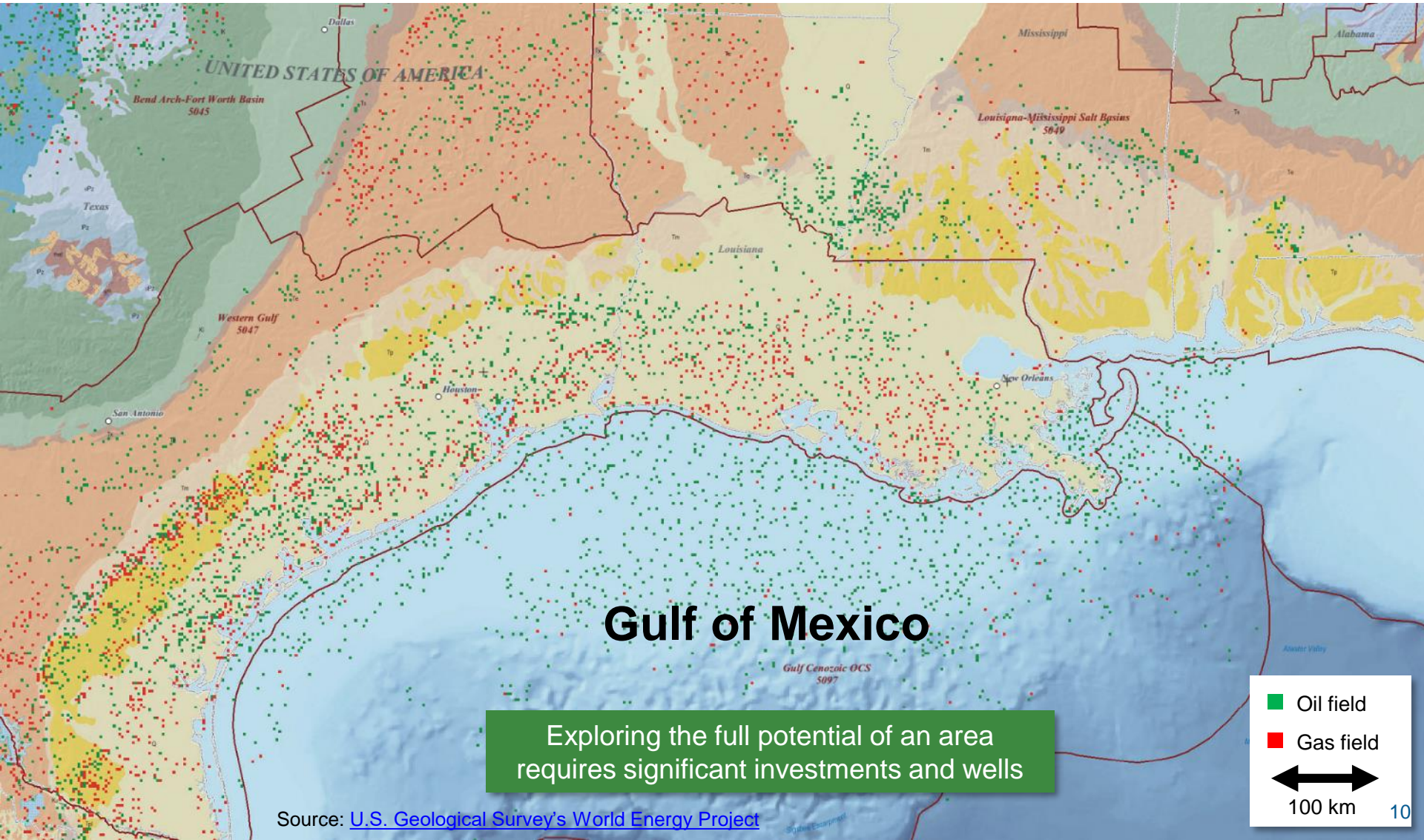


Source: Autoridade Nacional do Petroleo

YET TO MATURE PETROLEUM PROVINCES: WITH DISCOVERED FIELDS



GULF OF MEXICO MATURE PETROLEUM PROVINCE: DISCOVERED & PRODUCING FIELDS



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*.

TASI MANE PROJECT



OIL & GAS SERVICES CAPABILITIES DEVELOPMENT: SUAI SUPPLY BASE

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.*



AREA LOCATION
SSB: 1113 ha | NOVA SUAI: 213
ha

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)

