Integrated Development of Greater Sunrise Gas

The Timor-Leste National Interest Case

Dili

April13th, 2007

Agenda

- Purpose of Meeting (Educate, Decide)
- Role of Participants
- Education
  - Overall Benefits to Timor-Leste
  - Pipeline
  - Onshore Plant Location
  - LNG Processing Plant
  - Corporate Structure
  - Markets
- Summary and Conclusions
- Next Steps

Purpose of Meeting

- Identify all local stakeholders
- Raise awareness of timeline risks
- Provide high-level education on situation and options
- Provide recommendations for moving forward
- Agree on ownership, timeline and accountability

Timing Risks

- It is in the best interests of everyone in Timor that design and development begin immediately, regardless of political affiliation.

- Fuel revenues and energy resources are a critical component of any national development strategy.

- **Lack of action from this meeting jeopardizes Timor's future. LNG development takes years and the clock is ticking.**
- **The relevant Treaty has a Six-year provision for approval of a development plan, once tabled!**

Commentary on Energy demand/supply

- It is estimated that the population of Timor-Leste will reach 2 million people by 2020

- How are we going to supply the people with energy (as well as develop an industrial base)?

Two Ways

1. Import fuel – at cost in Foreign Exchange

2. Utilise indigenous fuel and energy sources

Import fuel

- The power sector could be developed through the utilisation of liquid fuels, such as diesel, or,
- Utilising nuclear energy
- Neither of these are preferred options for the development of Timor-Leste

Indigenous fuel and energy sources

- Hydropower
- Renewables
  - Solar
  - wind
- Biofuels
- Wood
- Oil and gas

Indigenous fuel and energy sources

- Hydro – relatively small potential, because of the lack of dam potential (mostly “run of the river”)
- Solar – small potential, useful for “off grid” power supply
- Wind – offshore wind farms could be utilised, but seasonal issues
- Biofuels – needs to be accelerated for rural power, and “off grid” supply
- Wood – alternatives need to be found asap
- **Oil and Gas is the only major, flexible energy source**

Indigenous oil and gas

- Onshore
  - Timor-Leste is geologically prone to relatively small oilfields - it is necessary to accelerate this onshore development. Local benefit will result.
- Offshore
  - Discovered fields (e.g. Greater Sunrise)
  - Undiscovered fields (“yet-to-find”)

Seeps known since the 18th Century

Onshore Hydrocarbon exploration targets

The Prize

Small (to moderate??) *commercial oil*

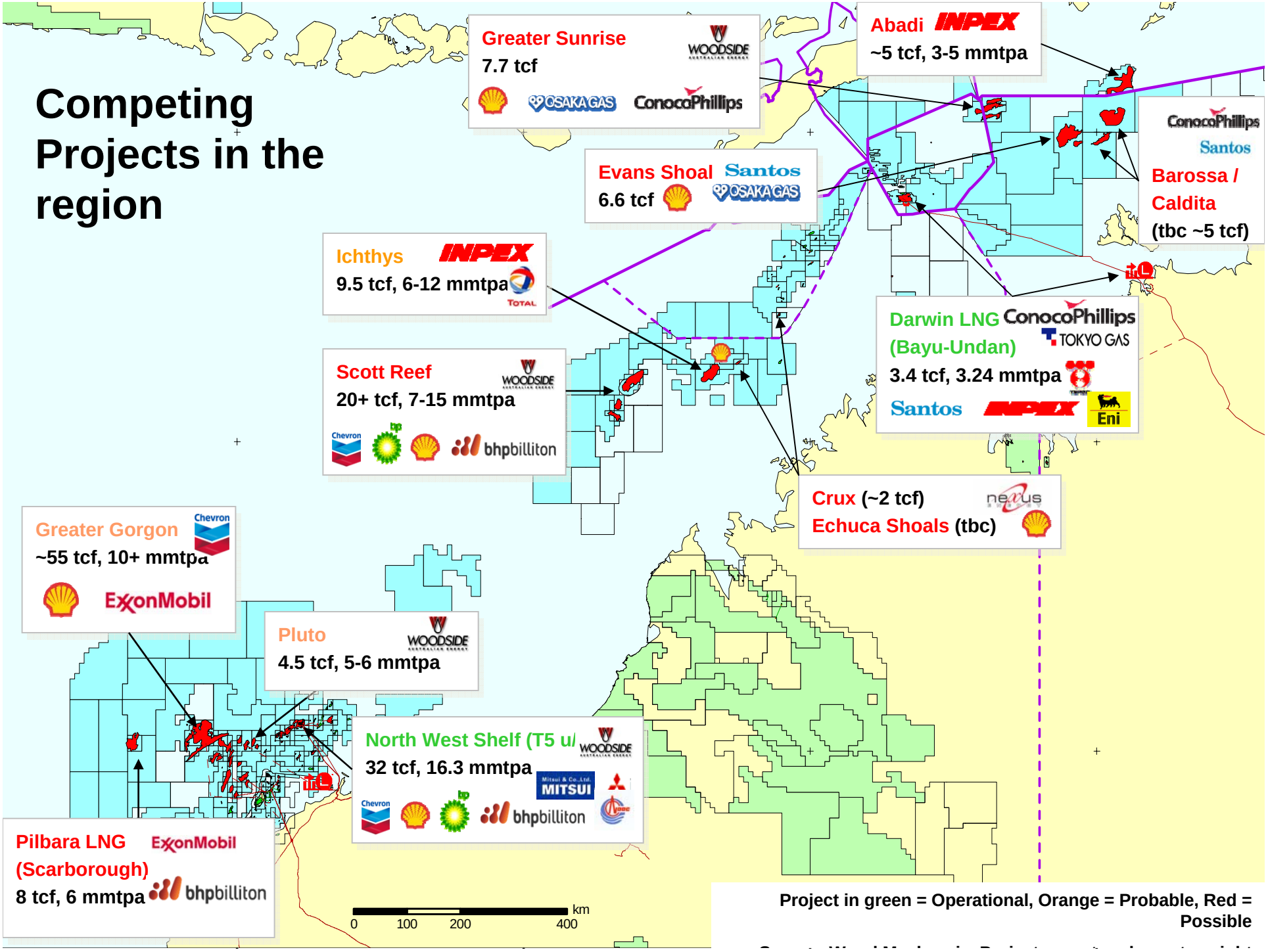
- **Southern Onshore East Timor**
  - **Onshore Viqueque Basins**
    - **Past drilling unlikely to have been on target**
    - **Structural discordance with depth**
    - **No logs, at times no wellsite geologist!**
    - **Plumbing system not understood**
    - **Charge & migration models based on Viqueque**
    - **Only the later wells located by seismic**
    - **Historically poor seismic imaging**
    - **Improvements possible**
    - **Ponded turbidites – plumbing favourable where contact with diapirs- plastic deformation in depocenters – no faults**

Not a contender

- **'Floating Hill' (!!!) Play (a variation on 'buried hill'!)**
  - **Massive, oil-charged olistoliths**
  - **No serious volume**
  - **Quoted as evidence of Bobonaro sealing capacity**
    - **Is it??? How did the oil get there in the first place?**

Moderate size commercial oil
Higher risk, more difficult
Greater reward

- **Mesozoic Play**
  - **Structurally more exposed areas beneath frontally accreted stacks – or sub-Bobo -possible larger oil accumulations**


Competing Projects in the region
Greater Sunrise
7.7 tcf
Woodside
Shell
Osaka Gas
ConocoPhillips
Abadi
INPEX
~5 tcf, 3-5 mmtpa
ConocoPhillips
Santos
Barossa / Caldita
(tbc ~5 tcf)
Evans Shoal
Santos
6.6 tcf
Shell
Osaka Gas
Ichthys
INPEX
9.5 tcf, 6-12 mmtpa
Total
Darwin LNG
ConocoPhillips
(Bayu-Undan)
Tokyo Gas
3.4 tcf, 3.24 mmtpa
Santos
INPEX
Eni
Scott Reef
Woodside
20+ tcf, 7-15 mmtpa
Chevron
bp
Shell
bhpbilliton
Crux (~2 tcf)
nexus
Echuca Shoals (tbc)
Shell
Greater Gorgon
Chevron
~55 tcf, 10+ mmtpa
Shell
ExxonMobil
Pluto
Woodside
4.5 tcf, 5-6 mmtpa
North West Shelf (T5 u/
Woodside
32 tcf, 16.3 mmtpa
Mitsui & Co.,Ltd.
MITSUI
Chevron
Shell
bp
bhpbilliton
Pilbara LNG
ExxonMobil
(Scarborough)
8 tcf, 6 mmtpa
bhpbilliton
km
0
100
200
400
Project in green = Operational, Orange = Probable, Red = Possible

Social and Economic Benefits of Gas to Timor-Leste

I would like to suggest that we look at the examples of Brunei, Indonesia and Trinidad as countries that have benefited greatly from the utilization of offshore gas underpinned by LNG projects

Basic Concepts of LNG Plants

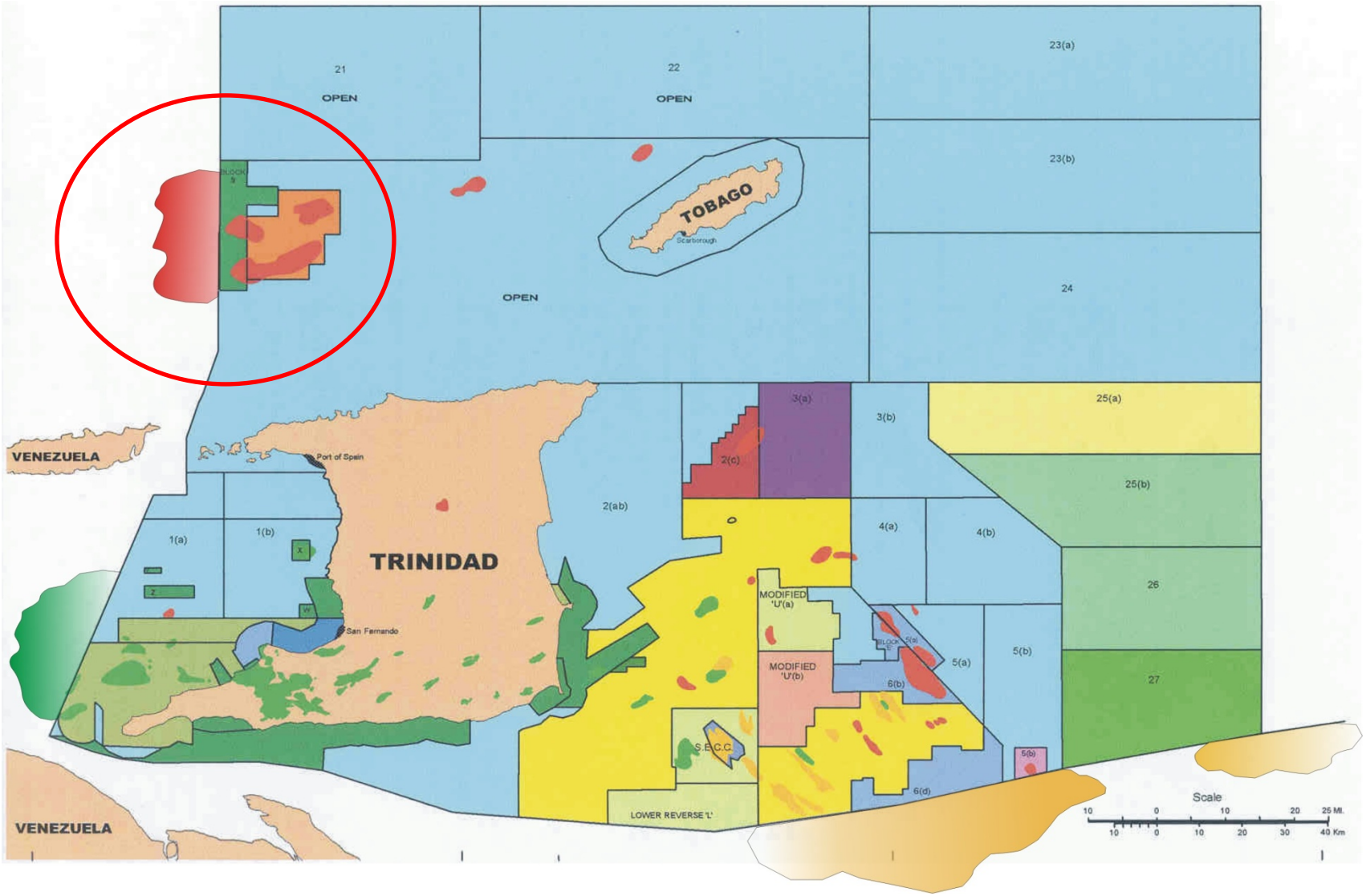
- Raw gas is extracted, purified, separated to extract valuable liquids and chilled to form a stable liquid which is shipped in specialised tankers
- Plant is developed in stages as a series of “Trains” each of which produces a large step in exportable volume
- First Train must bear the cost of pipelines, field development, and export port
- Market is international – largely in Southeast Asia (Japan, Korea, Taiwan) Emerging demand in China, USA
- To underpin initial development, a long-term purchase agreement is generally signed and the gas purchasers often take equity in the producing field and onshore plant
- Sales above contracted volume are sold on the international “Spot Market”

Trinidad Example

- Population 1.3 Million
- Established (small) Oil production but need for Electricity
- Large Gas discoveries now developed
- Now 800 MW installed generation capacity

Trinidad LNG Plant

Map showing Cross border fields/discoveries in Trinidad



Trinidad LNG Plant

- First LNG Train Heavily supported by Government
- Subsequent Trains financed entirely by industry
- Later Developments give higher tax yield
- Rapid growth of Infrastructure and Economy

Gas Based Plants in Trinidad

- 1 Natural Gas Liquids Processing Facility (46 MBPD)
- 3 Liquefied Natural Gas Plant (1600 MMscfd)
- 9 Ammonia Plants (4,485 MTPA)
- 1 Urea Plant (550 MTPA)
- 5 Methanol Plants (2,960 MTPA)
- 4 Iron and Steel Mills (2,560 MTPA)
- 4 Power Generation Plants - Powergen (3) & Inncogen
- Other
  - Refinery
  - Cement Manufacture
  - Light Industrial/Commercial Consumers - 96
  - 2 Gas Fired Air Cooling Projects
  - 4000 CNG powered vehicles

Atlantic LNG Train 1

- Modest Entry into LNG : 3 million tpy (425 MMcfd)
- Utilized Phillips Optimized Cascade Process
- Amoco (now BP) sole gas supplier
- Commissioned - 1st Q 1999
- Government Taxes- US$3 Billion over 20 yrs
- Project “fast-tracked” by simultaneously seeking and finding gas reserves and identifying markets.
- Tax holiday granted to facilitate development

Atlantic LNG Train 2/3 Expansion Project

- The construction of 2 Liquefaction Trains together with storage and related facilities. Liquefaction of 1 billion standard cubic feet per day of natural gas

- Gas to be supplied from fields in the North Coast (BG) and East Coast Marine Areas (BP) .

- GORTT to receive US$6 Bn in revenues

- Expenditure commitment of US$160 million minimum in goods and services

- A US$1.1 Billion investment in the domestic economy

- No Tax holidays granted this project

Atlantic LNG Train 4

- June 2003,Government approved Train 4 project
- Processing capacity of 800 million cubic feet per day.
- Largest single LNG train in the world with capacity of 5.2 mtpy when completed in January 2006
- Different equity holdings
- Tolling arrangement
- Marketing to new destinations
- Government capture of upside

OVERALL BENEFITS TO TIMOR-LESTE

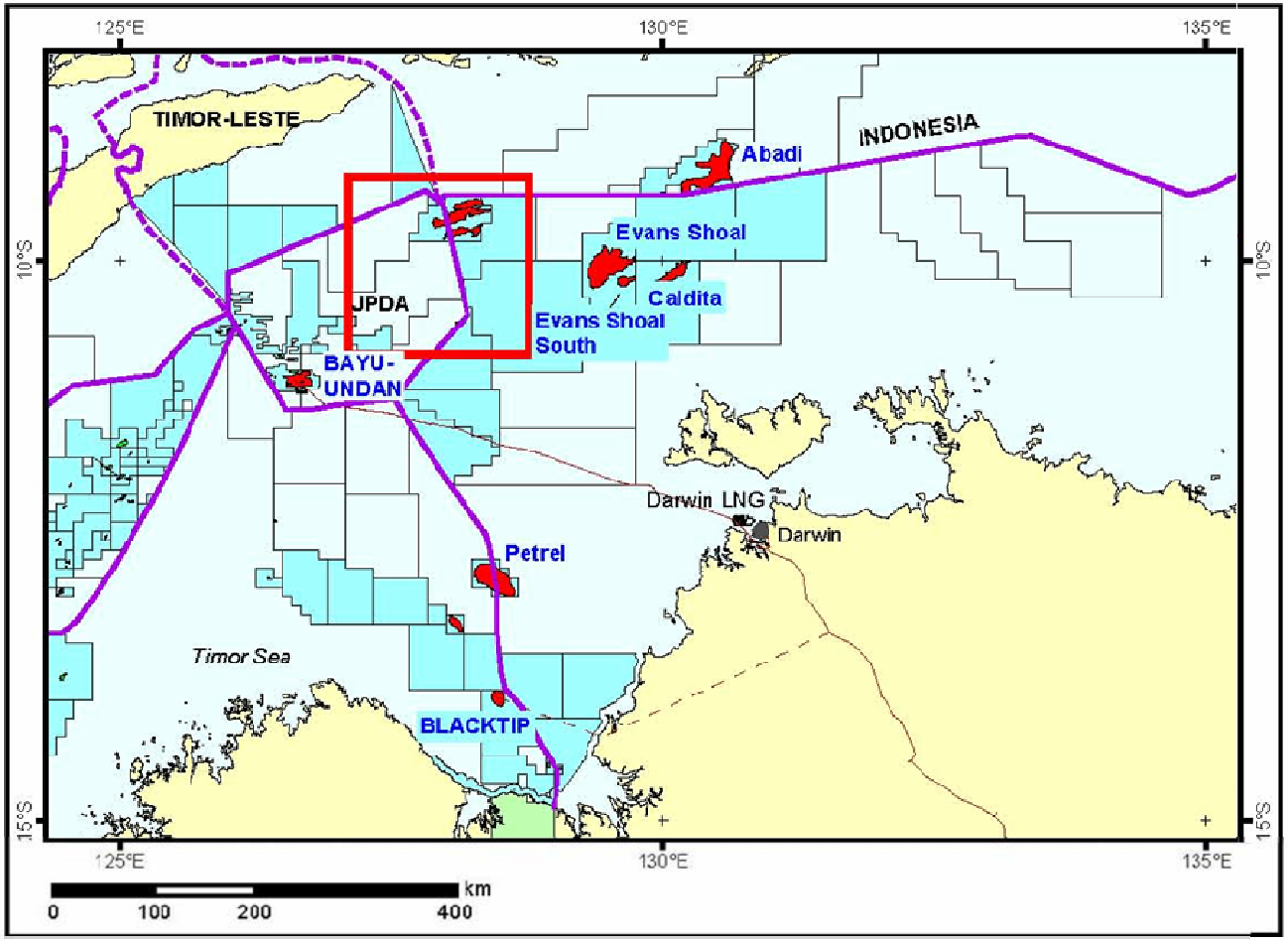
The additional benefits to Timor-Leste of the gas onshore from Sunrise option compared:

- Over $20 billion in additional national wealth over the life of the project as measured by GDP (Gross Domestic Product)
- Employment of over 2000 full-time equivalents during construction phase
- Permanent job and skill creation (e.g. Brunei example)
- Development of domestic gas and power sector
- Fertilizer plant development
- “Kick-start” to industrial growth through additional ports and infrastructure
- A World Player in the Energy Business

Social benefits of TL Energy hub

- Creation of new, decentralised town in South East Timor – a “Freeport” to stimulate investment
- Infrastructure development (roads, airport, port, hotels, housing, etc.)
- Able to provide efficient, reliably priced energy to Timor Leste which could decrease the use of firewood, with its bad environmental problems.
- The domestic energy sector would underpin job creation and agricultural wealth in rural areas

Greater Sunrise

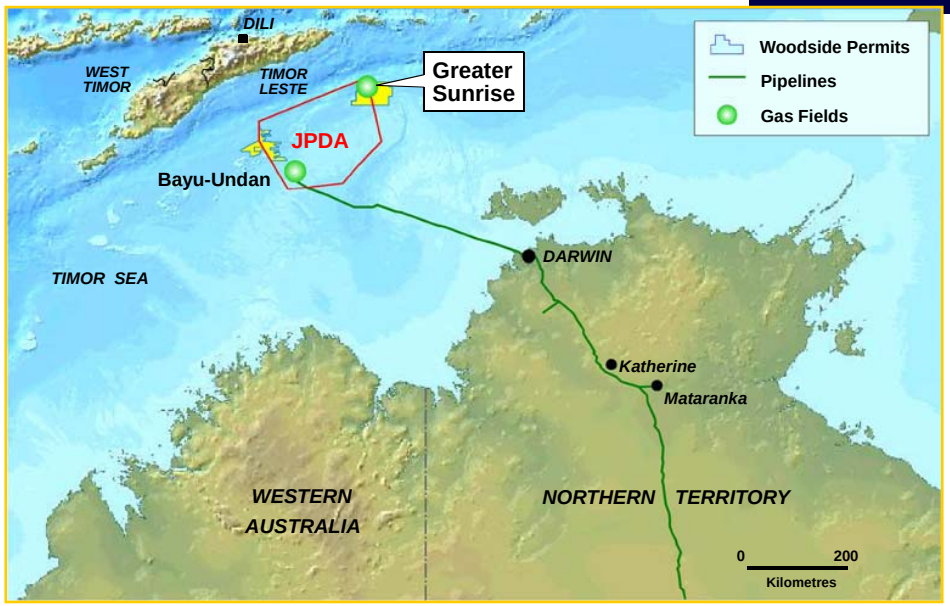


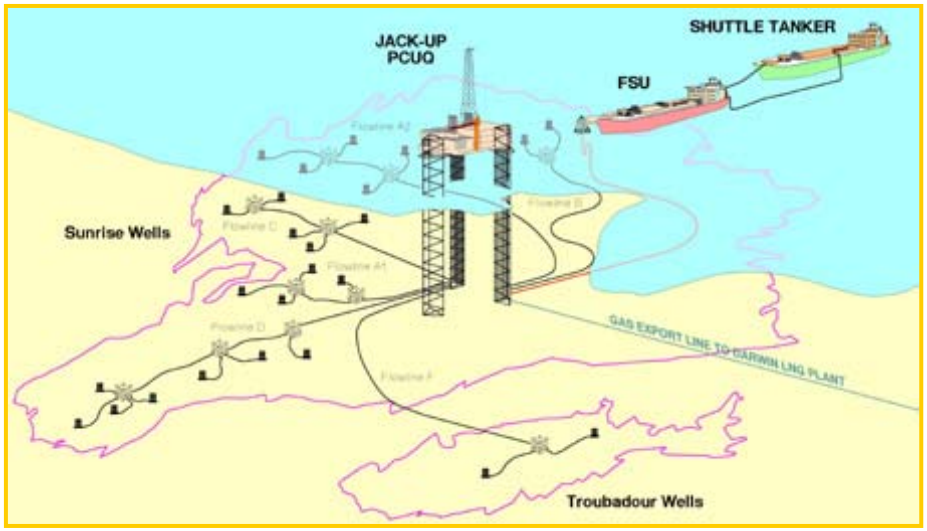
Sunrise gas

Woodside: 33.44% equity share and Operator

Background

- ~8 Tcf and 300 million barrels of condensate
- Most offshore development and onshore environmental approvals secured
- Internationally competitive
- Project stalled, pending fiscal, legal and regulatory certainty





Development of the Greater Sunrise Field

The Greater Sunrise partnership consists of the operator Woodside Energy, Royal Dutch/Shell, ConocoPhillips, and Osaka Gas. The following three options exist:

1. Transporting the gas to Darwin, Australia and processing it at an existing LNG plant in Darwin.
2. Processing the gas at sea at an LNG (or CNG) plant located offshore.
3. Transporting the gas to Timor-Leste and processing it at a new LNG plant in Timor-Leste. *An LNG plant located in Timor-Leste would be much closer to the field than a plant in Australia. It would also provide important stimulus to the local economy. Therefore, the Timor-Leste Government is actively encouraging the partners to give serious consideration to this option.*

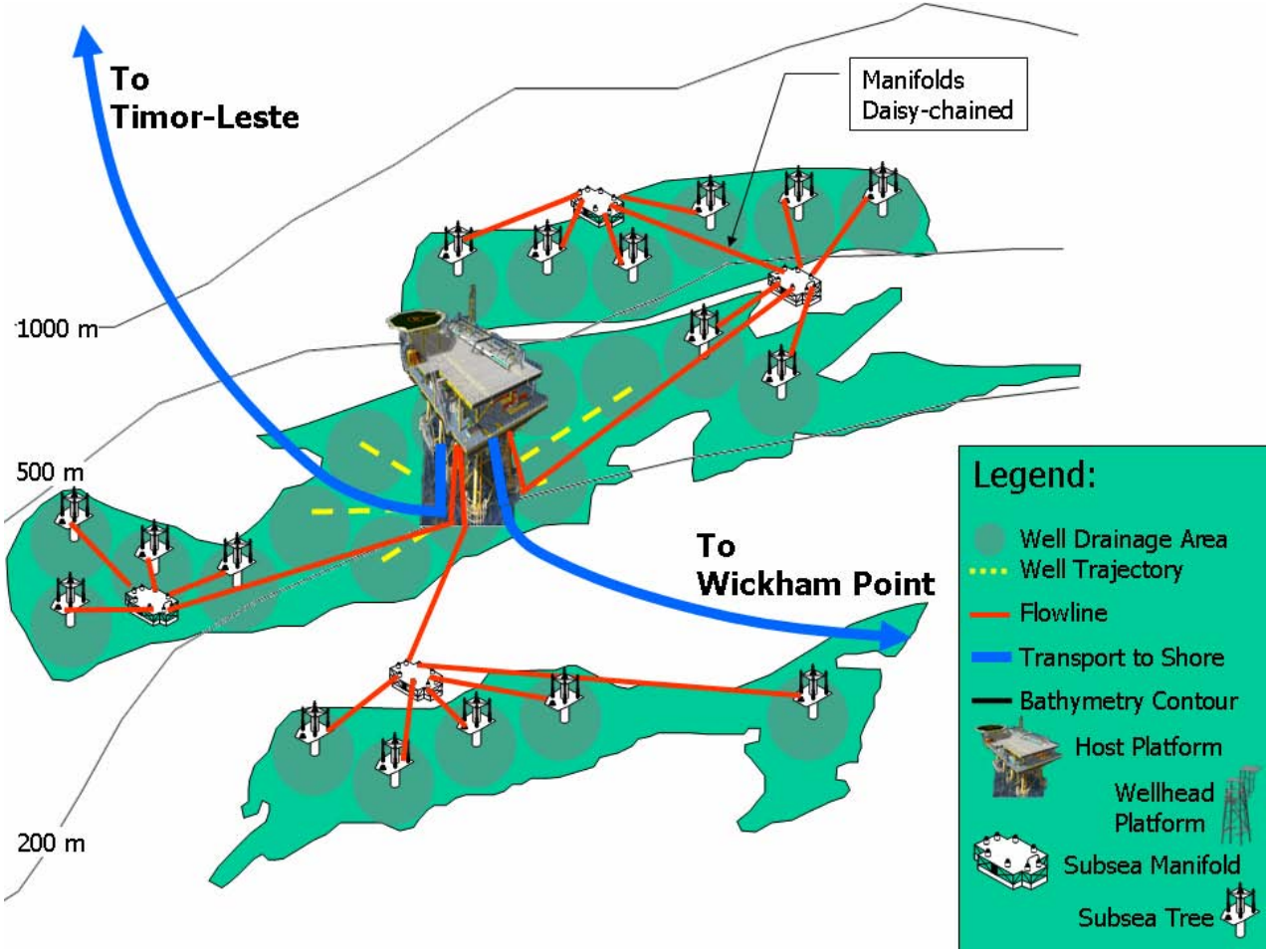
Assuming that all necessary agreements are in place and a location for the LNG plant agreed by the end of the 2nd quarter of 2007, LNG production could not be expected earlier than 2013, and is likely to be later. It is estimated that the life of the field will be approximately 30 years.

The Greater Sunrise partners are currently looking for buyers for Greater Sunrise gas.

DEVELOPMENT SCENARIO

- Central wellhead platform with 9 wells
- Centrally located Production, Compression, Utilities and Quarters facilities, including:
  - Condensate removal and stabilization
  - Bulk CO2 removal and re-injection facilities
  - Bulk dehydration
  - Pipeline Compression
- Tie-backs from 15 other wells as required (these may be subsea)
- FSO for storage and offloading of condensate
- Gas pipeline to Timor-Leste or Wickham
- Greenfield LNG Liquefaction and export facilities on the south shore of Timor-Leste
- OR Brownfield LNG Liquefaction and export facilities at Wickham (Brownfield facilities can utilize existing LNG loading facilities at Wickham Point. All other facilities shall be included in estimate.)
- Operations shore base on Timor-Leste to support the operation of the Great Sunrise are facilities

Development Concept



Undiscovered “Yet-to-Find” oil and gas

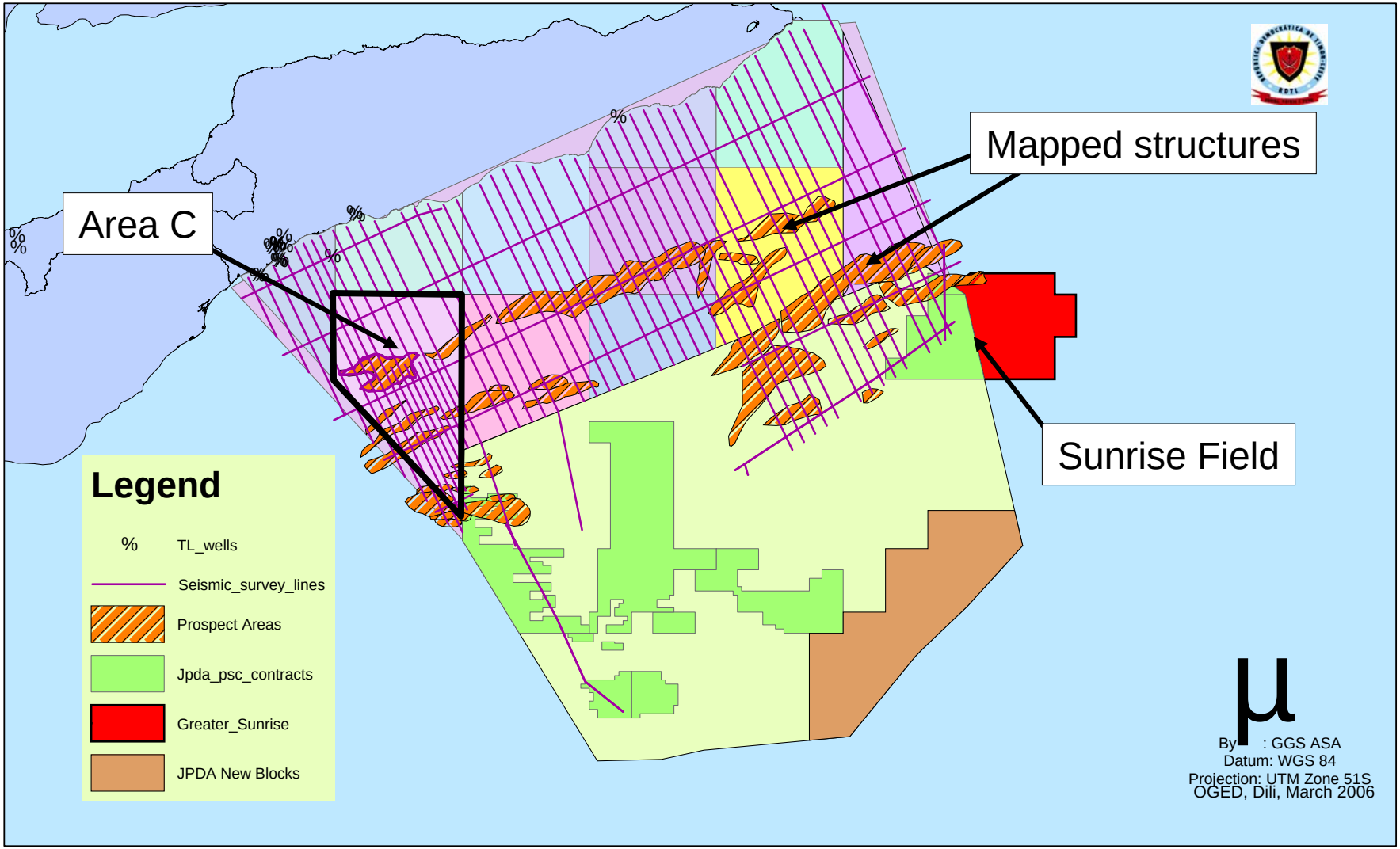
We need to factor in the chances of additional exploration success both within the JPDA area as well as in Timor-Leste’s sovereign waters.

The recent exploration bid round was handled very professionally and transparently by the Ministry of Natural Resources, and resulted in two winners, ENI of Italy, and Reliance of India. These companies are internationally acclaimed companies

Exploration success is not Guaranteed – it is a gamble. The International companies are hoping to find oil. Perhaps nothing will result, perhaps Oil, perhaps Gas?

“Do not count your chickens until they hatch”

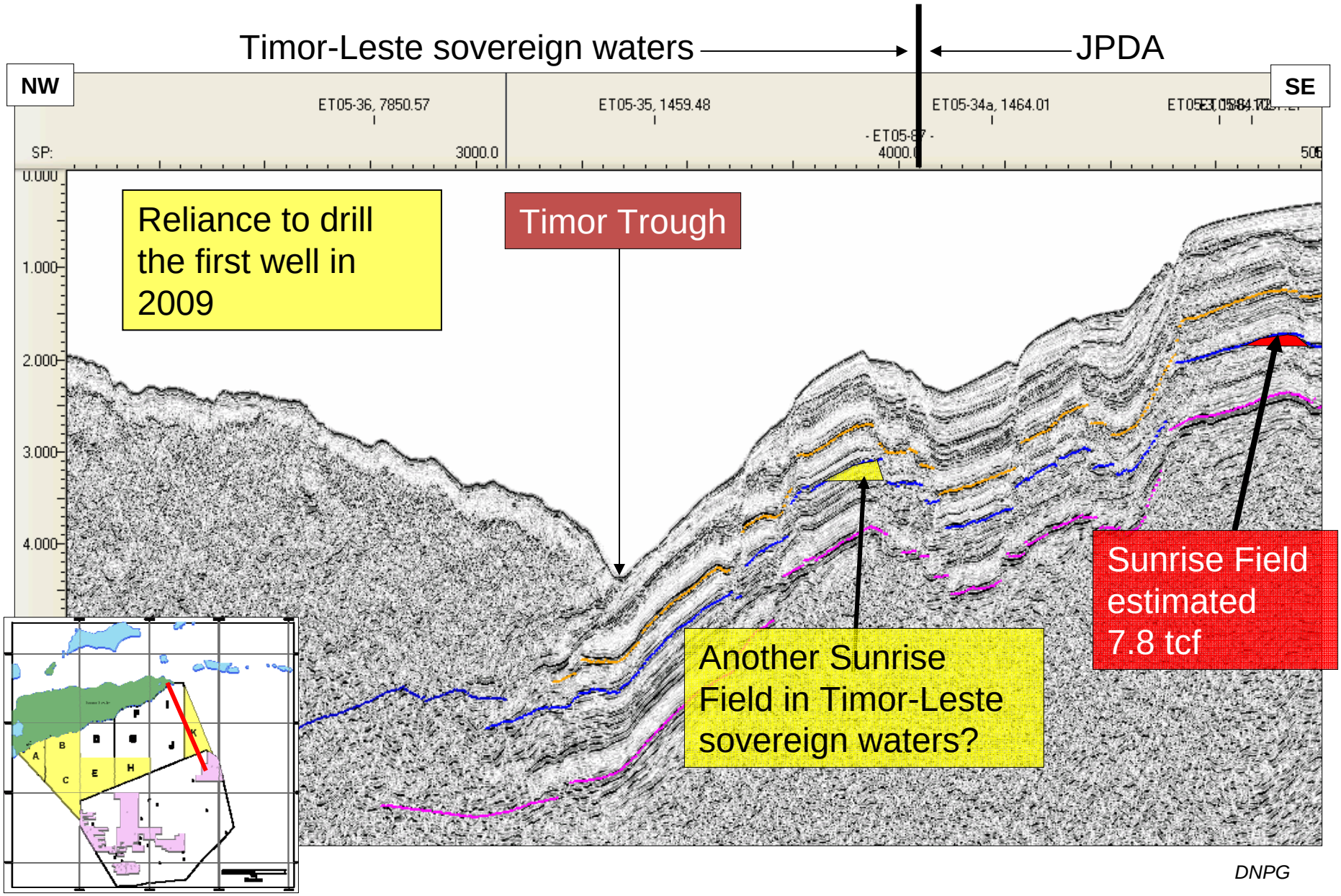
Timor-Leste sovereign offshore, mapped structures



Recompiled by: Mateus da Costa
Oil, Gas and Energy Directorate

0 50 100 200
Kilometers

Exploration potential, Timor-Leste

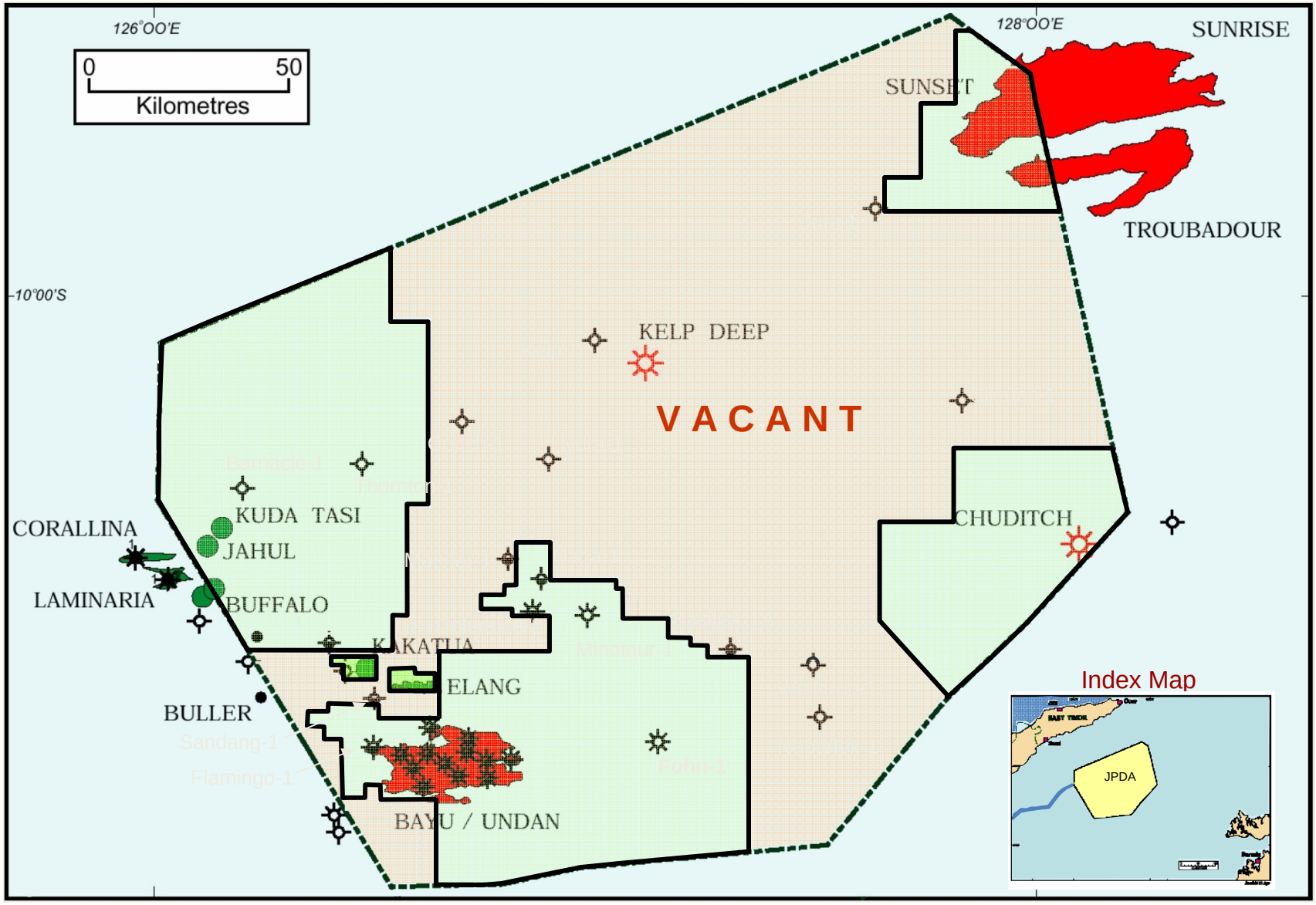


DNPG

Success Rates

We need to remember that the commercial success rate in this geological area has been been very low with over 45 exploration wells drilled with commercial success from only very few fields