Pipe racking, fuel tanks and warehouses



Oil rigs parking for supply/maintenance



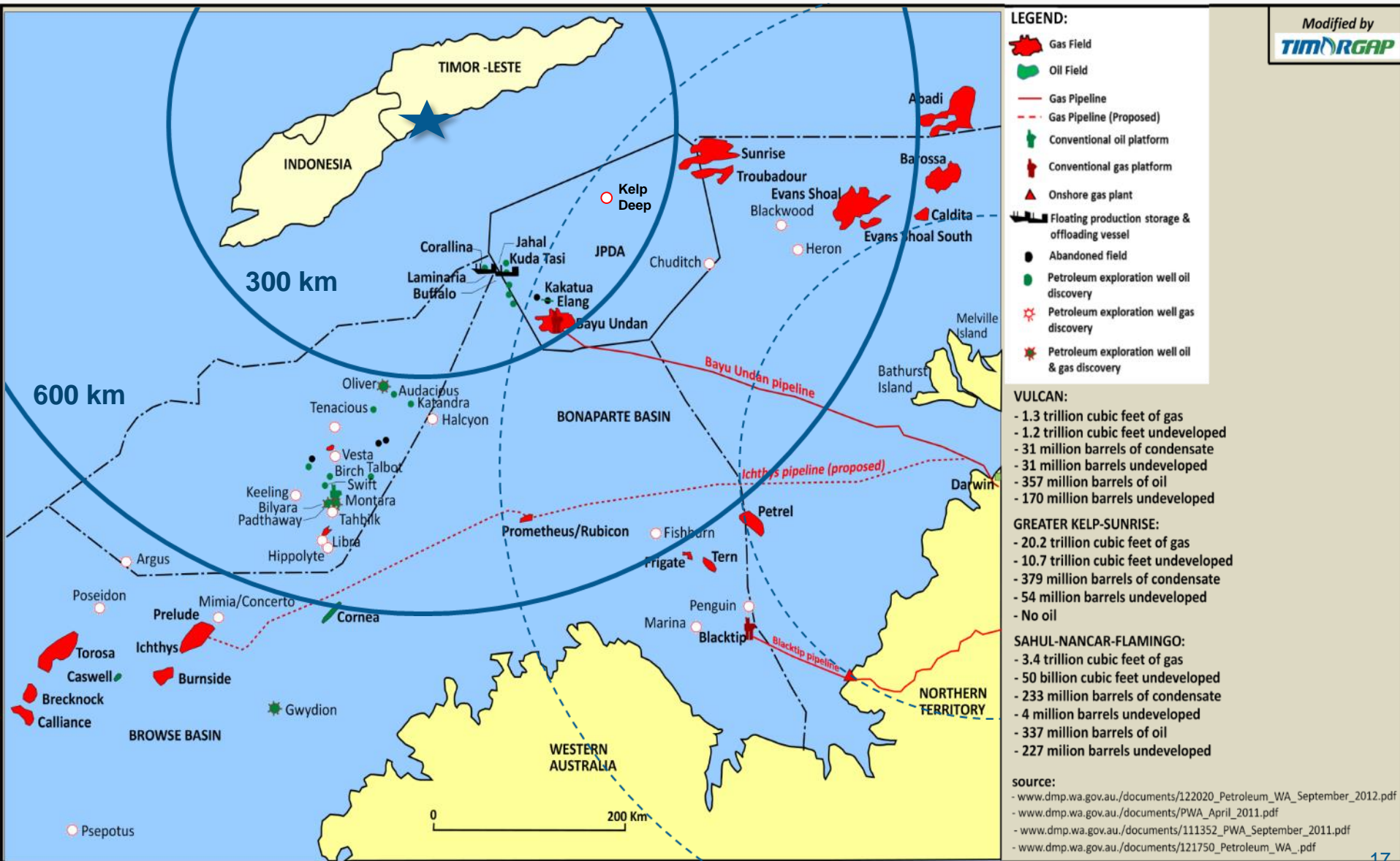
Welding



Fabrication

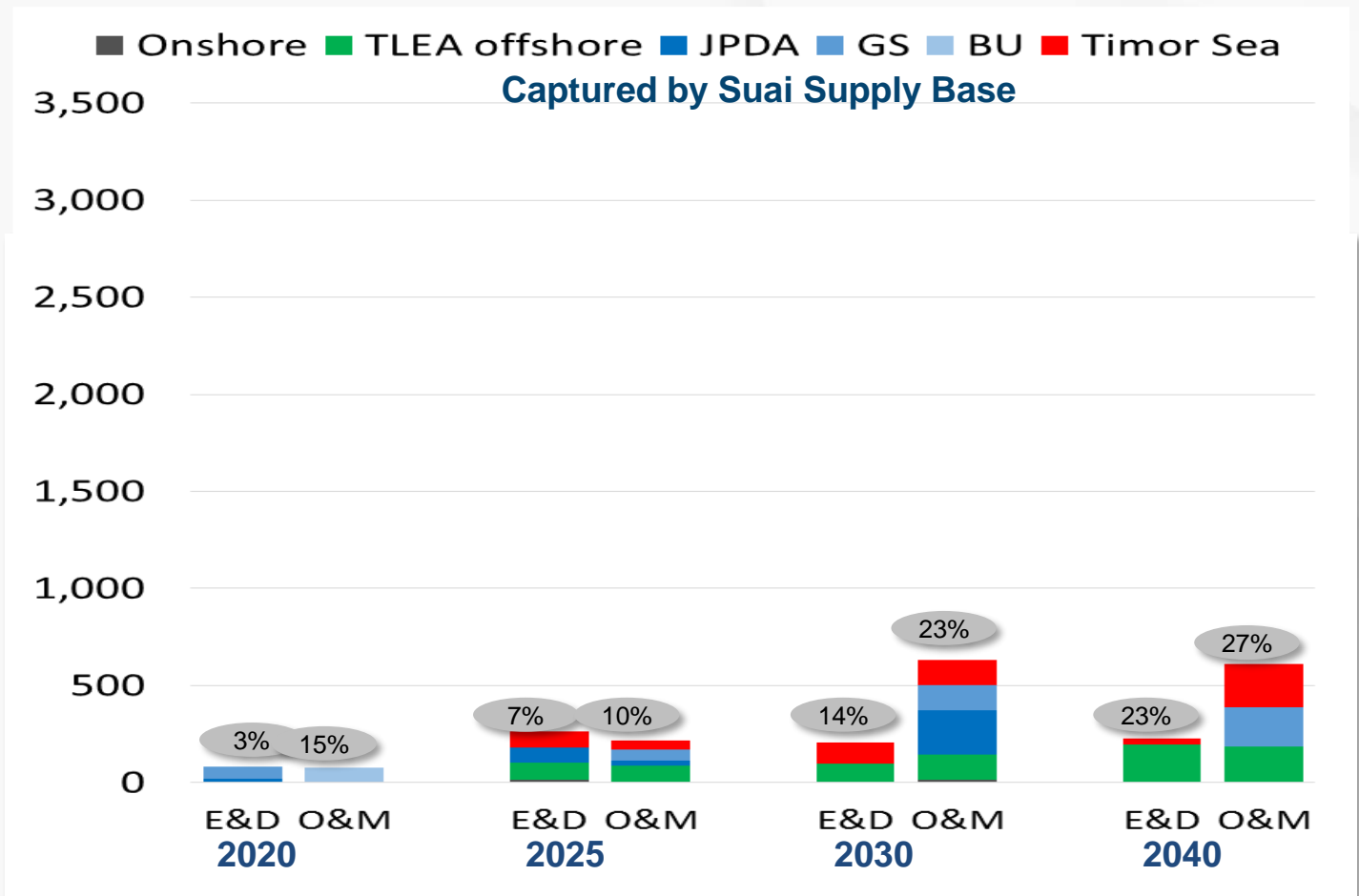


SSB SERVICES COVERAGE: PLENTY OF FIELDS



Modified by
TIMOR GAP

TIMOR-LESTE AND TIMOR SEA MARKET AND SUAI SUPPLY BASE SHARE

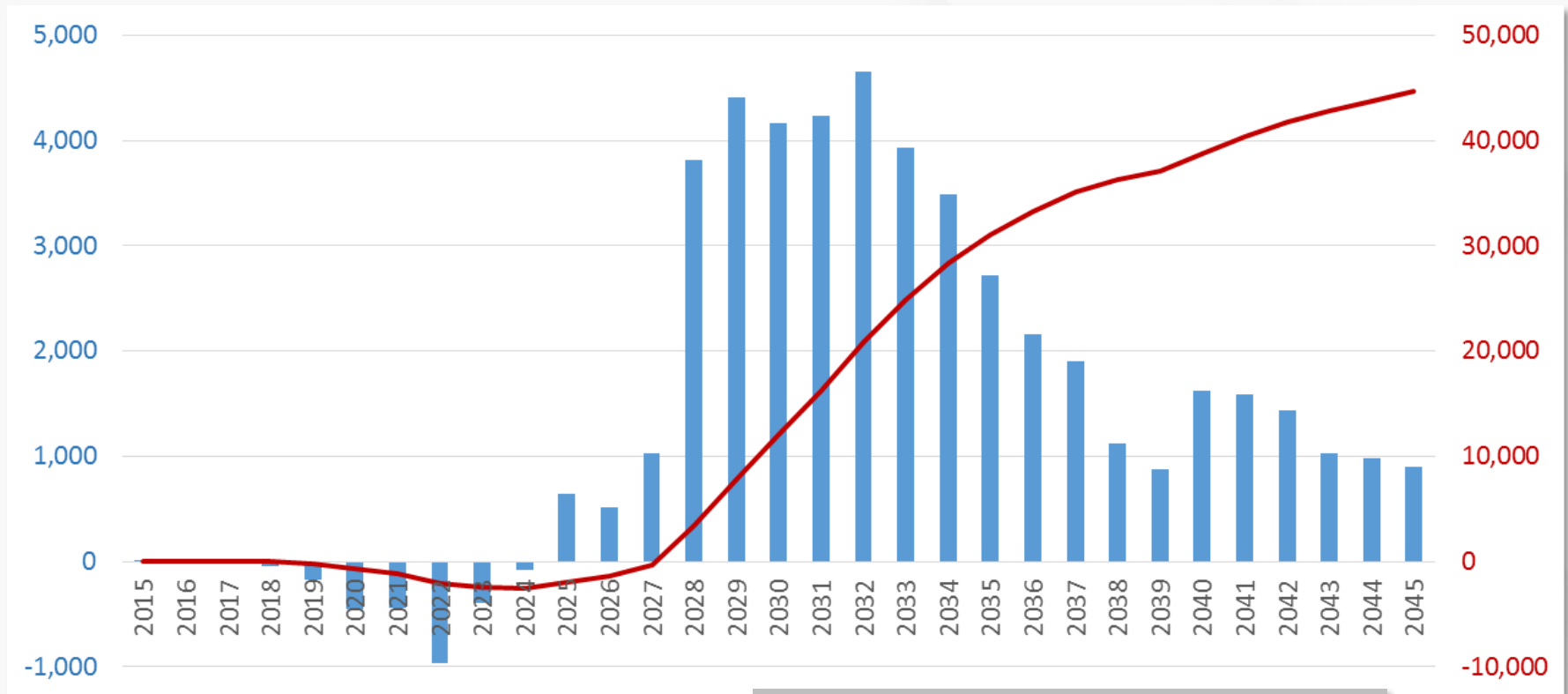


3. MONETARY & SOCIO-ECONOMIC IMPACT TO THE COUNTRY