JPDA VACANT ACREAGE 2007




TIMOR-LESTE
National capital
District seat
Town, village
Airport
International boundary
District boundary
Road
Wetar Island
Mamau
Airpanas
Horan
Pillipuang
Hahoho
Tuputi
Mahuan
Sesen
Aimau
Hiai
Ilmedo
Luna
Hatutau
Kara
Dirkuun
Halpaas
Lirah Island
Atauro Island
Biquele
Maumeta
Berau
Strait of Wetar
Lebelau
Kisar Island
Wonreli
Savu Sea
Timor Sea
Liquica
Bazar
Tete
Maubara
Cape Corimbala
LIQUICA
Railaco
Comoro
Dili
Metinaro
DILI
Cape Matoliana Run
Manatuto
Laklo
Laleia
Vermasse
Cai Rui
BAUCAU
Bucoli
Baucau
Cape Bondura
Laga
Atelari
Luro
Kelikai
Bagula
Venilale
Aba
Lautem
Com
Mainal
Mehara
Tutuala
Cape Cutche
Jaco Island
Laivai
Fuiloro
Lospalos
LAUTEM
Loré
Cape De Loré
Iliomar
Uato Carabau
Ossu
Uatolari
Lacluta
VIQUEQUE
Viqueque
Beacu
Cape Ima
Cape Caisawe Luli
Cape Delutoun
Punilala
AILEU
Aileu
MANATUTO
Lissapote
Ermera
Laclubar
Barique
Turiscai
Maubisse
Hatolina
Letefoho
Atabae
Cape Fatucapo
Cape Bauc
BOBONARO
ERMERA
Hato Builico
Atsabe
MANUFAHI
Fato Berliu
Natarbora
Same
Alas
Ainaro
Batugade
Balibo
Maliana
Atapupu
Atambua
Bobonaro
Mape
AINARO
Hotudo
Lolotoe
Zumalai
Cape Metiaut
Cape Cacetoc
Halilulik
Fato Mean
Fatolulic
COVA LIMA
Suai
Fohorem
Tilomar
Kotafun
INDONESIA
Cape Suai
Cape Tafara
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
124°00'
124°30'
9°00'
9°30'
Savu Sea
Pante Macassar
Wini
OECUSSI
Citrana
Nitibe
Oe Silo
Kefamenanu
Passabe
INDONESIA
0 10 20 30 km
0 5 10 15 20 mi

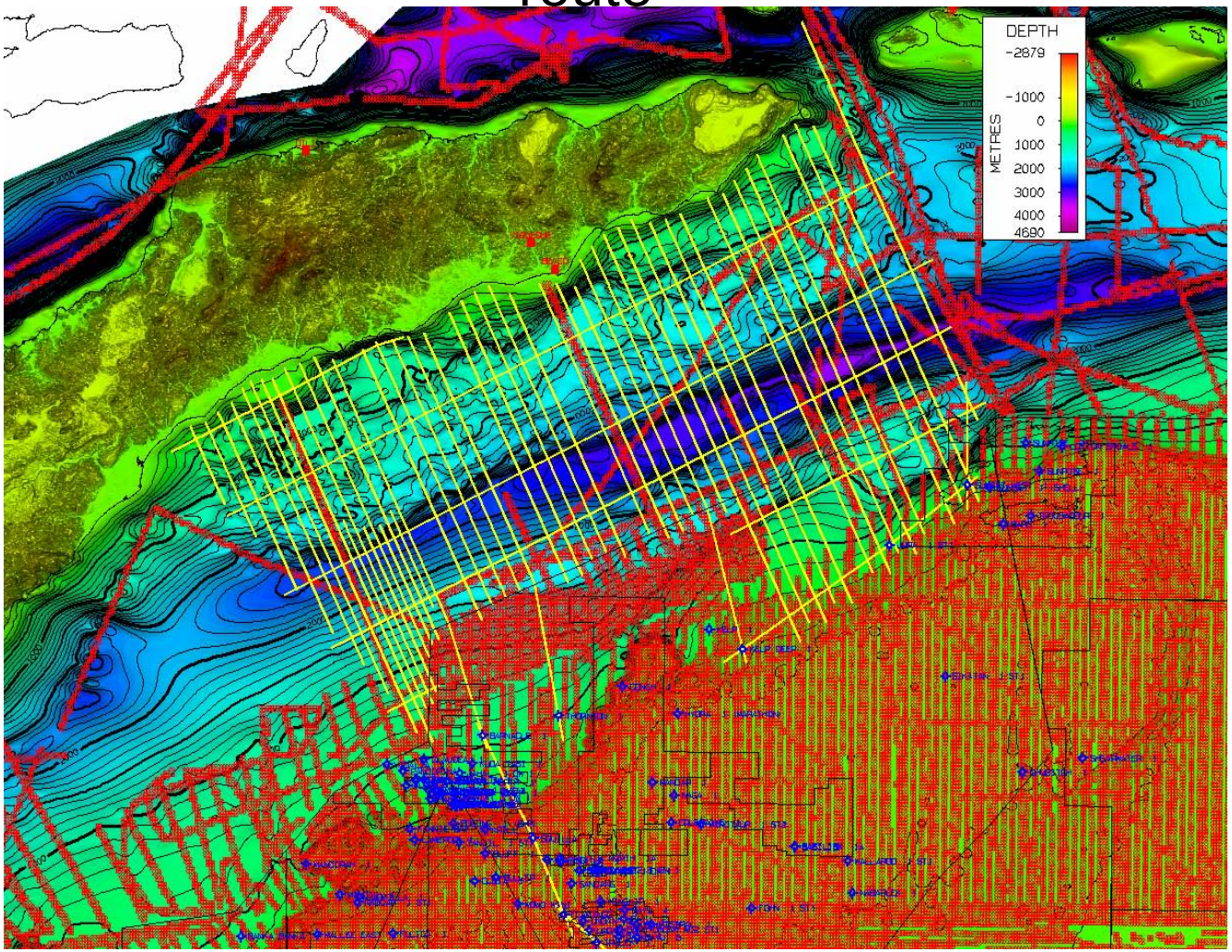
PIPELINE

– POTENTIAL ROUTE

– RISKS (including earthquake risks)

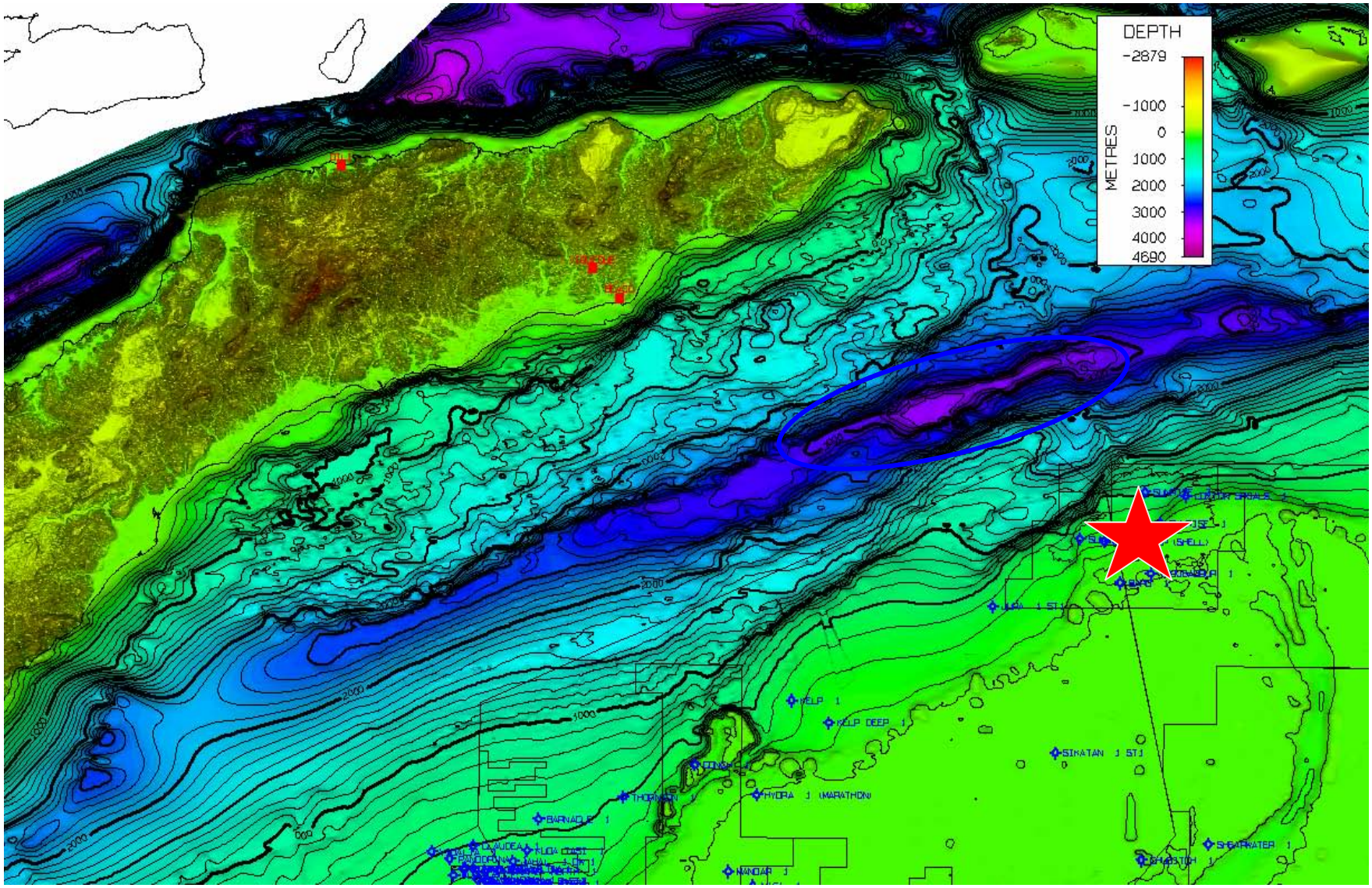
– PROPOSED SCHEDULE AND COST

Geotechnical Aspects of Timor Trough and pipeline route



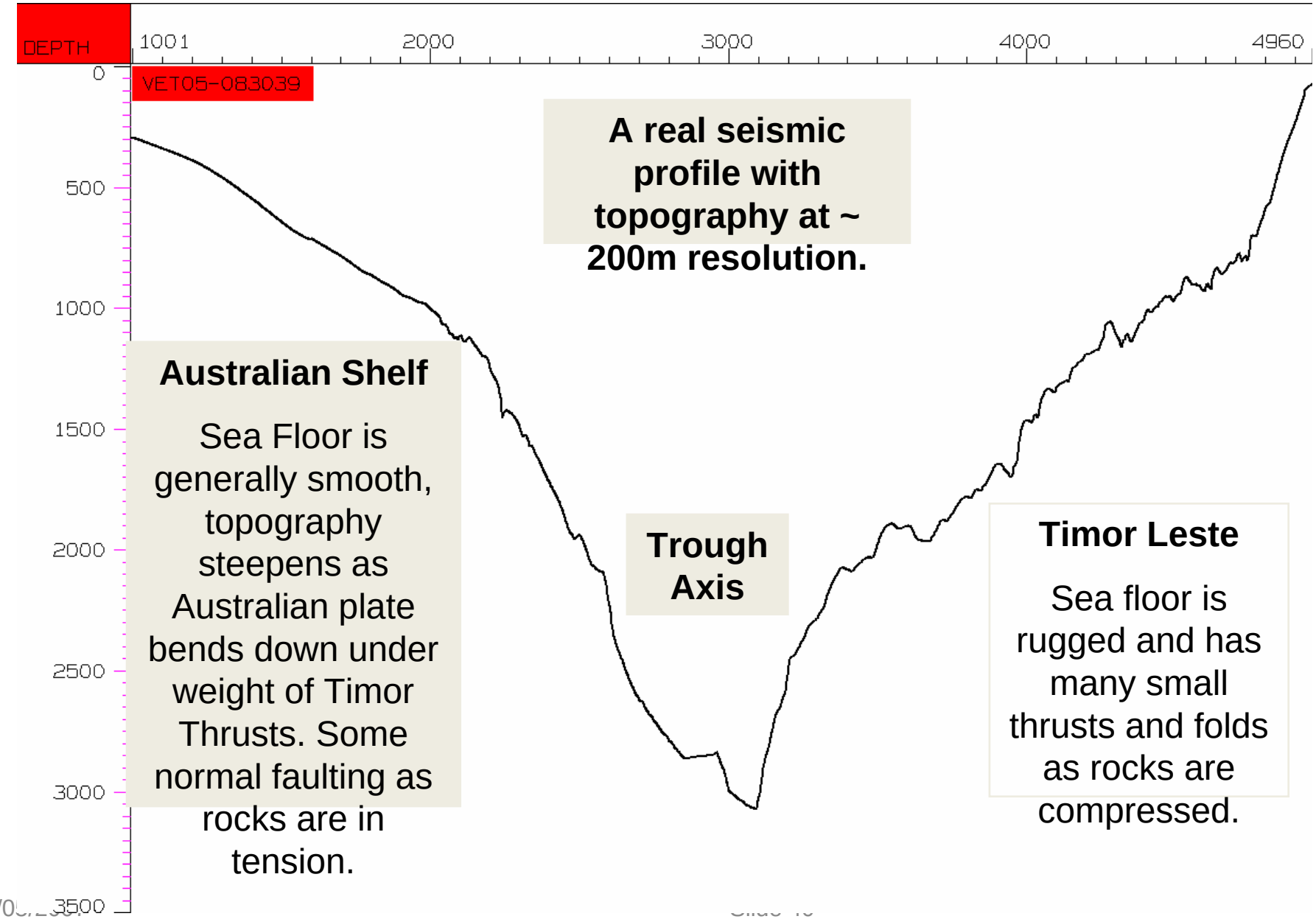
Data Sources: Onshore Topography from NASA SRTM

Offshore bathymetry: Yellow = GGS survey, Red = Geoscience Australia compilation (less accurate) Infill bathymetry from Satellite gravity and digitised general hydrographic contours (least accurate)



Sunrise Field is adjacent to the DEEPEST segment of the Timor Trough – 3300-3350 metres deep

Length scale Arbitrary



A real seismic profile with topography at ~ 200m resolution.

Australian Shelf

Sea Floor is generally smooth, topography steepens as Australian plate bends down under weight of Timor Thrusts. Some normal faulting as rocks are in tension.

Trough Axis

Timor Leste

Sea floor is rugged and has many small thrusts and folds as rocks are compressed.

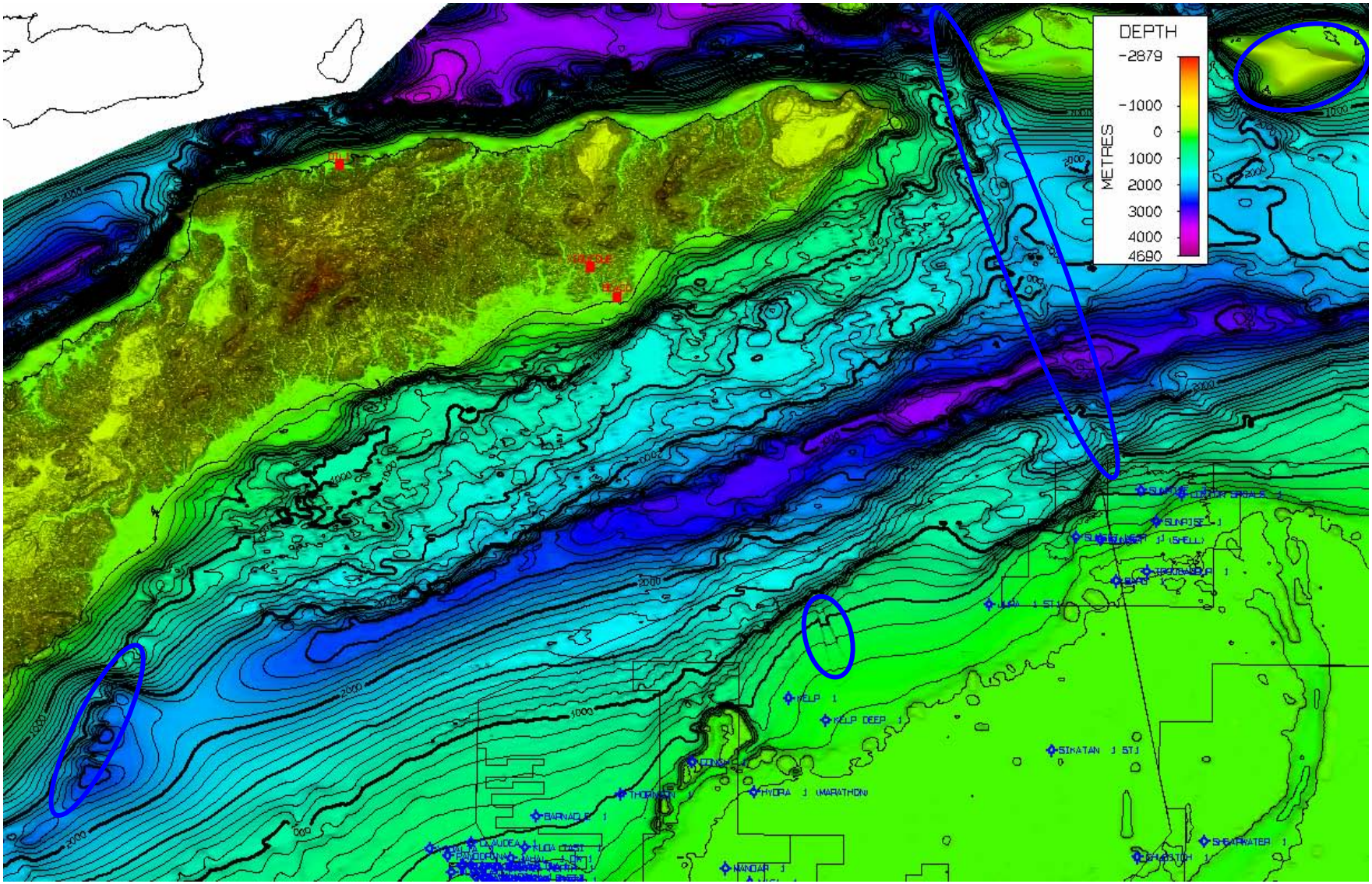
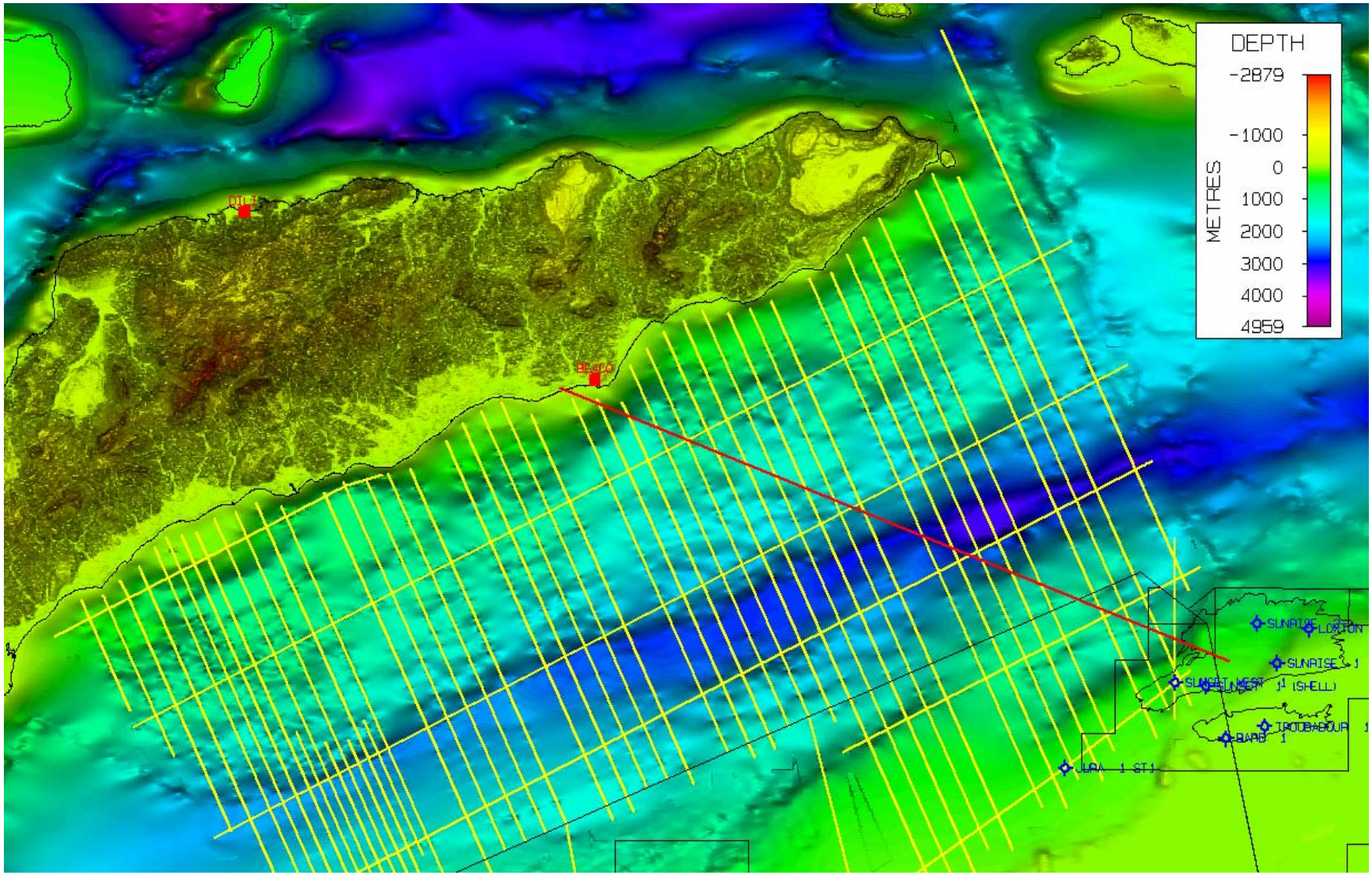
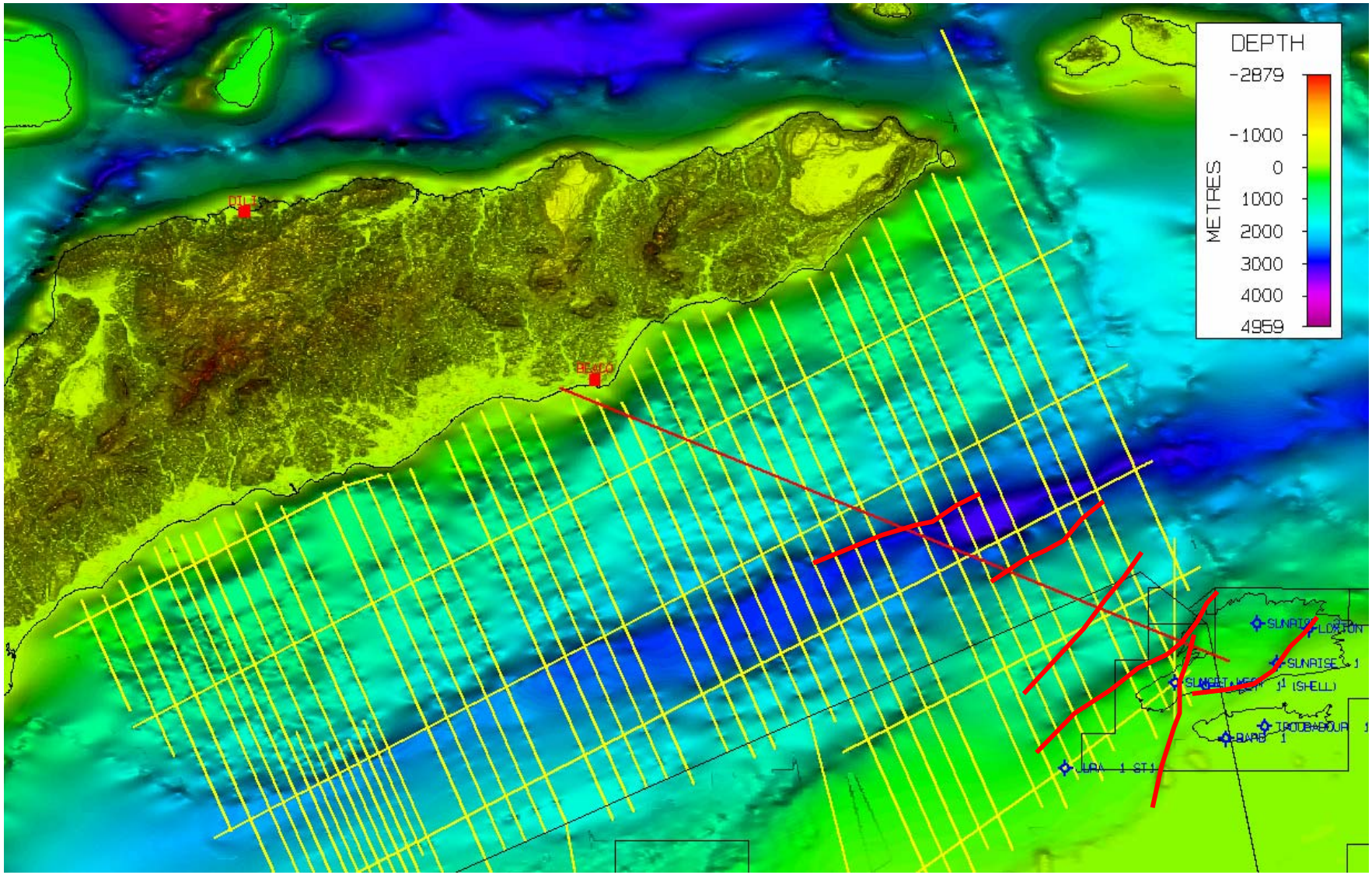


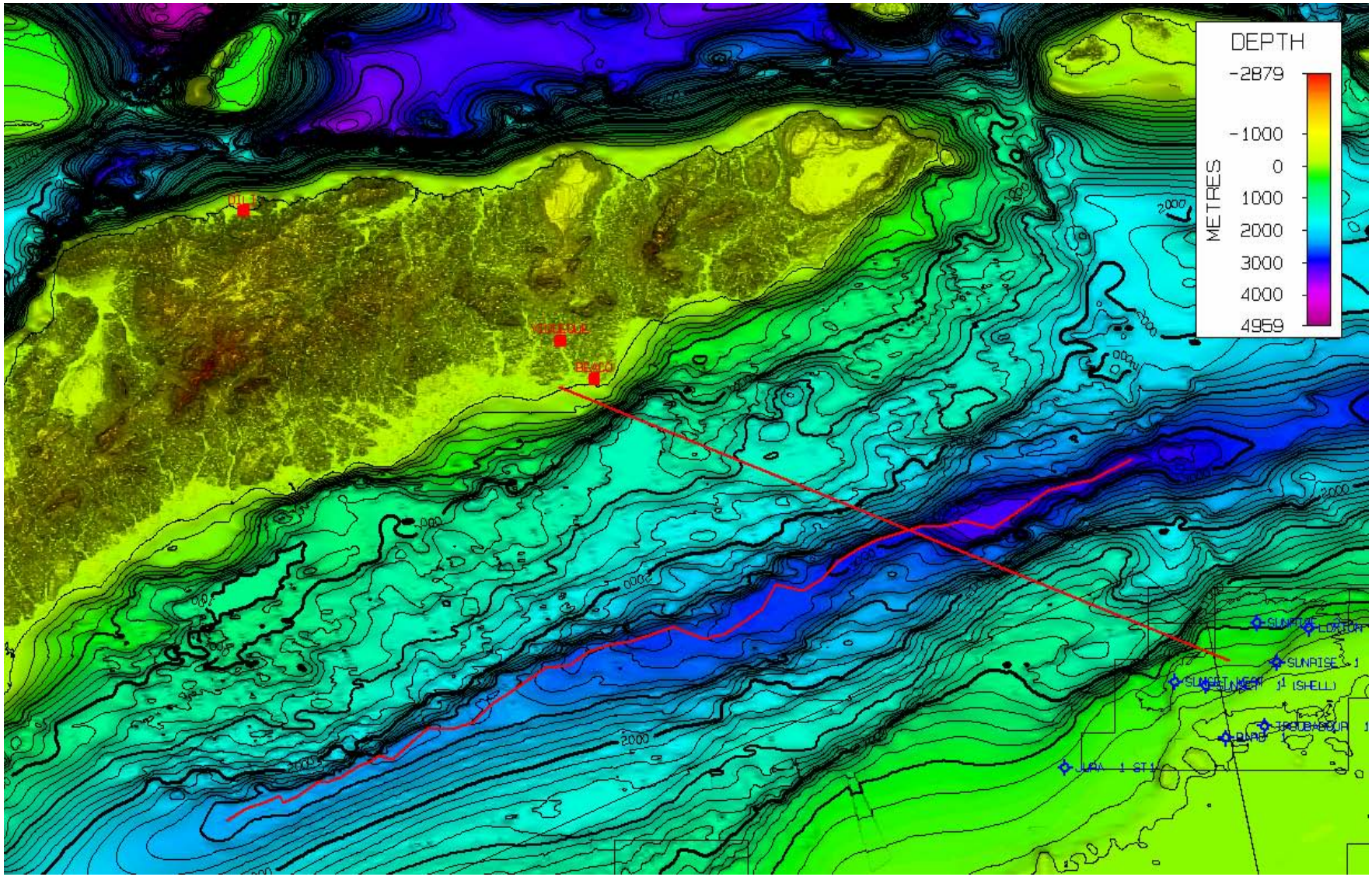
Image contains some local data and gridding artefacts



Pipeline Route will cross near deepest part of Trough and over steep slopes.

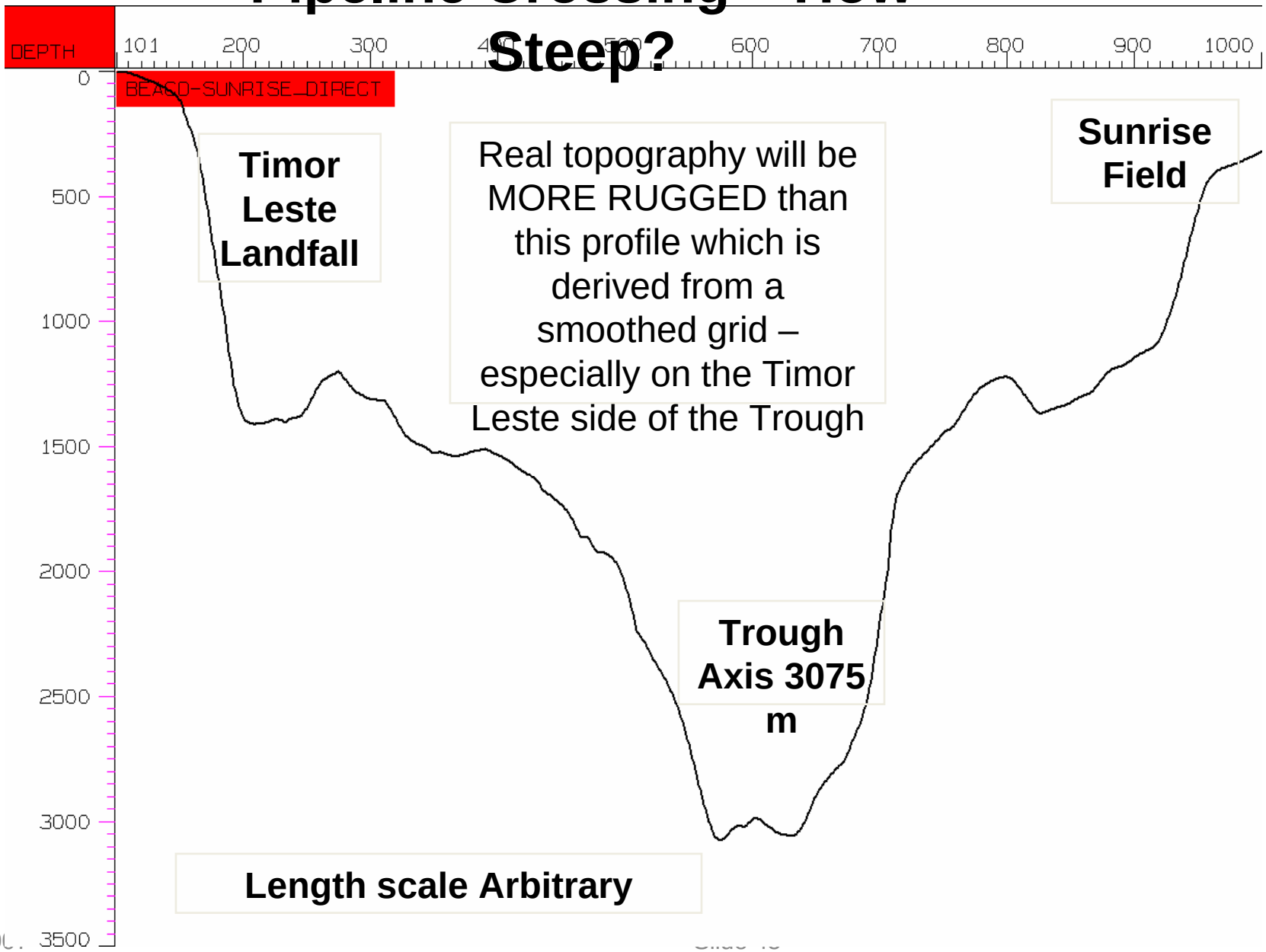


Sunrise Field is adjacent to major faults and topography at seabed, so pipeline routing WILL be affected

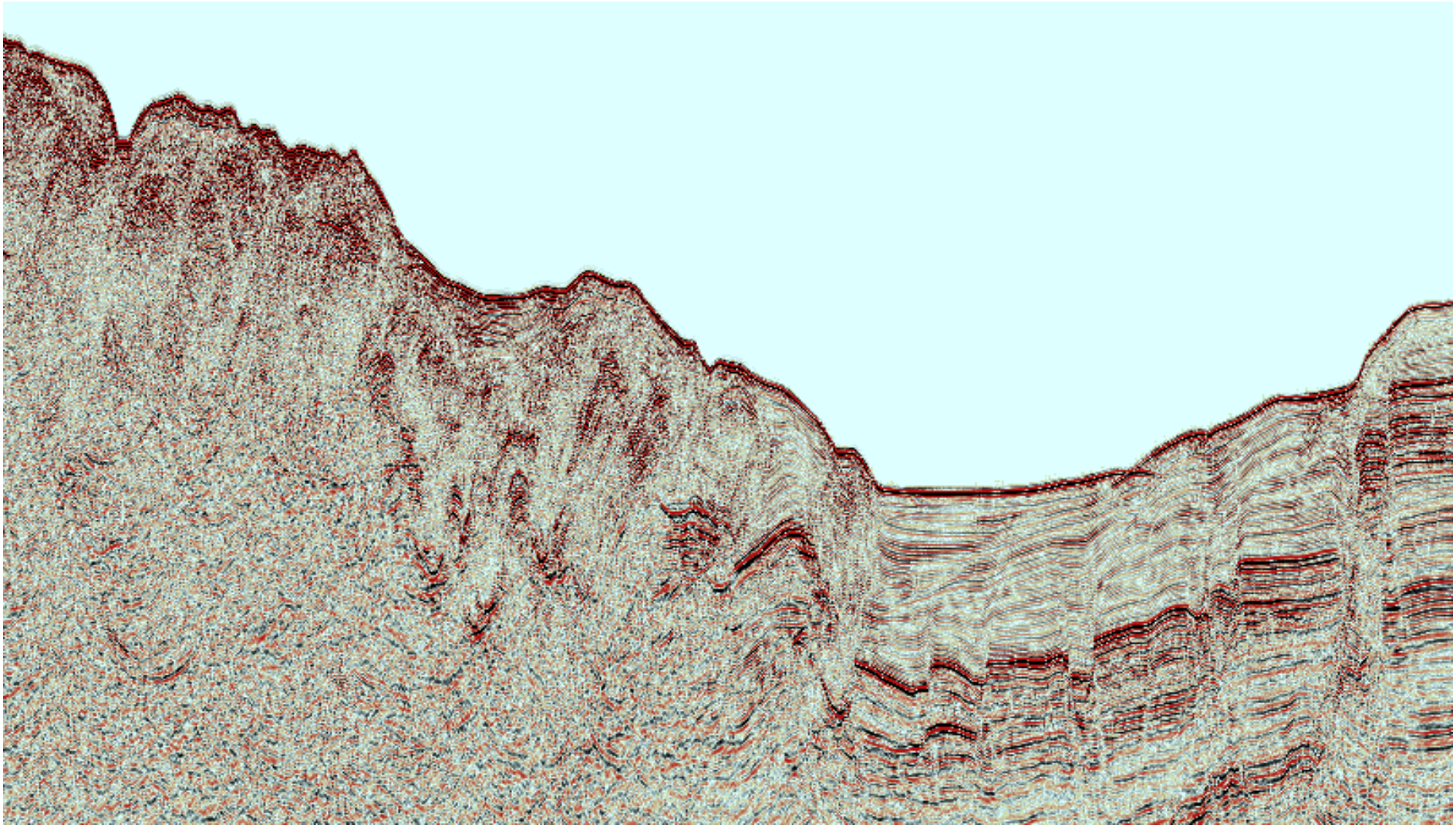


Bathymetric profiles across and along Trough

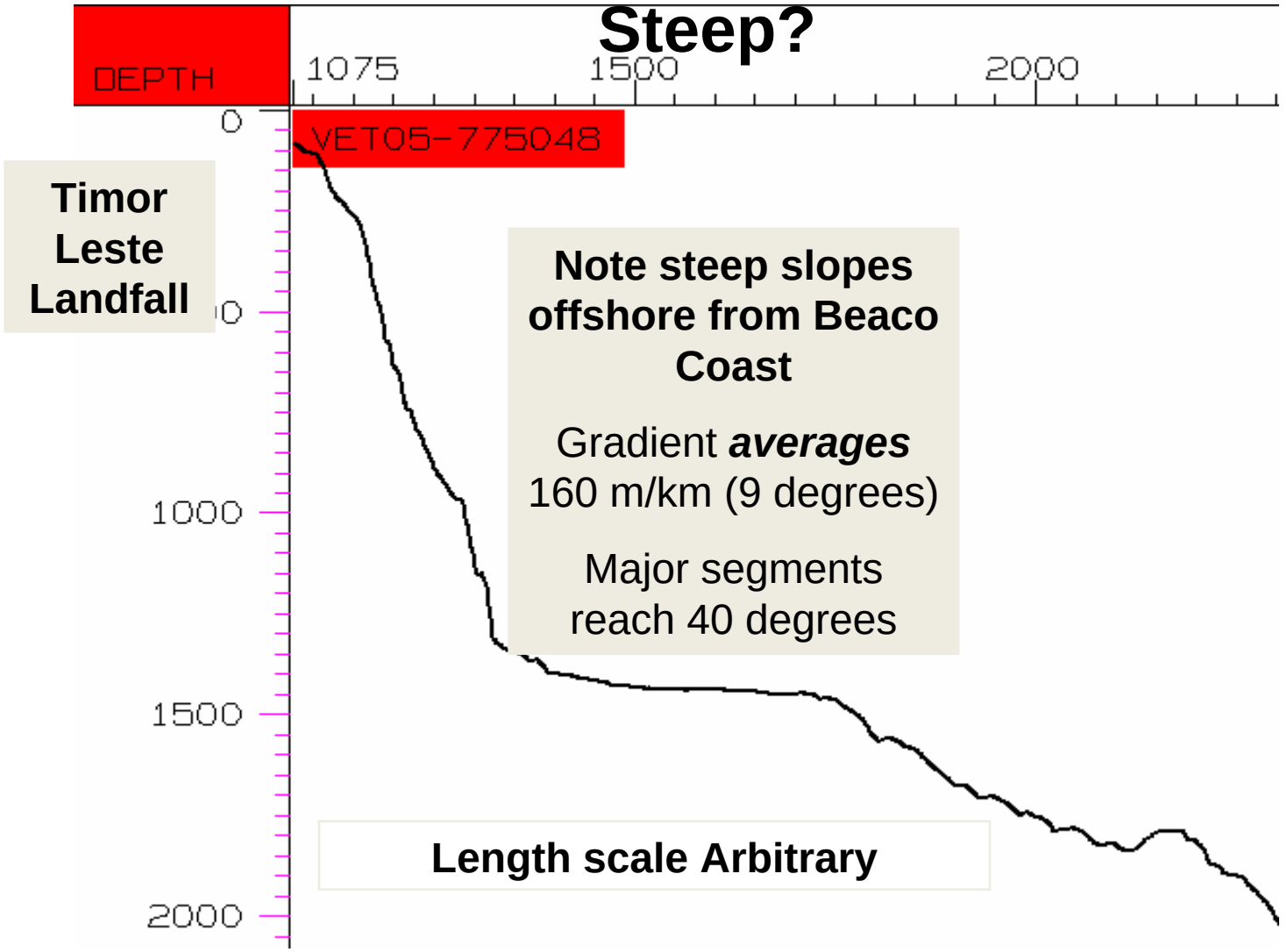
Pipeline Crossing – How Steep?