UPSTREAM-TIMOR-LESTE CASH FLOWS

Net cash flows (USD MM)

Accumulated cash flows (USD MM)

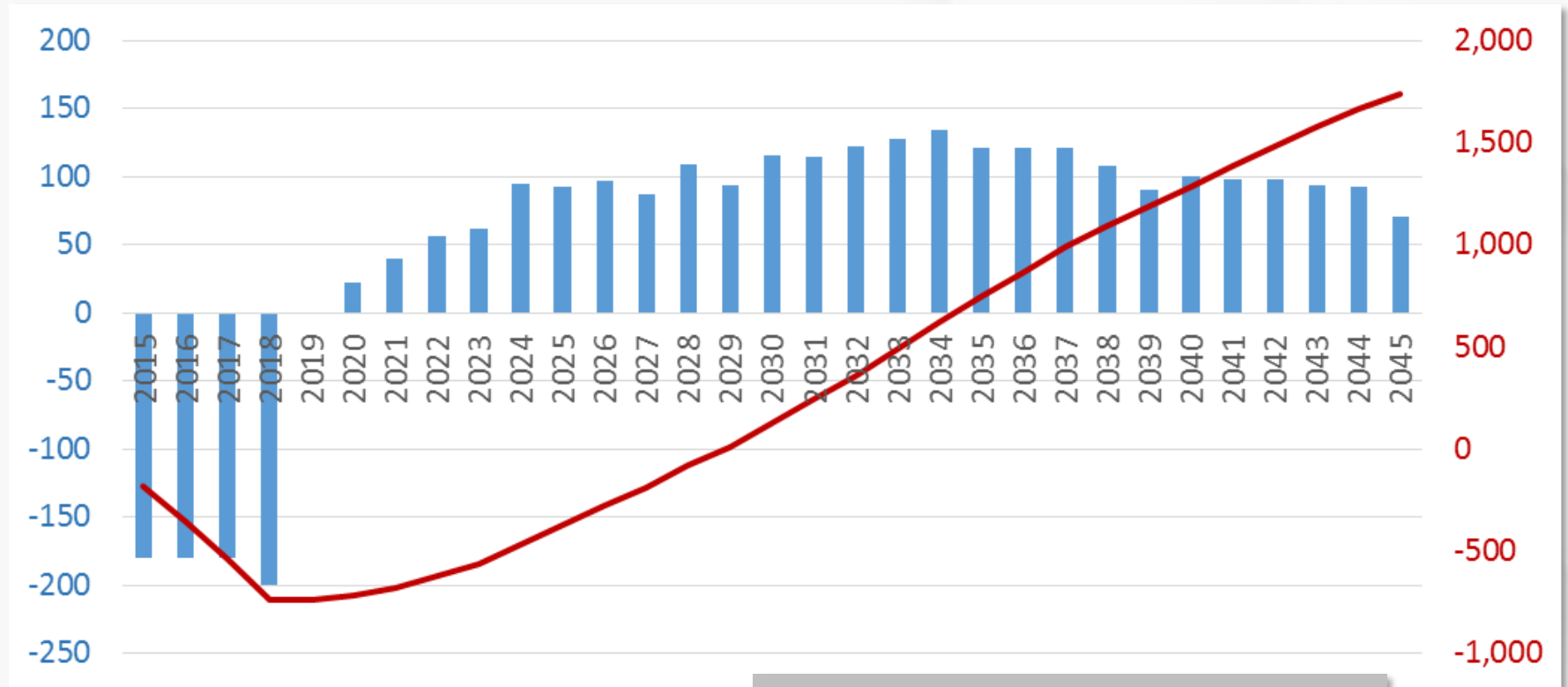


Accumulated cash flow = USD 47 billion
 NPV at 10% = USD 7.6 billion

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

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 accomodation, 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

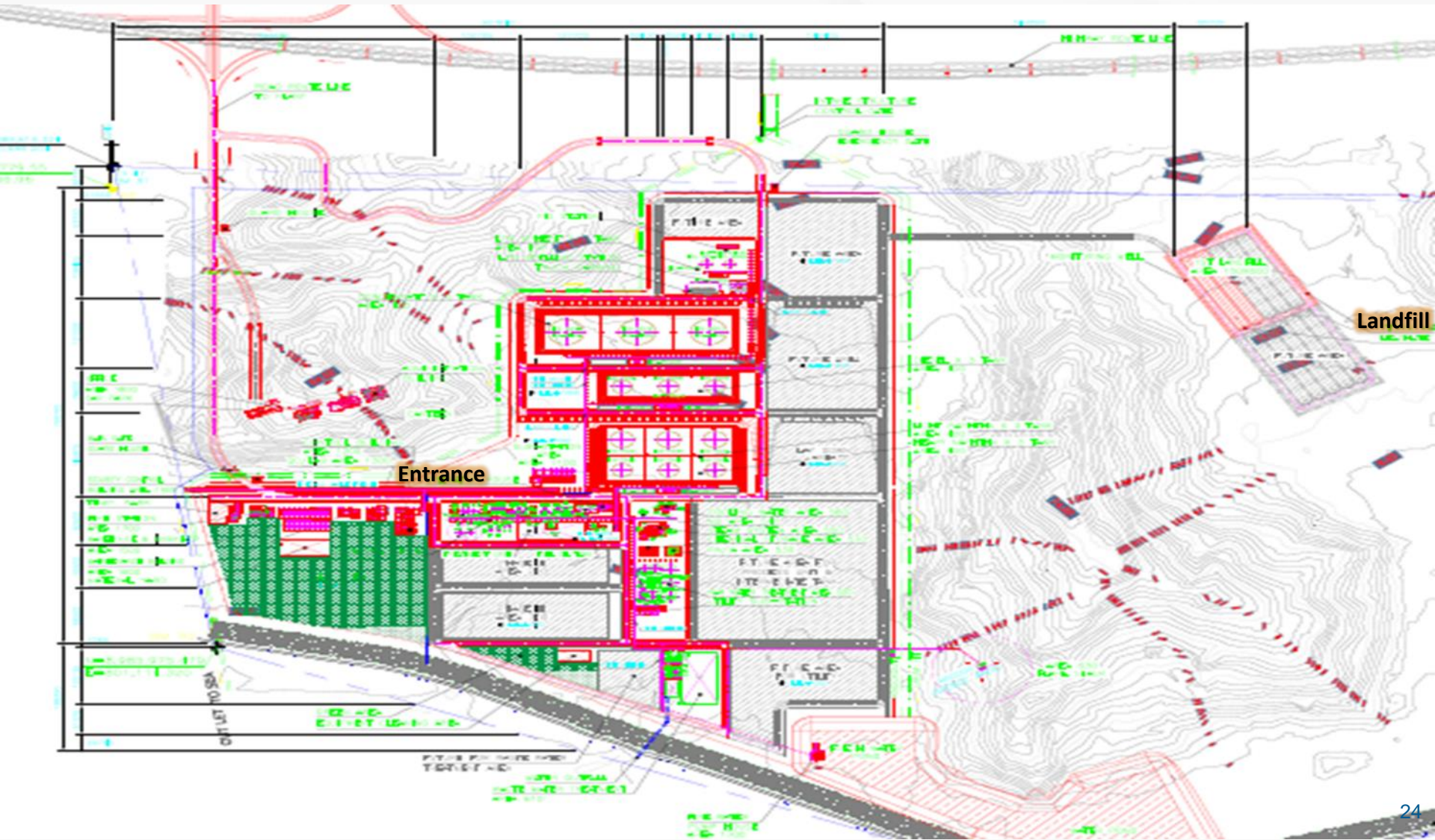
DOWNSTREAM PLANS

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

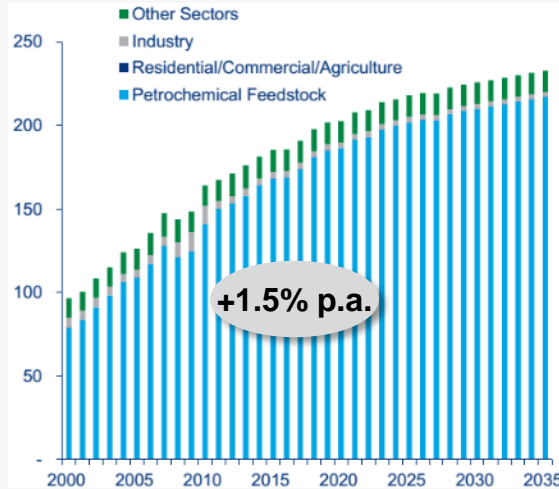
BETANO REFINERY & PETROCHEMICAL COMPLEX



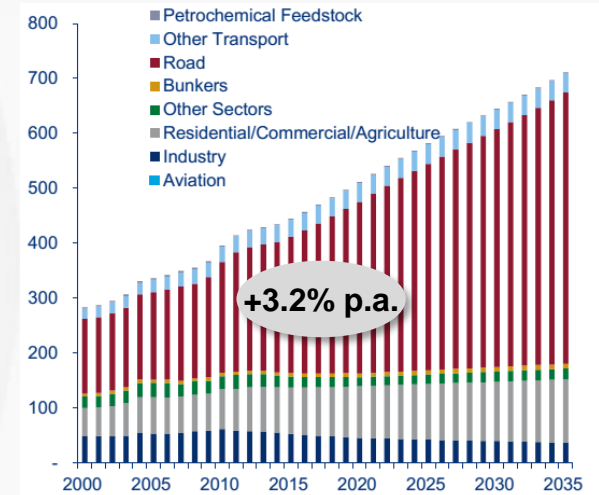
+X% p.a. Average annual growth rate

Asia

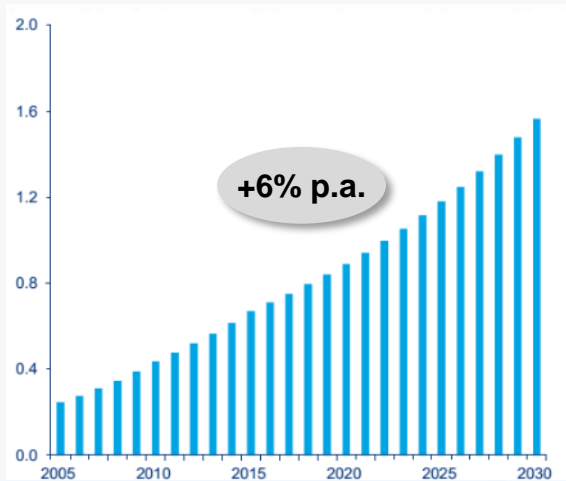
Naphtha (million tonnes)



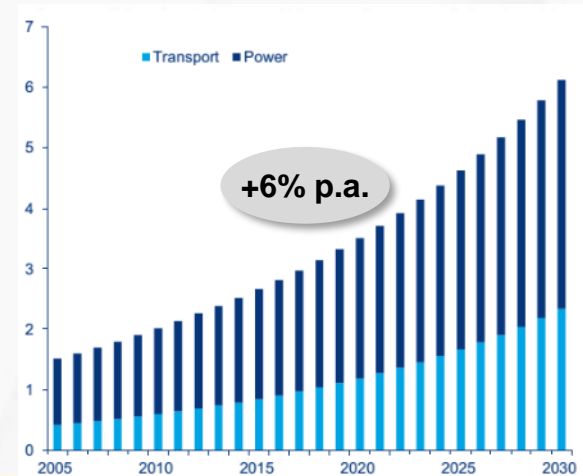
Diesel/Gasoil (million tonnes)