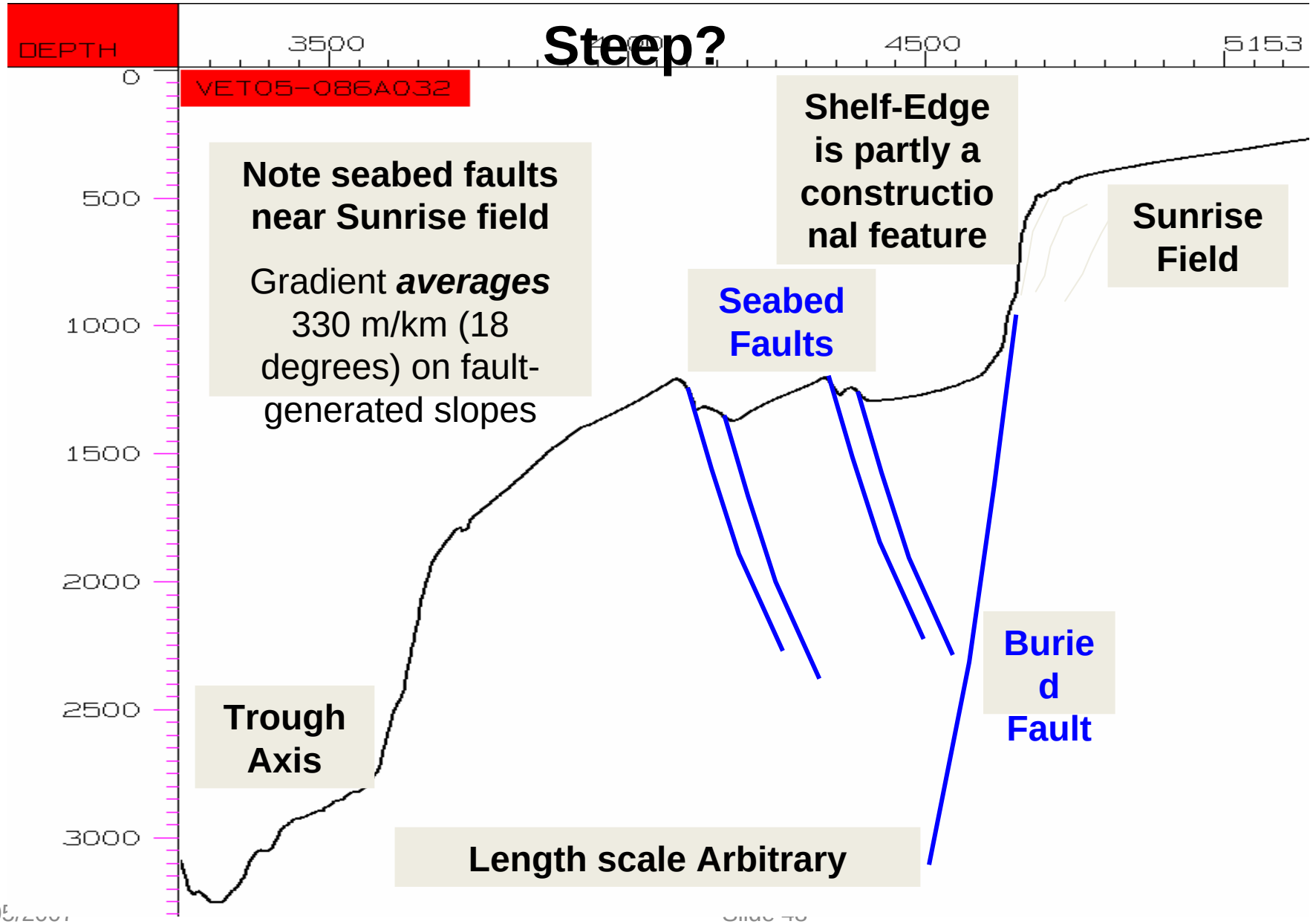
Example Seismic



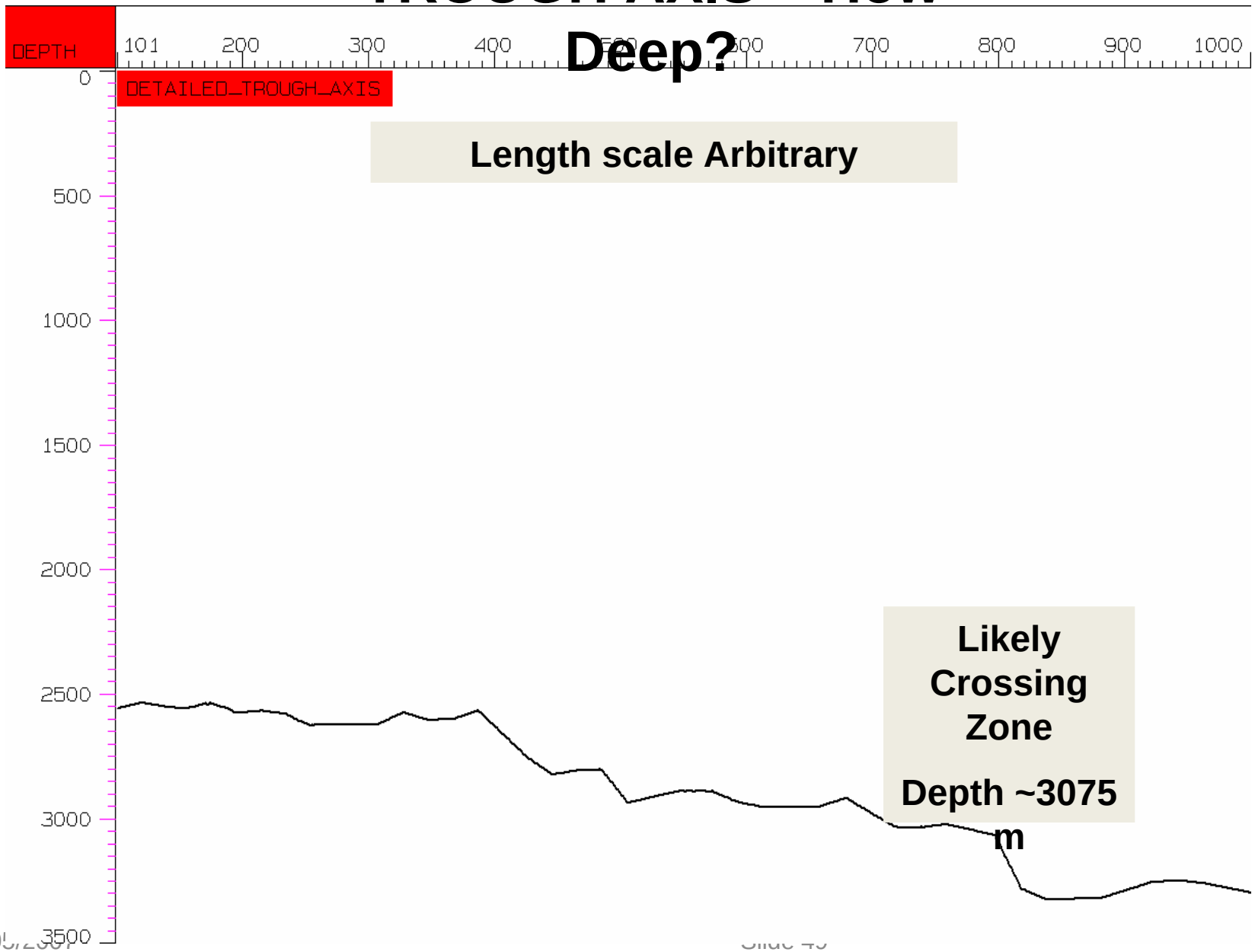
Landfall Area – How Steep?



Sunrise Area – How Steep?



TROUGH AXIS – How Deep?

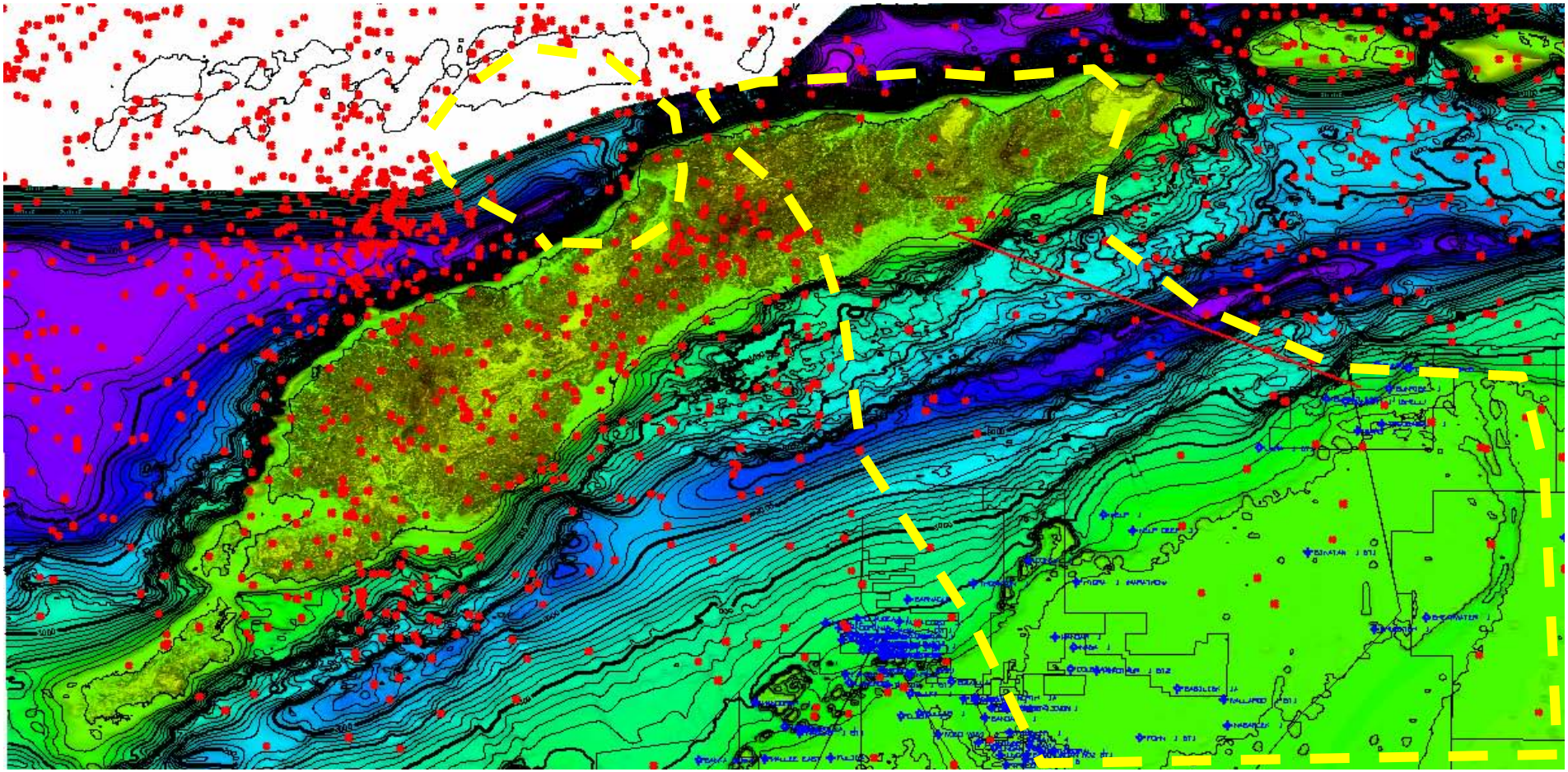


Length scale Arbitrary

Likely Crossing Zone

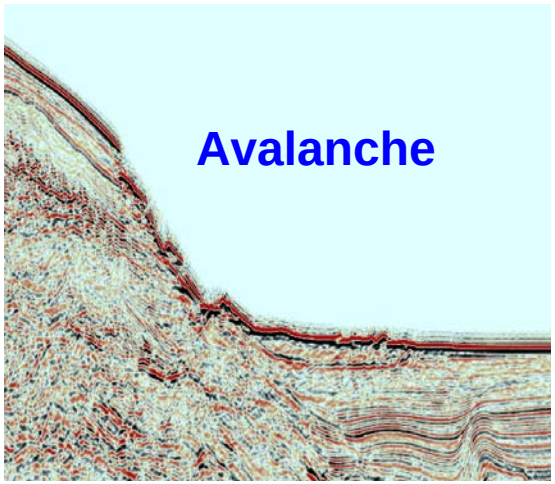
Depth ~3075 m

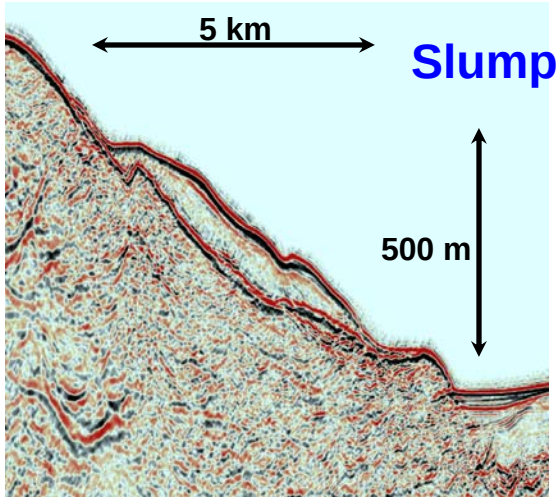
EARTHQUAKE RISK

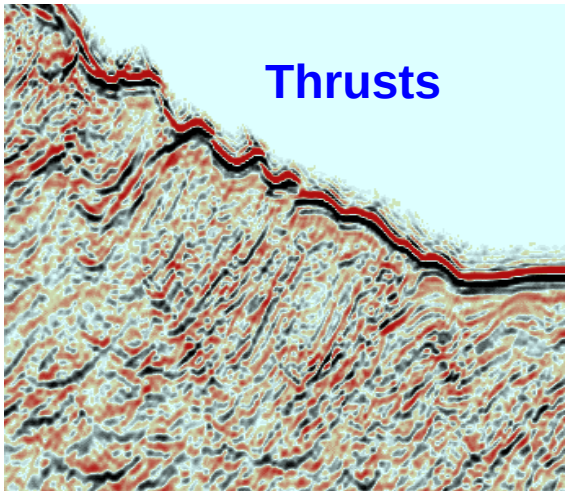


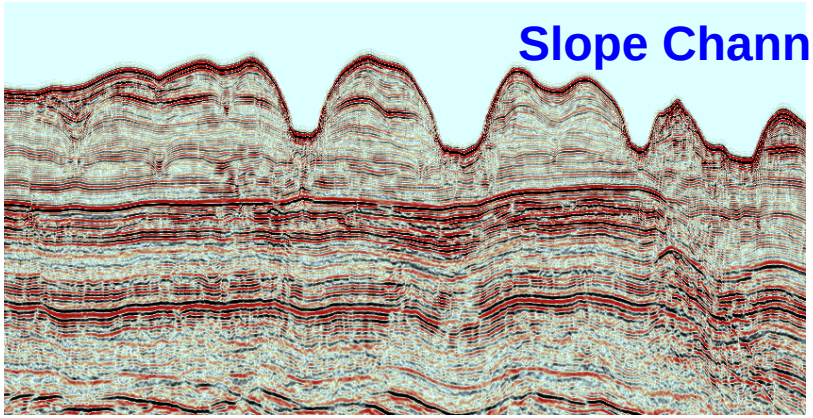
Seismic gaps may either be future major fractures, or could be geologically quiet. A major seismic quiet zone accomodates our pipeline route