Gasoline (kbpd*)



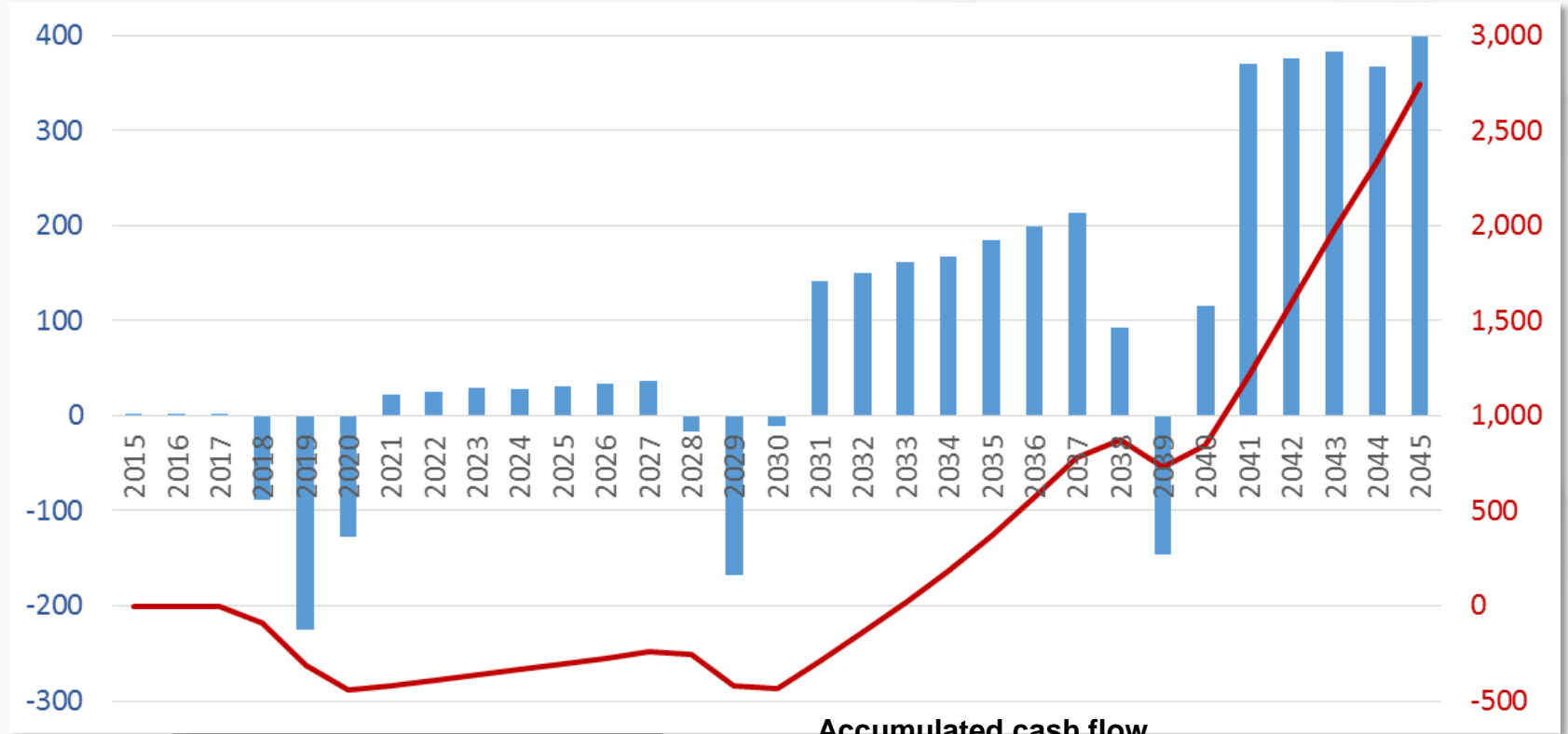
Diesel (kbpd*)



TOTAL TIMOR-LESTE CASH FLOWS: FROM REFINERY TO PETROCHEMICALS (30 to 100k bpd)

Net cash flows (USD MM)

Accumulated cash flows (USD MM)



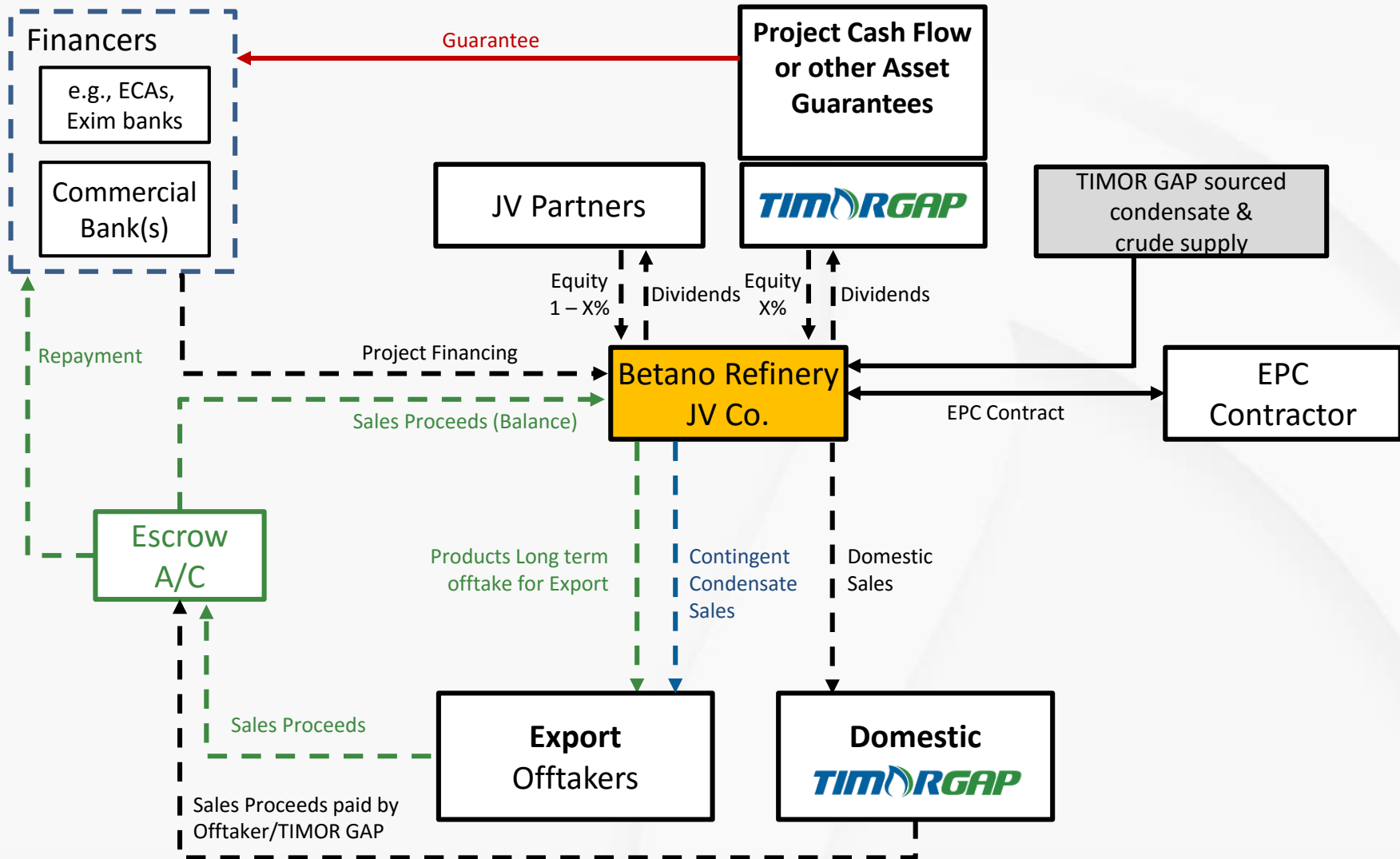
30k bpd in 2020, expanding to 60k in 2030, 100k with Aromatics in 2040