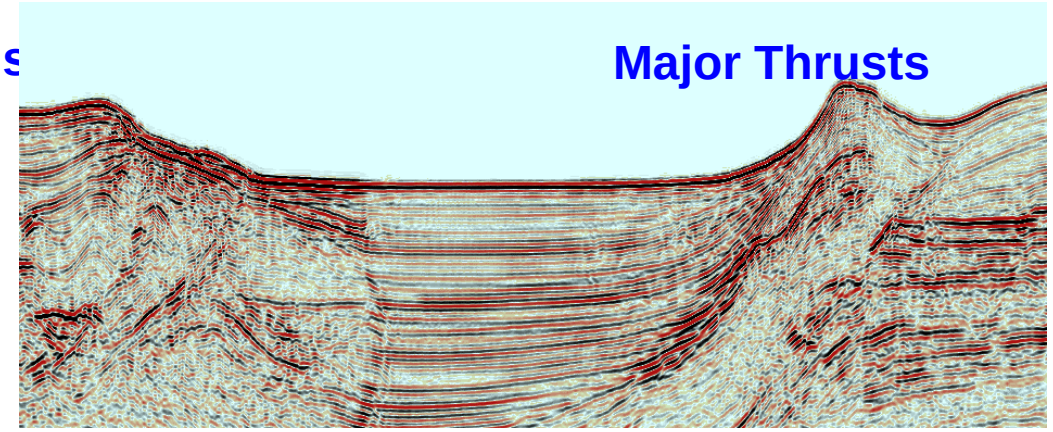
Seismic Hazards

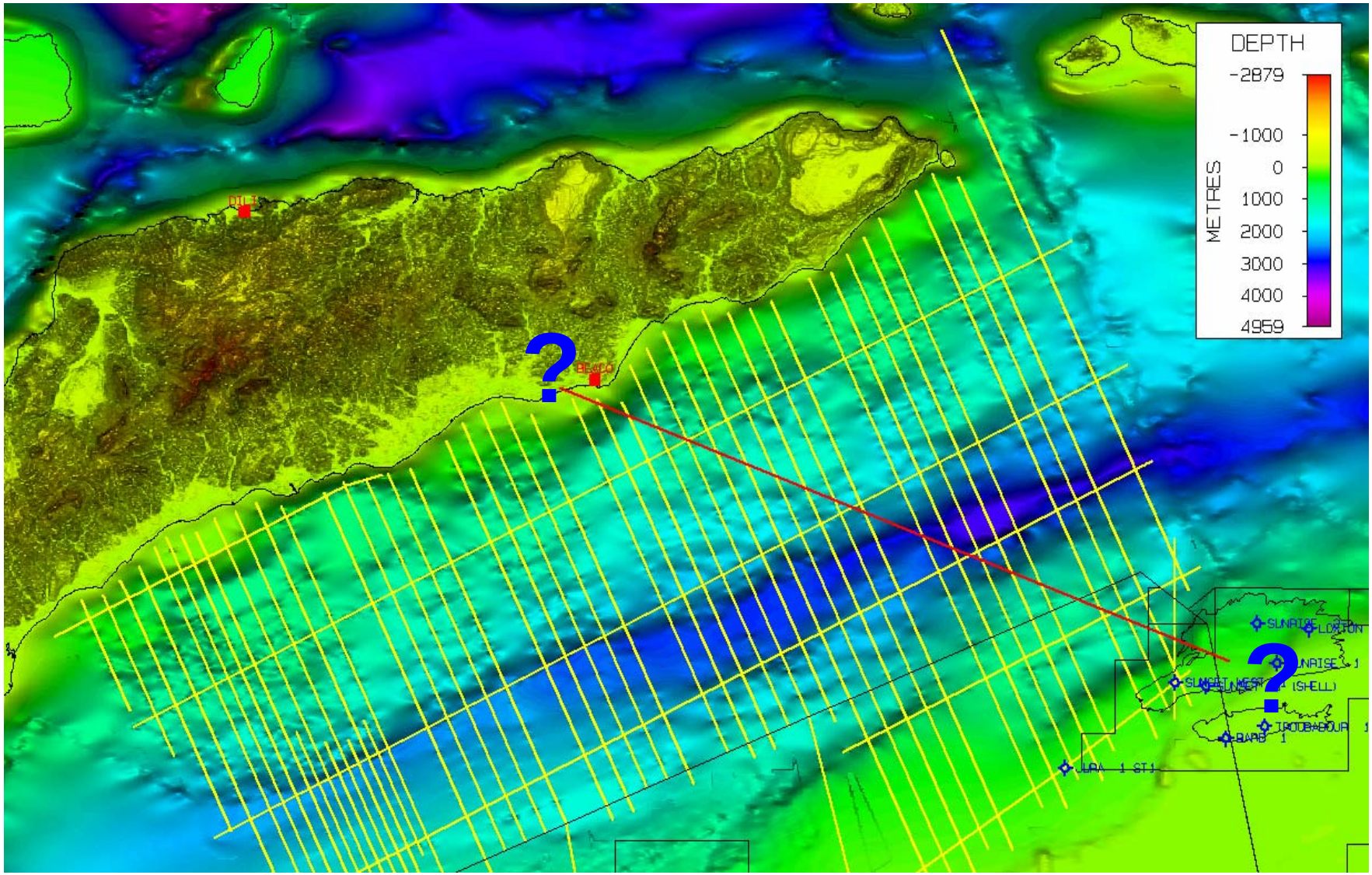




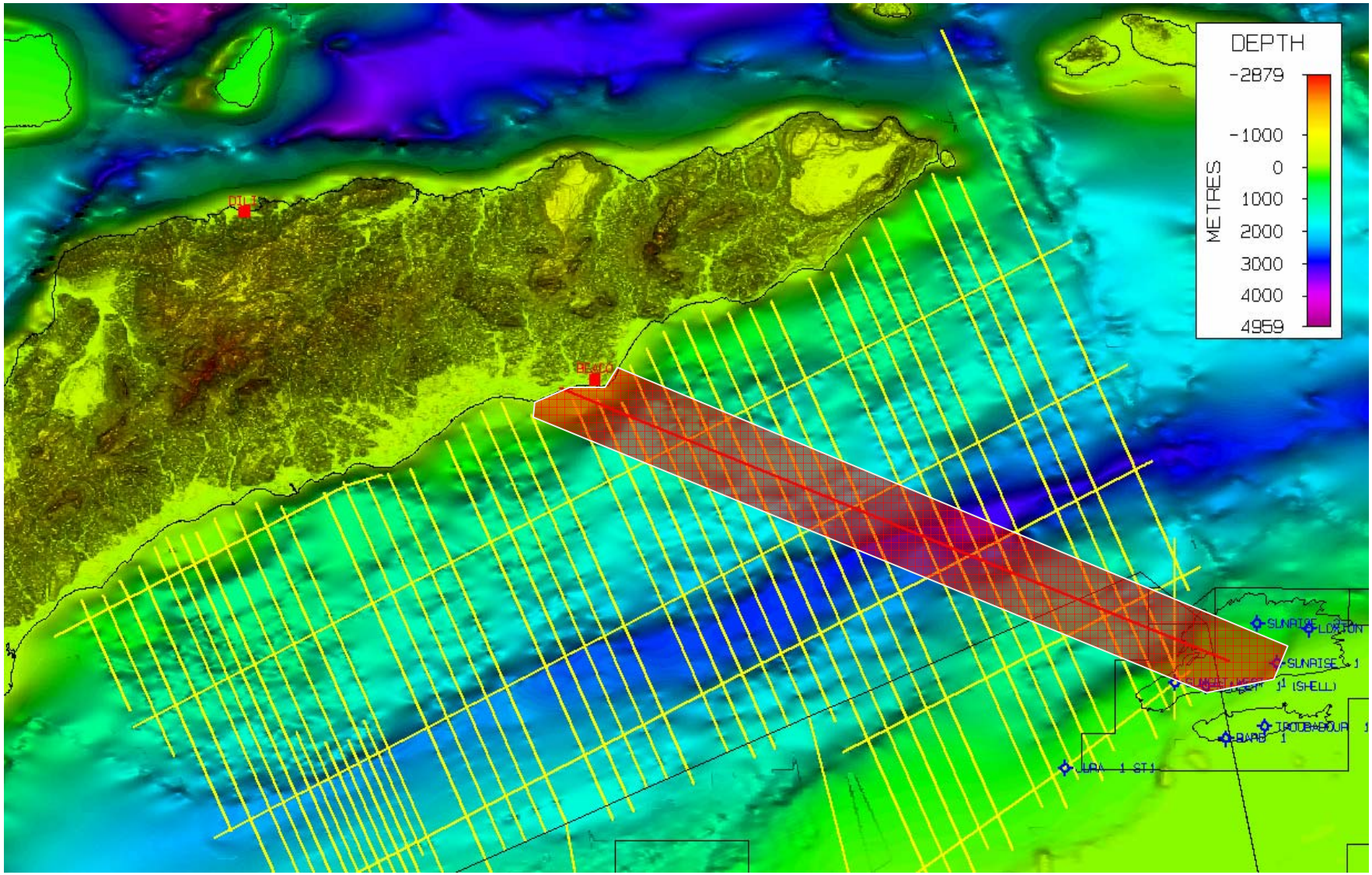




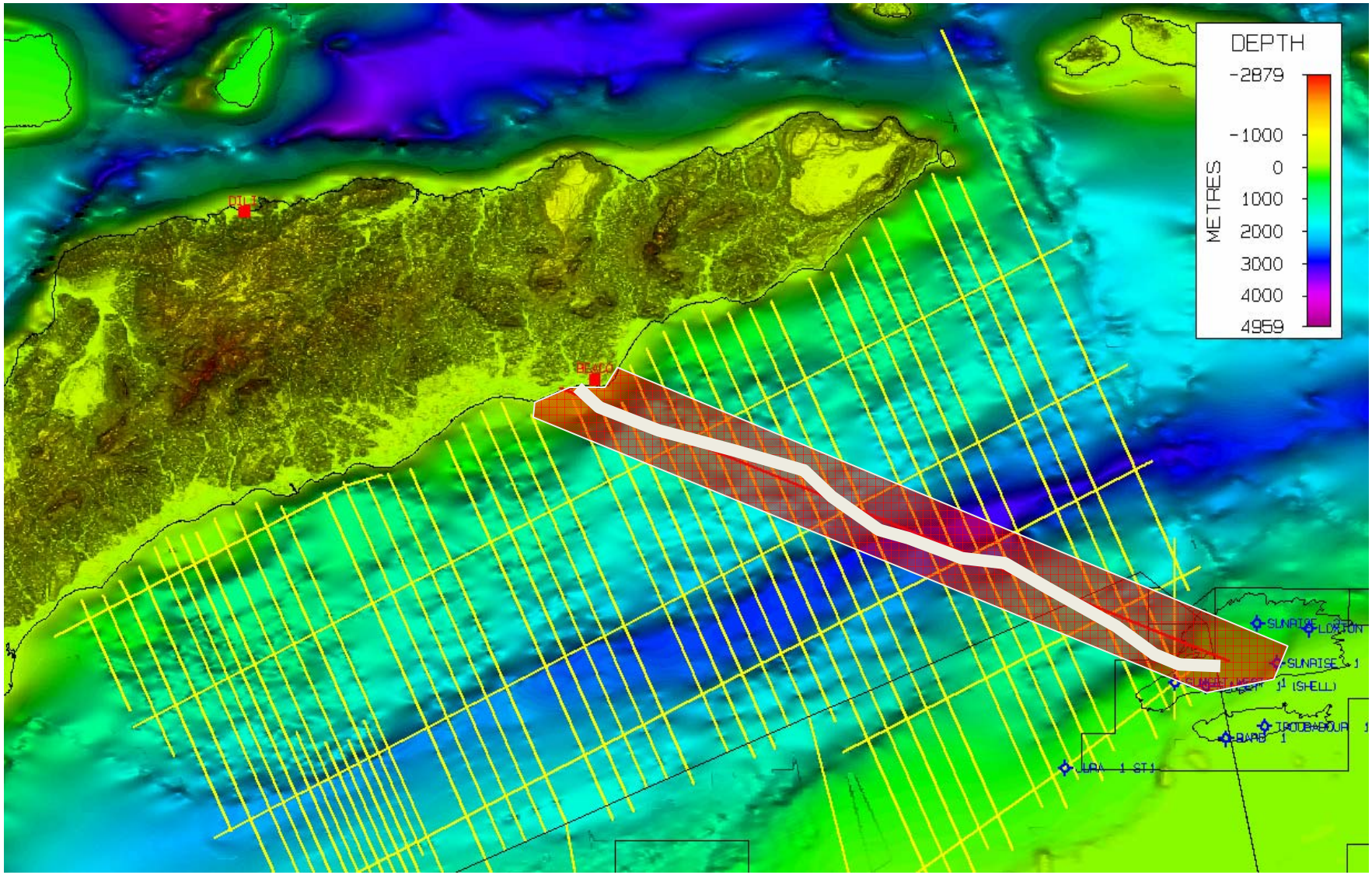




Recommended next steps – 1) Confirm end points of pipeline route (± 5 km)



Recommended next steps – 2) acquire ~ 1km spaced bathymetry profiles in 20 km wide belt



Recommended next steps – 3) Use 1km profiles to define area for detailed swath bathymetry

- **Bathymetry database needs further work**
- **The final map will change in detail but a DEEP crossing is inevitable (likely ~3075 m)**
- **Beware of artefacts in the database and grid – some features are NOT real**
- **There are many recent (possibly active) faults at seabed. These are very high risk zones and should be avoided if possible**

Next steps:

- **Incorporate additional seismic and other bathymetry**
- **Update Earthquake and seabed risk maps**
- **Refine locations of pipeline end-points**
- **Acquire ~1 km-spaced bathymetry profiles**
- **Interpret and map new data and define broad pipeline corridor**
- **Acquire swath bathymetry over corridor (needs specialised vessel)**
- **Geotechnical interpretation of pipeline route**

Pipeline technical options

There have been 2 feasibility studies completed about the possible pipeline: by INTEC Engineering Pty. Ltd.:

1. For Oceanic Exploration in June 2002, and
2. For Woodside dated 10th August 2004

Both studies concluded that a pipeline to Timor Leste is technically feasible – what is disputed is how much such a pipeline may cost.

- A review of the 2nd INTEC study was made by Sverre Lund of LUCON A/S in January 2005, on behalf of the RDTL Ministry of Development and Environment.

- Lund's conclusions disputed the Woodside/INTEC cost estimates very strongly. He stated that:

"A dedicated reconnaissance survey, which normally should have been performed prior to such a Feasibility Study, is strongly needed prior to any further conceptual work."

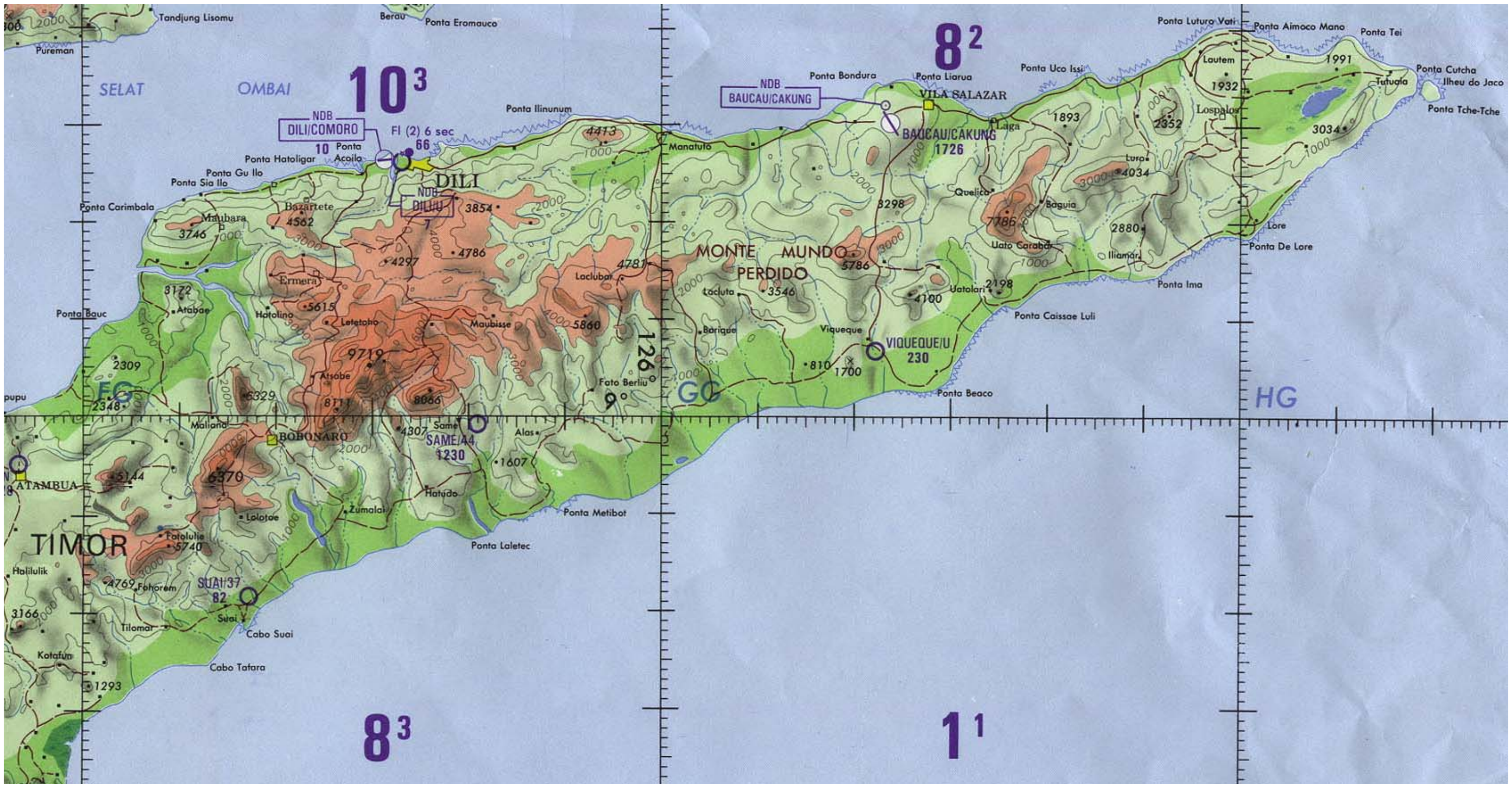
Pipeline technical options

- ***Basically, all experts suggest that the pipeline construction is technically feasible – the sizing, route and thus the cost is yet to be determined***.

- Stuart Joynson, a pipeline expert from the U.K. firm of Jee Limited is here today to answer further questions about the technical viability of such pipeline. Mr. Joynson's attendance has been sponsored by the Transasia group – a multinational resources company.

ONSHORE LOCATION

- CRITERIA
  - Oceanic conditions suitable for reliable tanker and berthing operations
  - Proximity to commercial centers that could provide raw materials and labor
  - Clear areas of land on the coast with a minimum distance from shore to at least 15 meters water depth
  - Minimum environment sensitivity
  - No densely populated areas
  - Stable soils to prevent damage from Timor-Leste's high level of seismic activity
- A SUMMARY OF POTENTIAL LOCATIONS
  - An evaluation of potential sites is necessary (PeruLNG evaluated 17 sites) before a more detailed assessment, including EIA, can be finalised.



Tandjung Lisomu
Berau
Ponta Eromauco
Pureman
SELAT
OMBAI
10 3
8 2
NDB
DILI/COMORO
Fl (2) 6 sec
66
10
Ponta Acoilo
Ponta Hatoligar
Ponta Gu Ilo
Ponta Sia Ilo
Ponta Ilinunum
4413
DILI
NDB
DILI/U
Ponta Carimbala
Maubara
Bazartete
4562
3746
3854
4786
4297
Ermera
3172
Atabae
Ponta Bauc
Hatolino
5615
Letefoho
Maubisse
Lacluba
4781
5860
9719
Atsabe
2309
6329
8111
8066
2348
Maliana
BOBONARO
4307
Same
SAME/44
1230
Alas
1607
Hatudo
ATAMBUA
5144
6370
Lolotoe
Zumalai
Ponta Metibot
Ponta Laletec
TIMOR
Fatolulic
5740
Halilulik
4769
Fohorem
SUAI/37
82
Suai
Cabo Suai
3166
Tilomar
Kotafun
Cabo Tafara
1293
8 3
1 1
126°
9°
FG
GG
HG
Manatuto
NDB
BAUCAU/CAKUNG
Ponta Bondura
Ponta Liarua
VILA SALAZAR
BAUCAU/CAKUNG
1726
Laga
Ponta Uco Issi
Ponta Luturo Vati
Ponta Aimoco Mano
Ponta Tei
Lautem
1991
1932
Ponta Cutcha
Tutuala
Ilheu do Jaco
Ponta Tche-Tche
1893
2352
Lospalos
3034
Luro
4034
Quelicai
3298
Baguia
7786
2880
Lore
Ponta De Lore
MONTE
MUNDO
PERDIDO
5786
Uato Carabau
Iliomar
Lacluta
3546
4100
Uatolari
2198
Ponta Ima
Ponta Caissae Luli
Barique
Viqueque
VIQUEQUE/U
230
810
1700
Fato Berliu
Ponta Beaco

An example site location on the South coast

LNG Project Components

- Liquefaction Plant AND LNG Storage
- Marine Facilities
- Administration, Housing, Infrastructure and facilities
- Sewerage and waste treatment facilities

Liquefaction Plant AND LNG Storage

The plant would contain the following process units:

- Feedgas Receiving, liquid separation, Gas metering and pressure reduction
- Acid gas removal (if necessary)
- Gas dehydration and carbon Adsorption units
- Refrigeration and Liquefaction
- LNG storage
- Refrigerant Storage

Marine Facilities

- Trestle
- Breakwater for wave protection
- Access navigational channel for LNG Tankers
- LNG tanker berth and LNG loading arms
- Tug berths
- Utility dock
- Lighting and navigational aids

Administration. Housing, Infrastructure and facilities

- Administration and operations staff will work (and probably housed) on site
- A permanent community housing area will be necessary for non-local personnel
- The plant will need to be self-sufficient for all utility requirements in water and electricity, with gas-powered turbine generators to provide electricity (and a seawater desalination plant?)

What type of gas will be handled in the LNG project?

- Natural gas, primarily methane, will be transported to the plant through a pipeline from the Greater Sunrise Field development
- The natural gas is likely to be separated from gas liquids before it is transported into the pipeline

What will be produced in this plant?

- LNG is an odorless, colorless, non-corrosive and non-toxic liquid. LNG is made by purifying natural gas and cooling it to a temperature of minus 163 degrees Celsius at atmospheric pressure. The cooling process transforms the natural gas into a liquid and reduces its volume by 600 times.
- LNG quickly evaporates into its gaseous components when it warms, thus needs to be stored in tanks.

Construction stages of LNG Plant

Construction begins after the planning and engineering stages result in an acceptable design. The construction phase includes:

- Phase 1
  - Preparation of the land area at the LNG plant site
- Phase 2
  - Transportation, mobilization and installation of mobile camps
  - Construction of processing, tank storage and work areas
  - Construction of port facilities and testing of systems and equipment

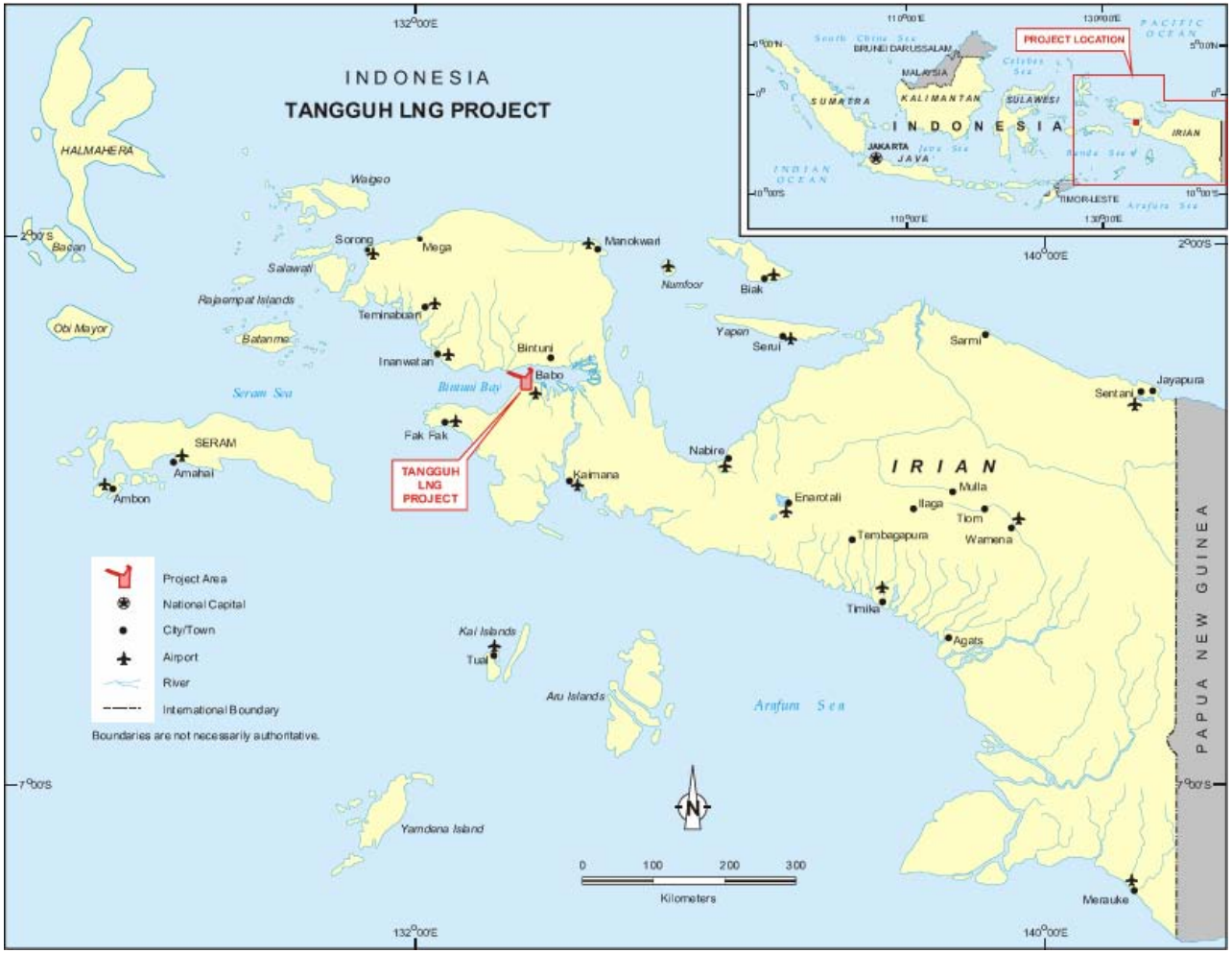
Environmental Impact Assessment ("EIA")