Accumulated cash flow = USD 2.7 billion
 IRR = 11.4%
 NPV at 10% = USD 70 million

OTHER BENEFITS/MULTIPLIER EFFECTS

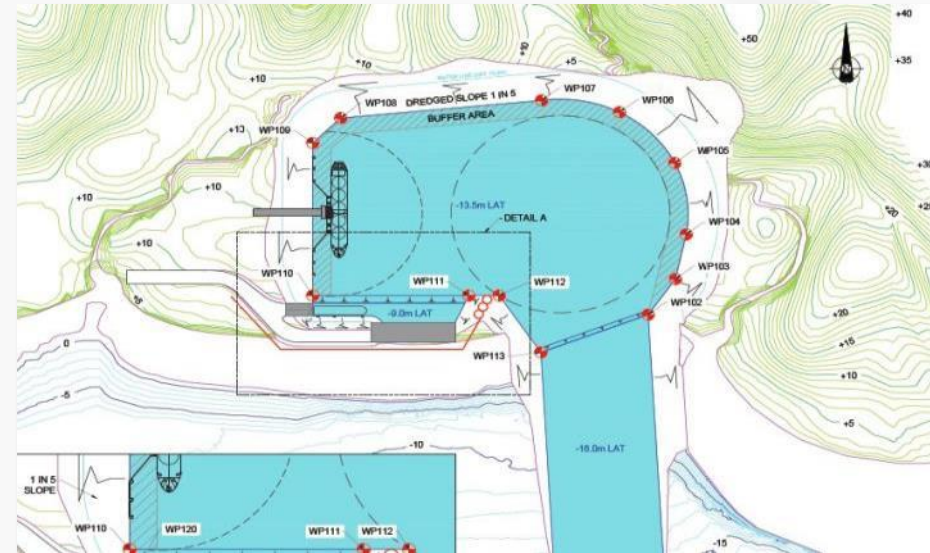
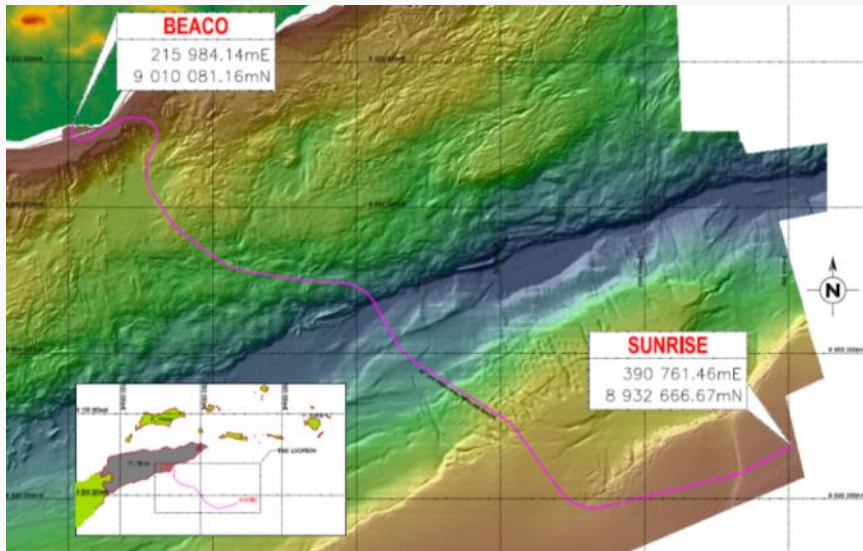
- **Jobs** : 2,000+ during construction & 250 direct jobs during operation; up to 1,000 direct jobs if fabrications and services are set up (possibly 2-5 years from the start of operation). Therefore over 6,000 indirect jobs (industry ratio: 1 direct job generates up to 5 indirect jobs)
- Timor-Leste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

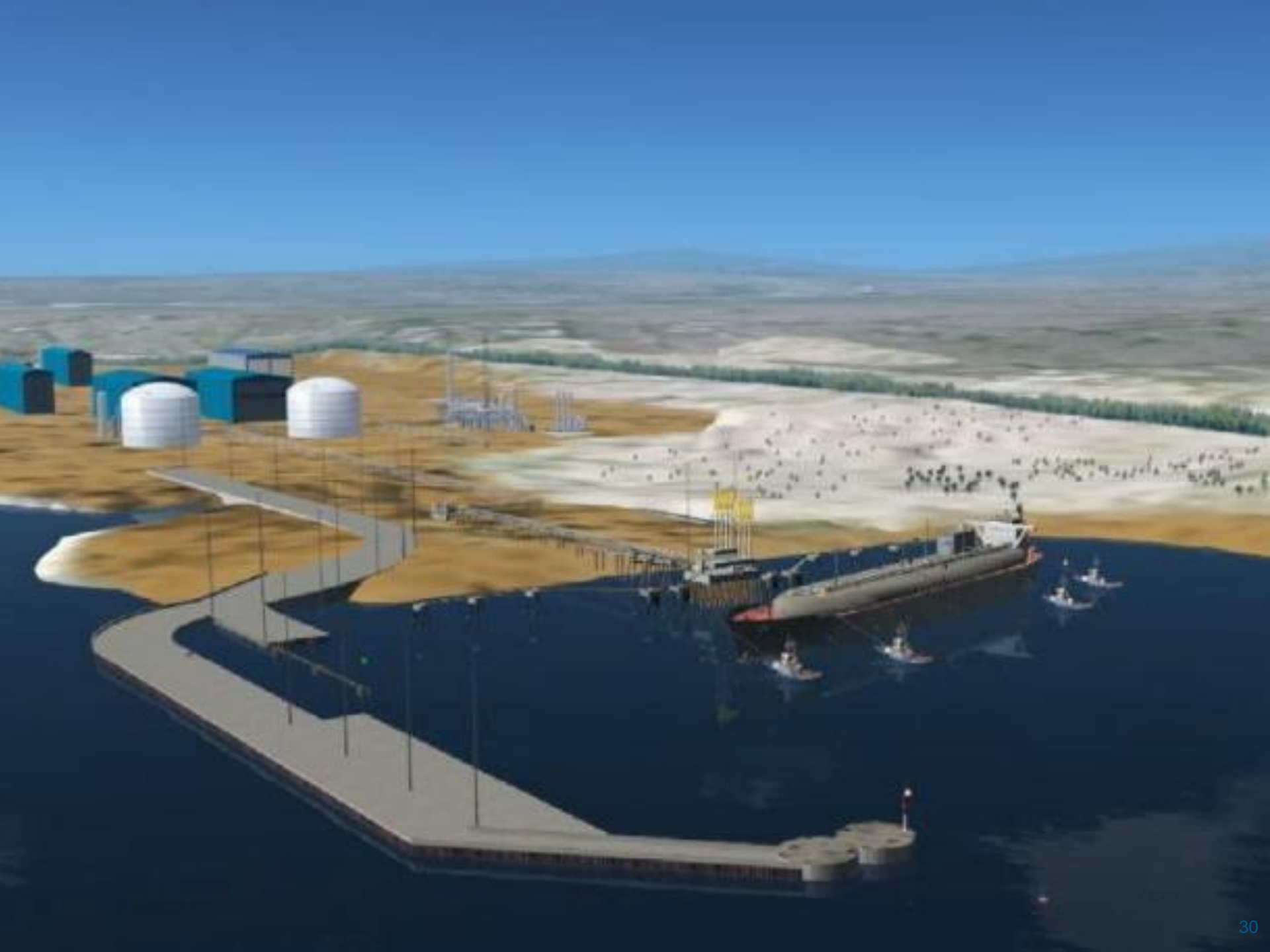


BEAÇO LNG PLANT & PIPELINE

The Beaçõ 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.

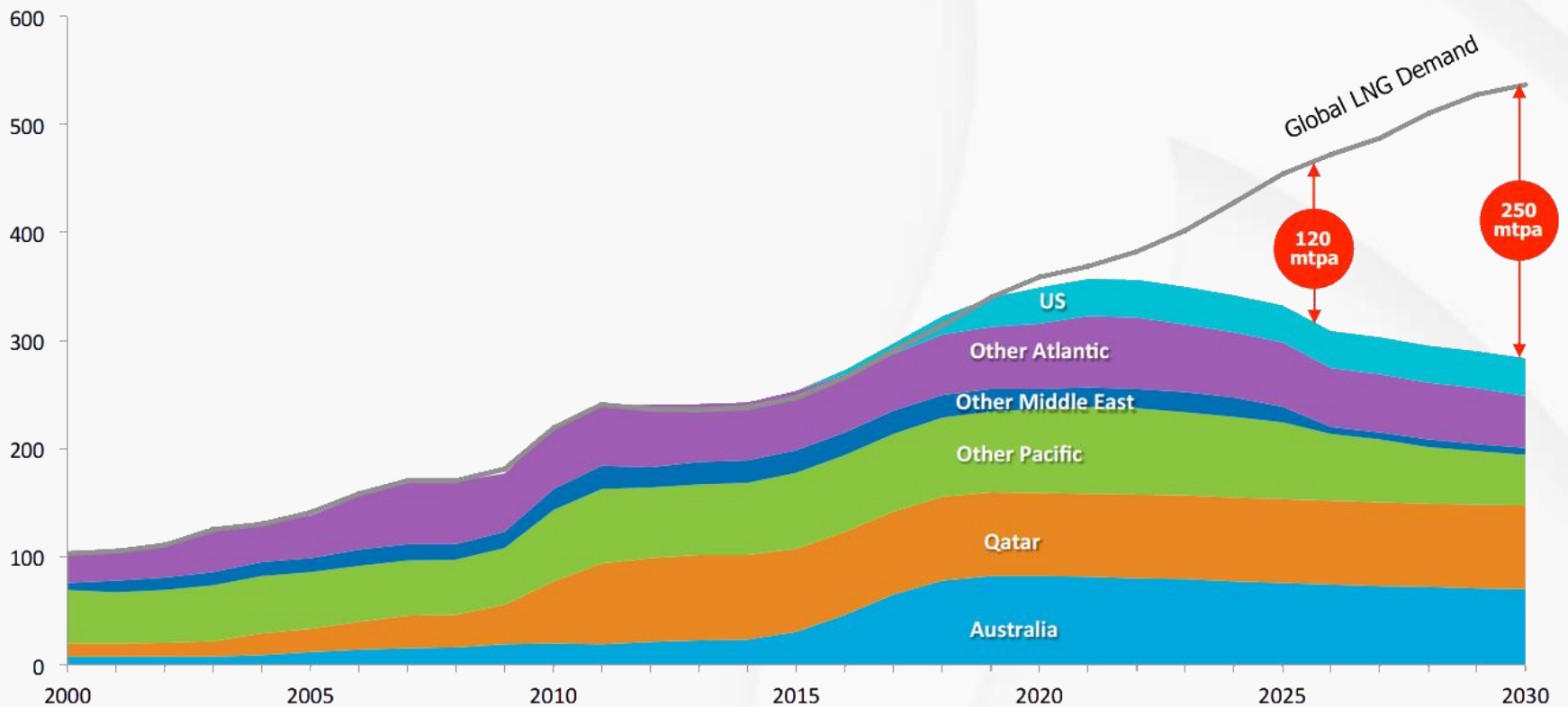


- PIPELINE AND DETAILED MARINE SURVEY (DMS), FEED LEVEL ✓ COMPLETED
- MARINE FACILITY (LNG PORT), FEED ✓ COMPLETED
- LNG PLANT – CONCEPTUAL/FEASIBILITY ✓ COMPLETED