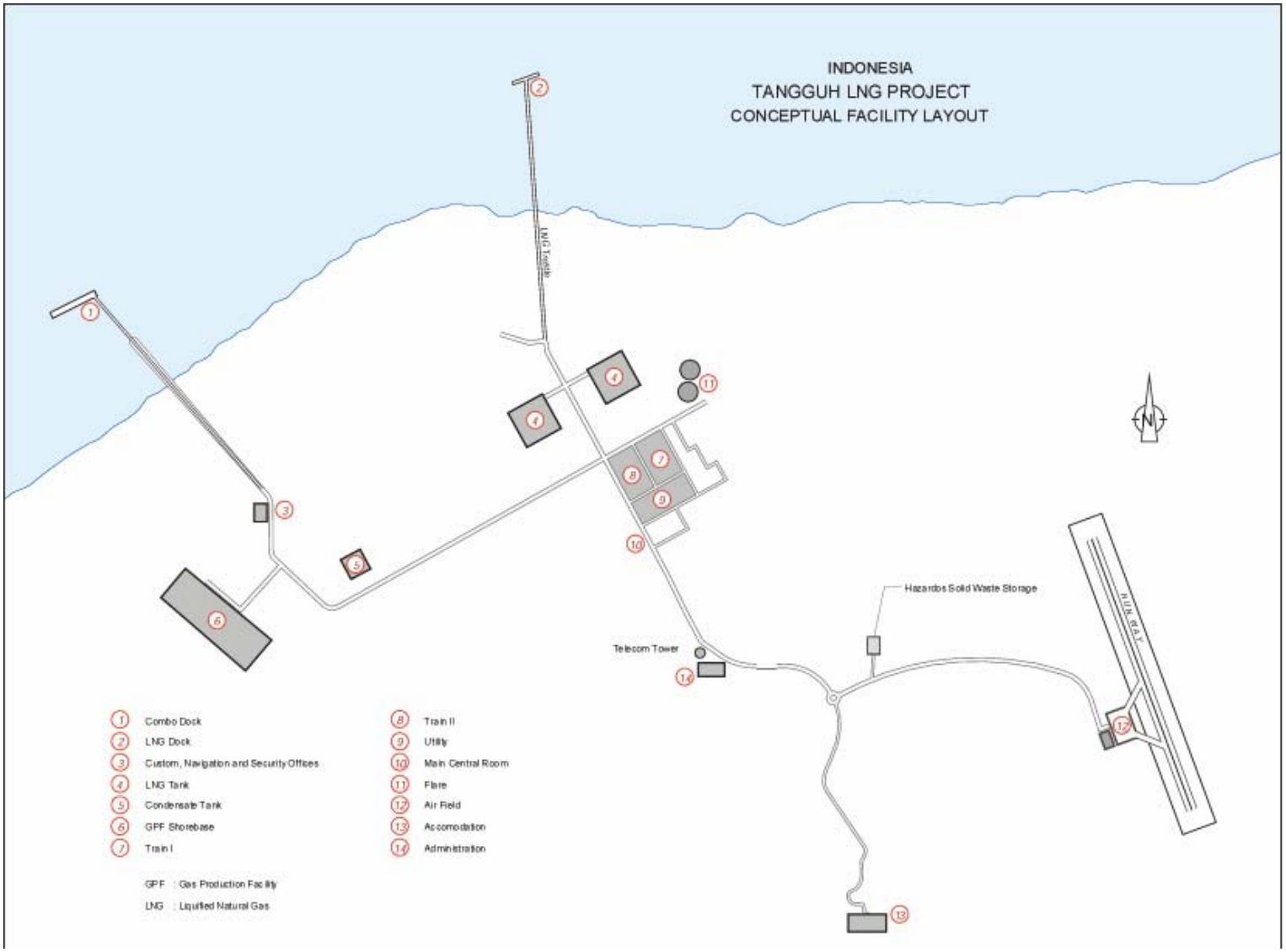
- The EIA identifies and analyzes the physical, biological and social aspects of a proposed project and the potential impacts on the area of influence where the construction and operation of a project will take place.
- The EIA is an instrument to identify risks to the environment, evaluate alternatives and design appropriate mitigation measures

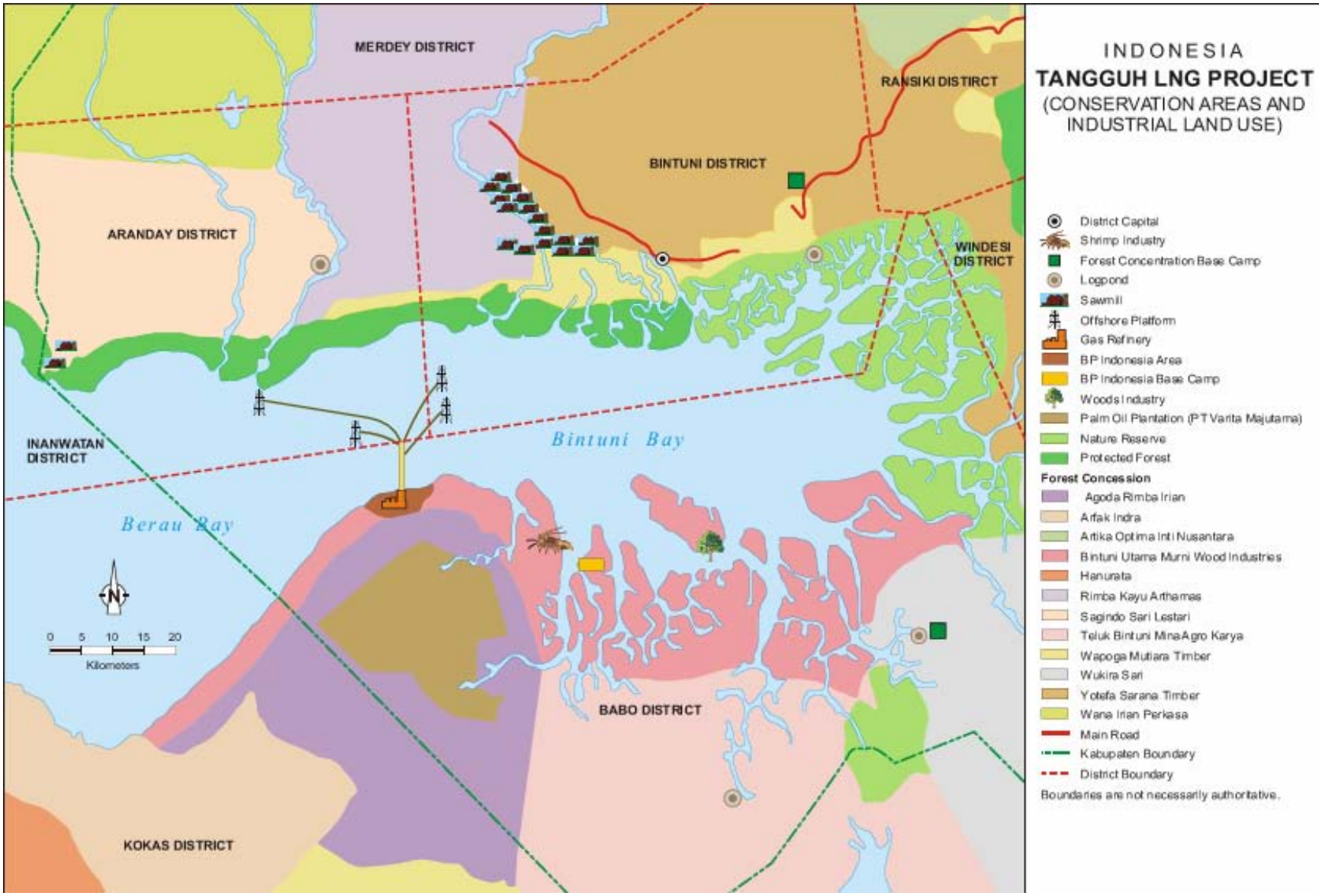
Objectives of the EIA

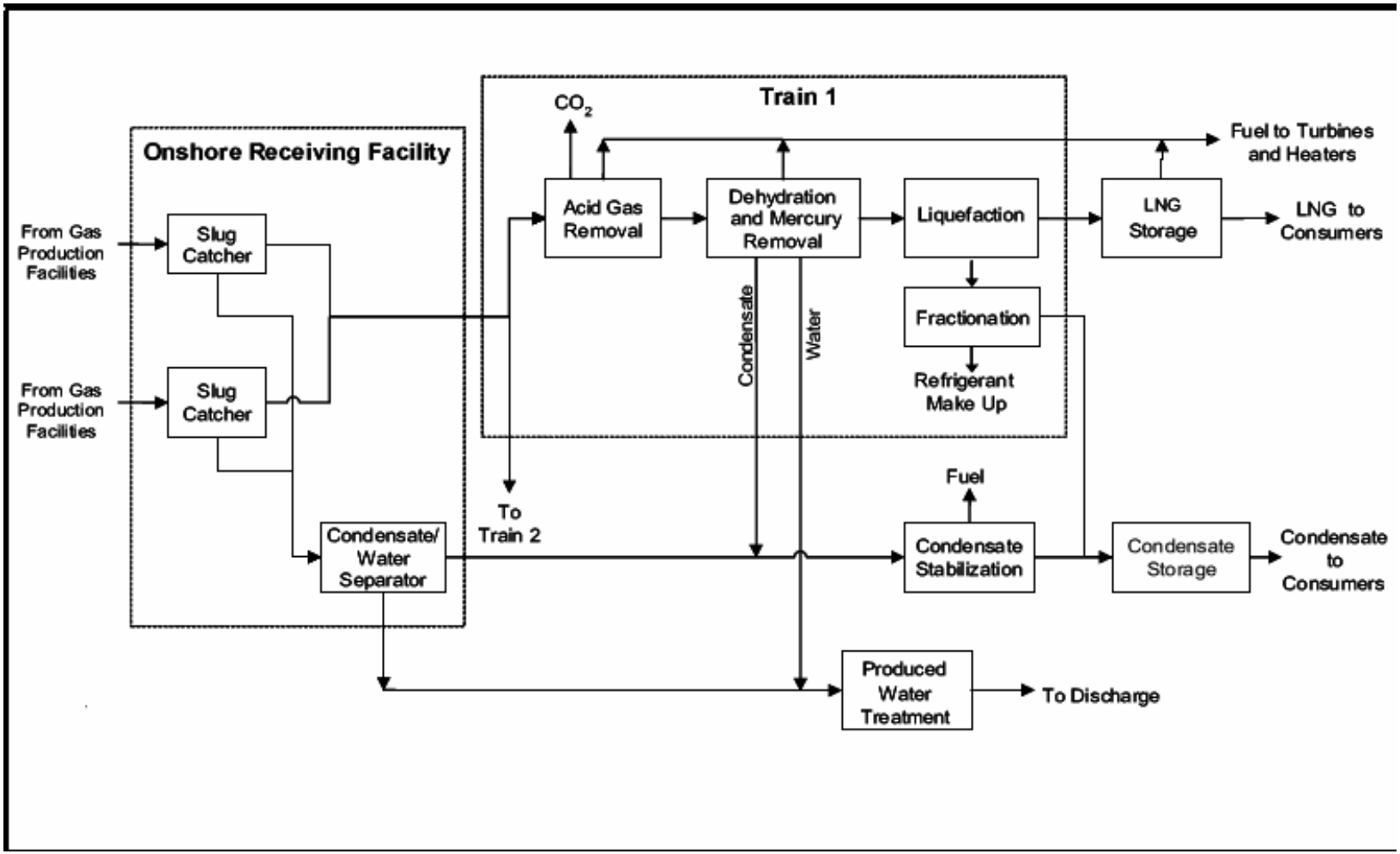
- Identify the positive and adverse impacts associated with the interaction between the project and the environment
- Evaluate alternatives and design environmental and social management measures to prevent or reduce the adverse effects and enhance the positive effects
- Develop the basis for an environmental management and monitoring plan
- Develop an early relationship with the local community leading to ongoing communication, and if applicable, monitoring throughout the project’s life.

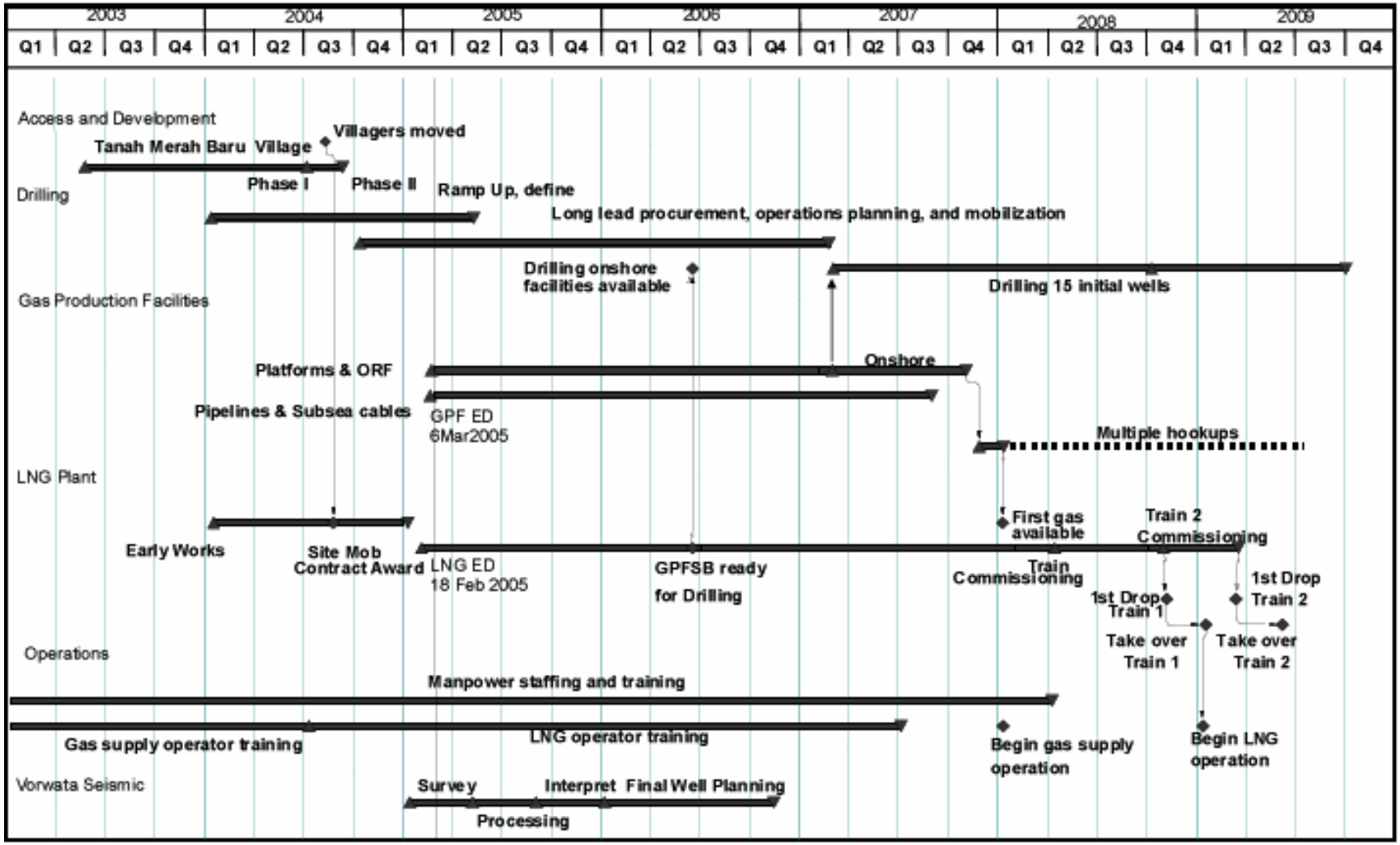
An example – the Tangguh LNG Project




INDONESIA
TANGGUH LNG PROJECT
CONCEPTUAL FACILITY LAYOUT
LNG Tunnel
Hazardos Solid Waste Storage
Telecom Tower
1 Combo Dock
2 LNG Dock
3 Custom, Navigation and Security Offices
4 LNG Tank
5 Condensate Tank
6 GPF Shorebase
7 Train I
8 Train II
9 Utility
10 Main Central Room
11 Flare
12 Air Field
13 Accomodation
14 Administration
GPF : Gas Production Facility
LNG : Liquified Natural Gas


MERDEY DISTRICT
RANSIKI DISTIRCT
BINTUNI DISTRICT
ARANDAY DISTRICT
WINDESI DISTRICT
INANWATAN DISTRICT
Bintuni Bay
Berau Bay
N
0 5 10 15 20
Kilometers
BABO DISTRICT
KOKAS DISTRICT
INDONESIA
TANGGUH LNG PROJECT
(CONSERVATION AREAS AND INDUSTRIAL LAND USE)
District Capital
Shrimp Industry
Forest Concentration Base Camp
Logpond
Sawmill
Offshore Platform
Gas Refinery
BP Indonesia Area
BP Indonesia Base Camp
Woods Industry
Palm Oil Plantation (PT Varita Majutama)
Nature Reserve
Protected Forest
Forest Concession
Agoda Rimba Irian
Arfak Indra
Artika Optima Inti Nusantara
Bintuni Utama Murni Wood Industries
Hanurata
Rimba Kayu Arthamas
Sagindo Sari Lestari
Teluk Bintuni Mina Agro Karya
Wapoga Mutiara Timber
Wukira Sari
Yotefa Sarana Timber
Wana Irian Perkasa
Main Road
Kabupaten Boundary
District Boundary
Boundaries are not necessarily authoritative.


Train 1
CO_2
Onshore Receiving Facility
Fuel to Turbines and Heaters
From Gas Production Facilities
Slug Catcher
Acid Gas Removal
Dehydration and Mercury Removal
Liquefaction
LNG Storage
LNG to Consumers
From Gas Production Facilities
Slug Catcher
Condensate
Water
Fractionation
Refrigerant Make Up
Fuel
To Train 2
Condensate/ Water Separator
Condensate Stabilization
Condensate Storage
Condensate to Consumers
Produced Water Treatment
To Discharge


2003
2004
2005
2006
2007
2008
2009
Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4
Access and Development
Villagers moved
Tanah Merah Baru Village
Drilling
Phase I
Phase II
Ramp Up, define
Long lead procurement, operations planning, and mobilization
Drilling onshore facilities available
Drilling 15 initial wells
Gas Production Facilities
Platforms & ORF
Onshore
Pipelines & Subsea cables
GPF ED
6Mar2005
Multiple hookups
LNG Plant
First gas available
Train 2 Commissioning
Early Works
Site Mob
Contract Award
LNG ED
18 Feb 2005
GPFSB ready for Drilling
Train Commissioning
1st Drop Train 1
1st Drop Train 2
Take over Train 1
Take over Train 2
Operations
Manpower staffing and training
Gas supply operator training
LNG operator training
Begin gas supply operation
Begin LNG operation
Vorwata Seismic
Survey
Interpret
Final Well Planning
Processing

Tangguh Employemet

- The construction workforce is expected to peak at 5,800 during 2007.

- Overall, at least 2,000 Papuans are expected to be employed during the main EPC construction phase. These employment numbers are related only to Tangguh site activities.
- Many jobs will be created in other parts of Indonesia. For example, the platforms are expected to be fabricated in Banten Province and require employment of up to 800 people for approximately 9 months. The pipeline coating is expected to be produced in Batam and will employ about 300 people for 2 to 3 months.

Tangguh Employment

- Operations of plant facilities will require a site workforce of approximately 450 people to allow for rotation of personnel. Job opportunities will become available during the operation stage for support and general maintenance services. Recruitment and training of the project's operations team, including local villagers, has already commenced.

- The Project employs 28 Papuans on the operations team, who are undergoing a 3-year training program in LNG operations at the Bontang LNG facility. The percentage of Papuans in the workforce is expected to increase steadily over the life of project as more local people are trained. The project's target is 85% Papuan content in the project workforce after 25 years of operations.