GAP BETWEEN LNG SUPPLY & DEMAND

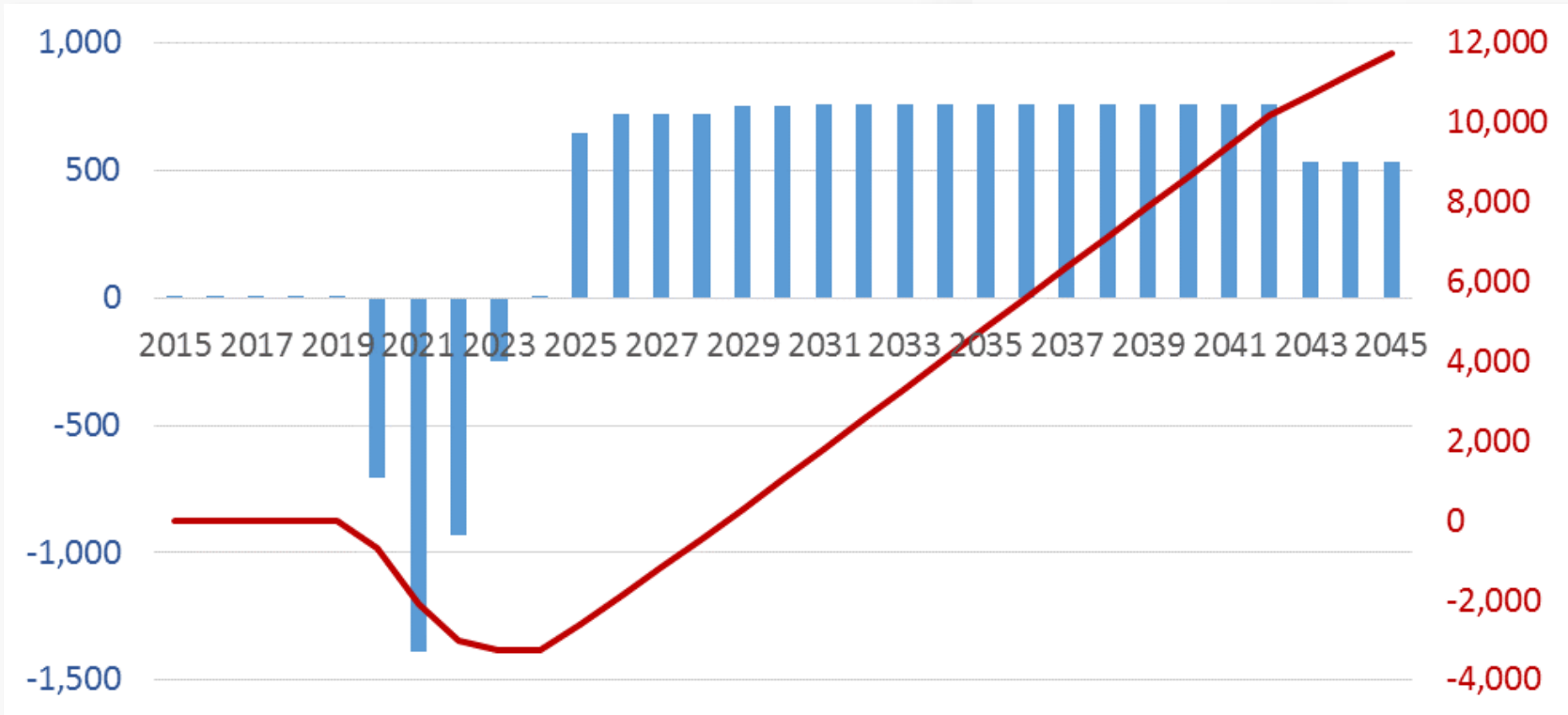
Global LNG demand vs. LNG supply by region (mtpa*)



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

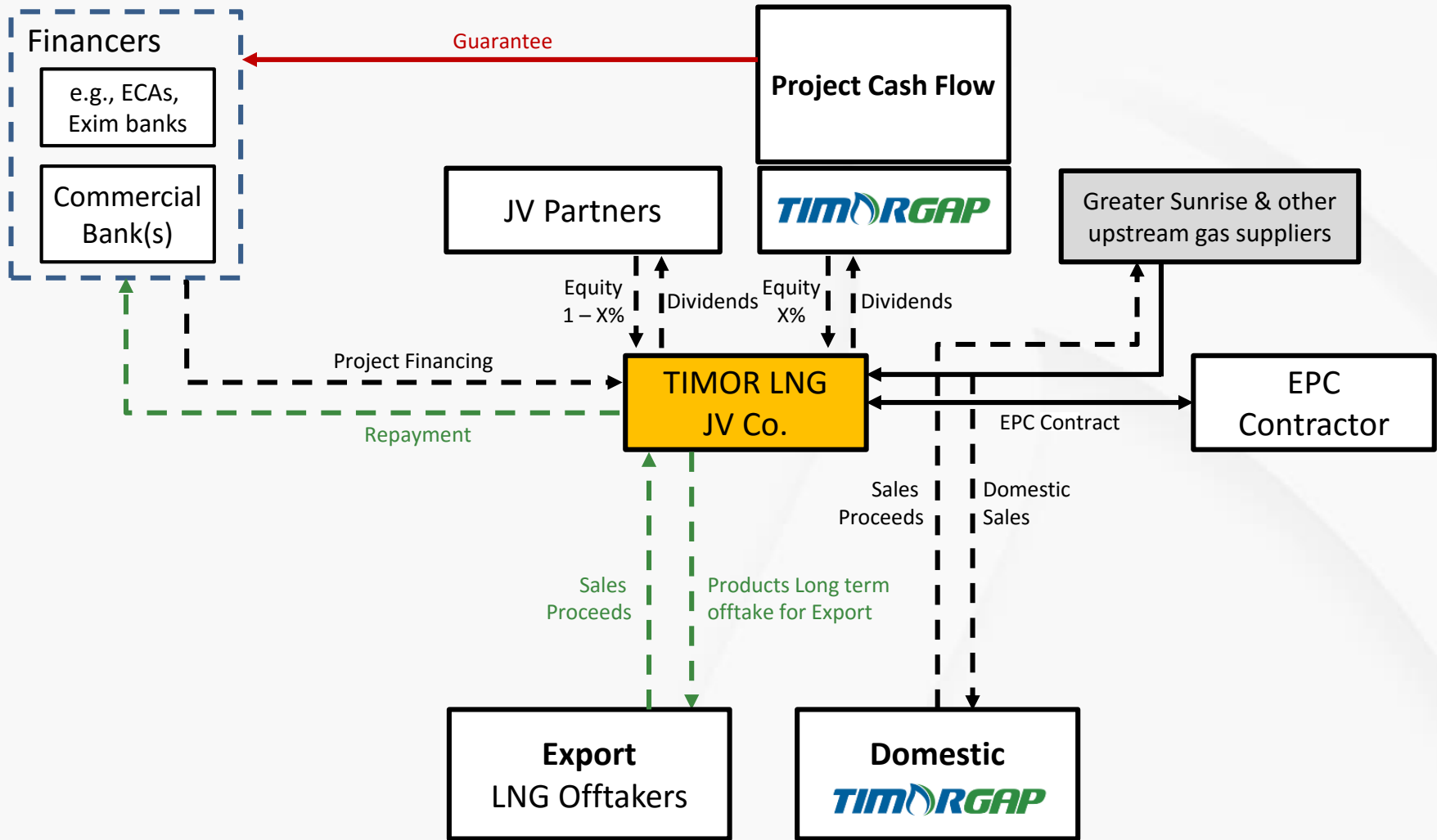
OTHER BENEFITS/MULTIPLIER EFFECTS

- **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 Beço 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



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