Site Selection for Tangguh

During 1996 and 1997, a thorough site selection process was carried out. Initially, 17 broad sites were identified within 250 km of the gas fields.

A screening process was used to reduce the number of potential sites. Sites were eliminated if one or more of the following conditions applied:

- proximity to area of environmental sensitivity, such as a nature reserve;
- clearly excessive development costs due to excessively long pipelines or difficult site conditions;
- (requirement for gas pipeline to traverse extensive tracts of mountainous terrain;
- (absence of deep water near the site, requiring substantial dredging or excessively long jetty structures;
- (port facilities would involve sites of rapid accretion or mobile seabed sediment, which would require repeated dredging to maintain shipping access;
- the presence of physical features such as swamps or cliffs, which are not amenable to site preparation.

While five of these six criteria are based on engineering feasibility and cost considerations, environmental concerns tend to parallel engineering constraints. Sites or routes involving the most difficult terrain require more construction effort and disturb the environment more. Based on a series of desk studies and field investigations, each site was screened for these conditions. Thirteen of the sites were eliminated, leaving a short list of four sites - for further, more detailed evaluation.

The short-listed sites were evaluated in terms of engineering suitability, social acceptability, environmental acceptability, and relative costs

The Tanah Merah location provides several advantages, such as

(i) proximity to deep water, requiring a jetty of only 1,100 m in length;

(ii) a seabed relatively free of sand waves and areas of sedimentation,

minimizing dredging requirements;

(iii) a relatively narrow mangrove fringe;

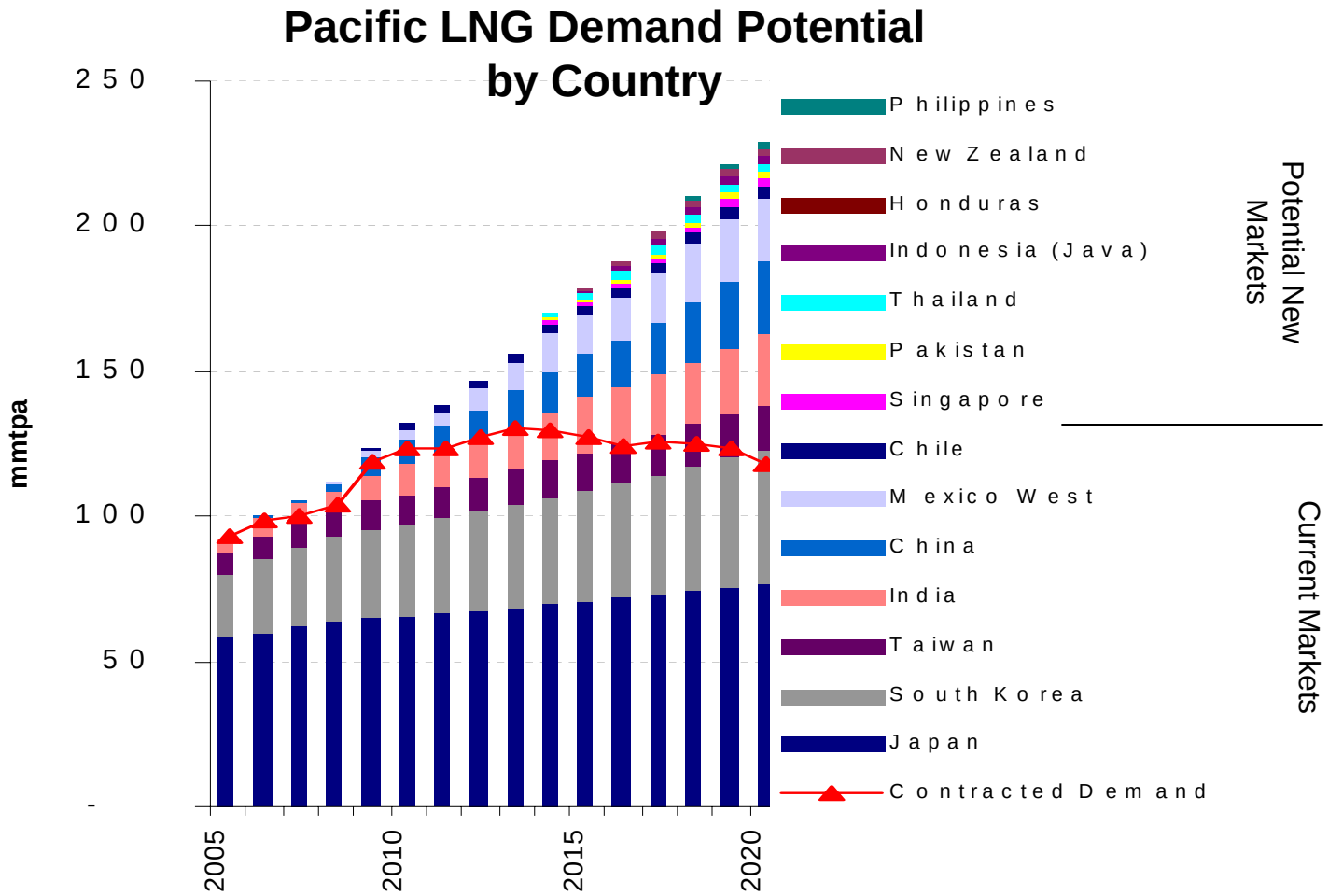
(iv) the presence of a shoreline bluff providing storm protection; and

(v) good ground foundation and drainage.

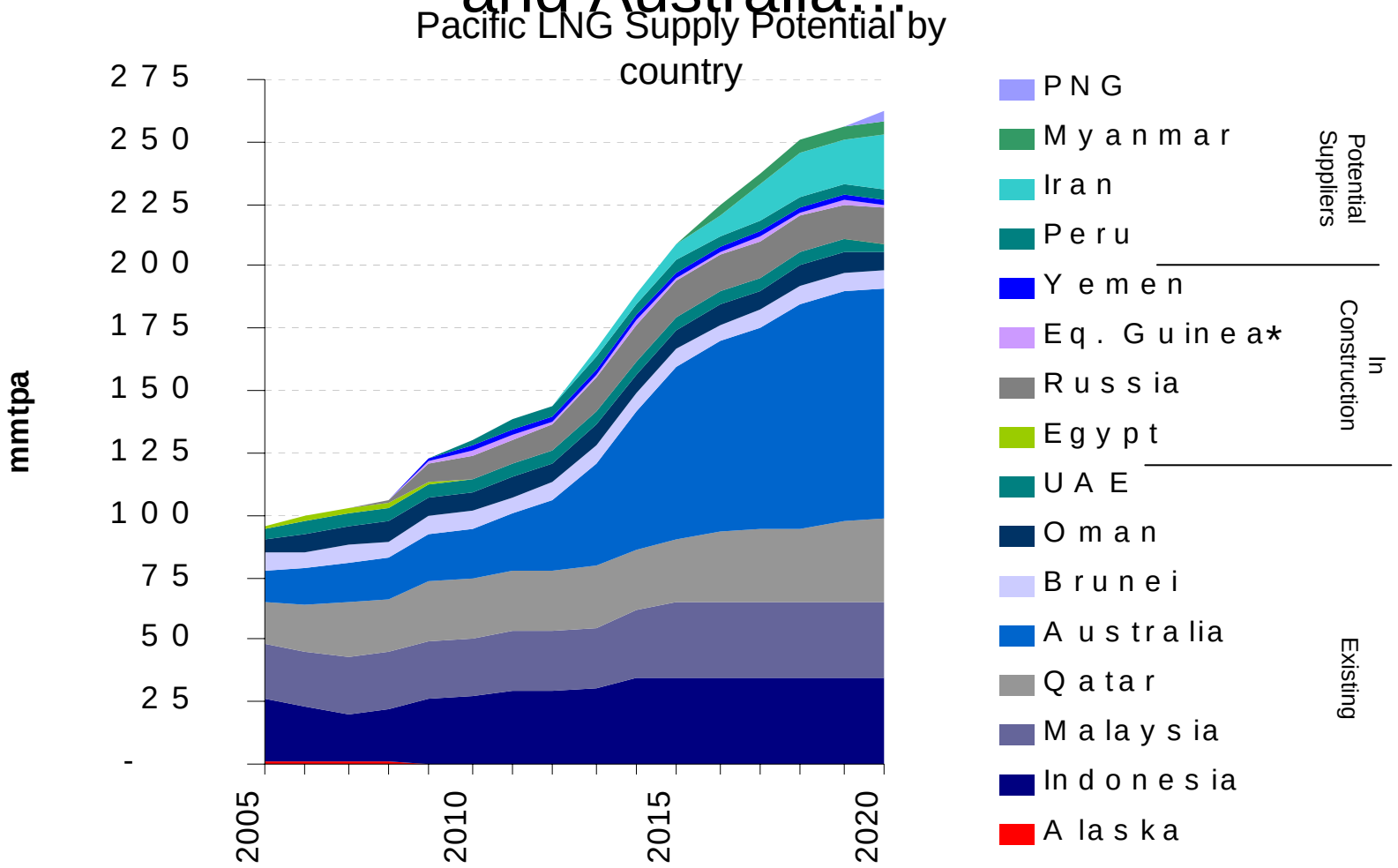
Regional Market Assessment for Potential Timor-Leste LNG

Report for the Timor Sea Office
March 2007

Demand in the Pacific Basin is currently dominated by Japan, South Korea and Taiwan. These traditional markets will grow modestly, however, China and India are likely to drive demand growth in the region more significantly.

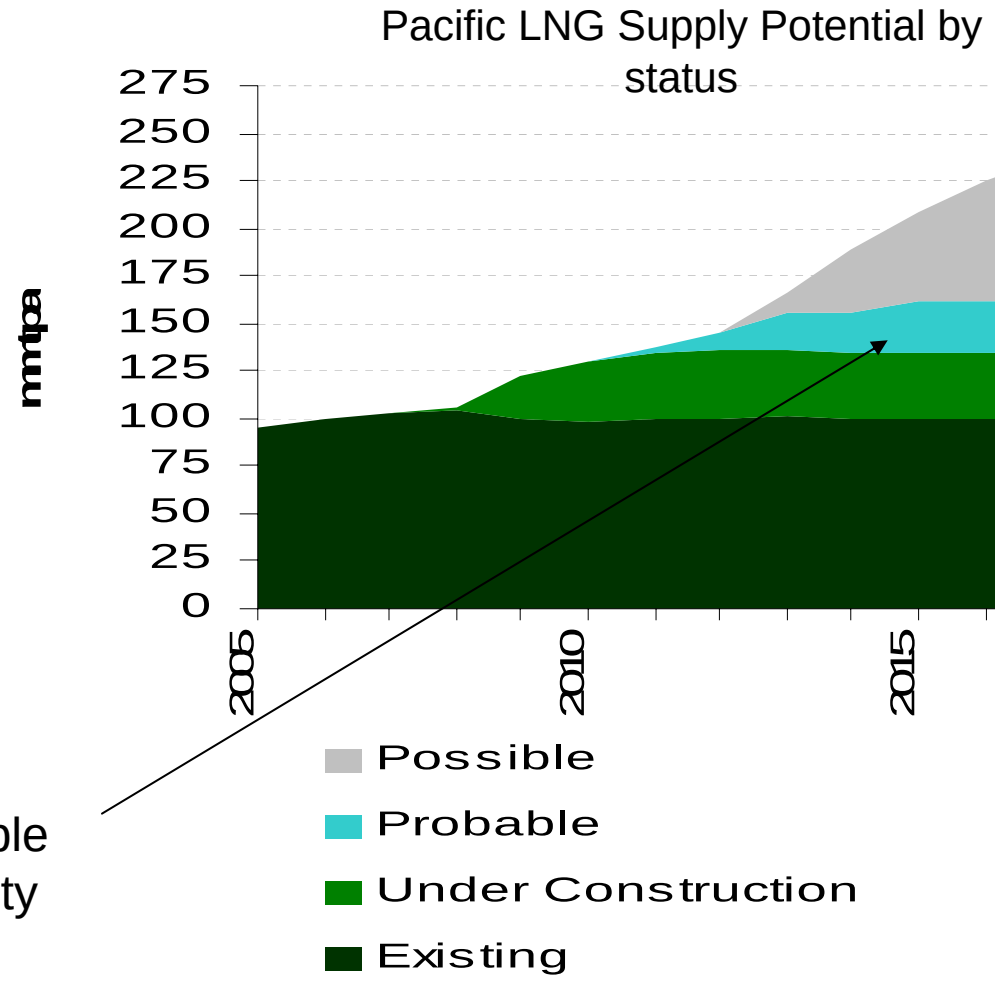


Around 80% of Pacific Basin LNG supplies currently come from Indonesia, Malaysia, Qatar and Australia…



* BG may choose to supply some volumes Atlantic volumes as part of portfolio to supply Chilean contracts

… and there is little upside for incremental LNG supply into the Pacific Basin in the medium term

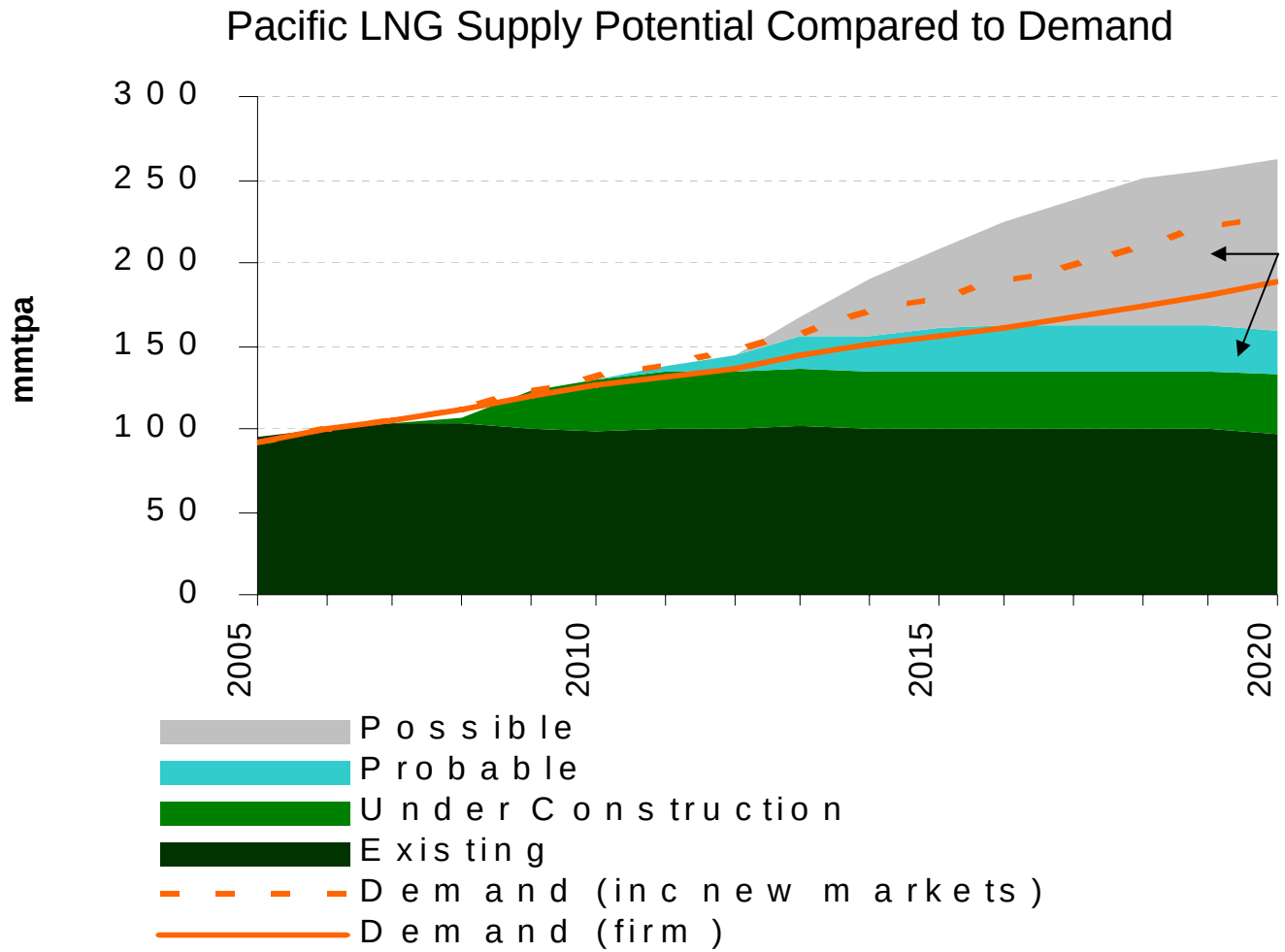


All probable capacity is in Australia

Not all probable and possible projects will be developed as currently planned

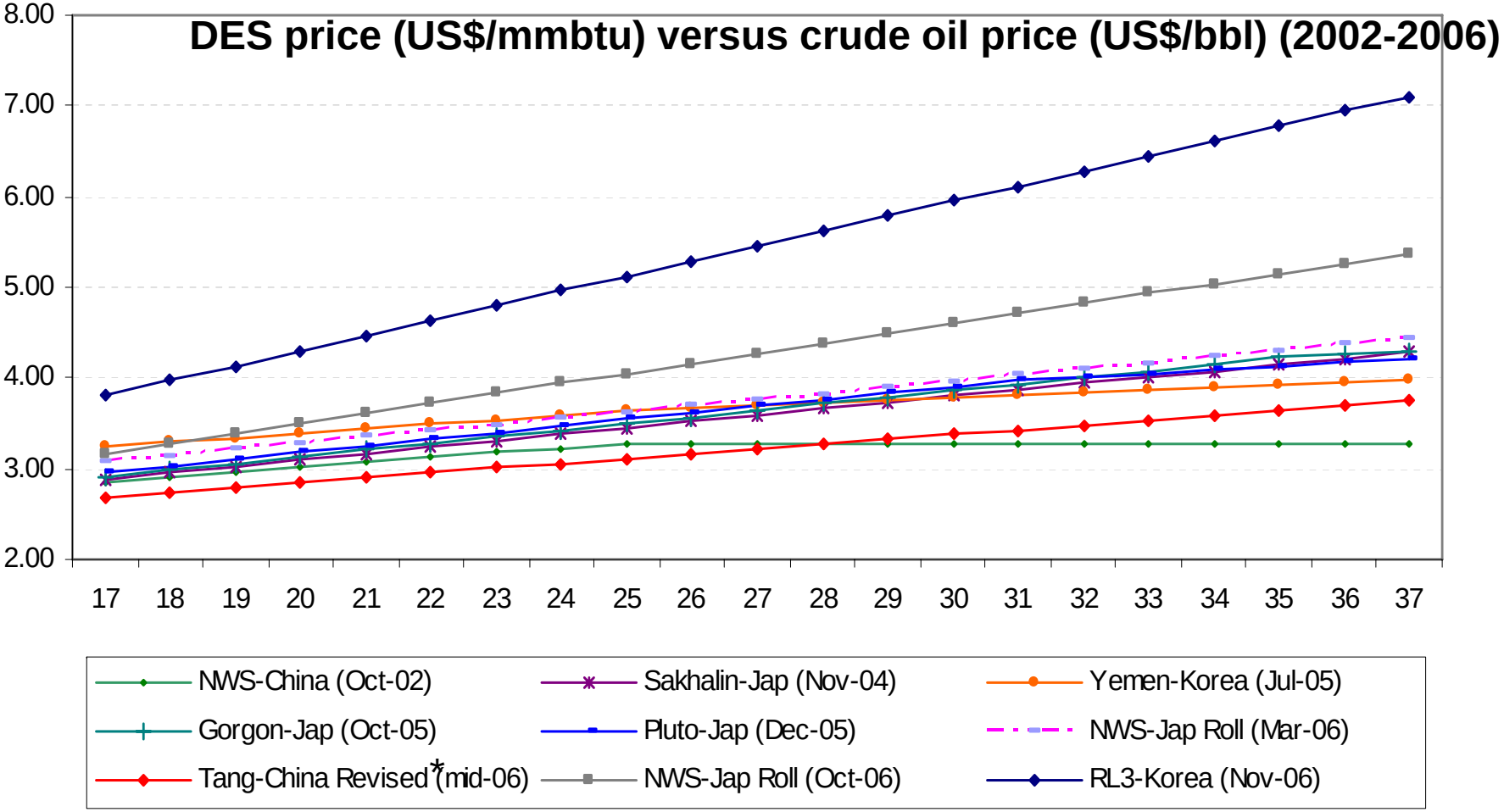
Possible expansions in Russia, Qatar, Indonesia, Malaysia or new supplies from Iran, Myanmar, & PNG

Demand in the Pacific Basin is constrained relative to supply out to at least 2013 and beyond



Not all possible and probable projects will be developed as currently planned

Rising oil prices have been driving Pacific Basin LNG prices upwards

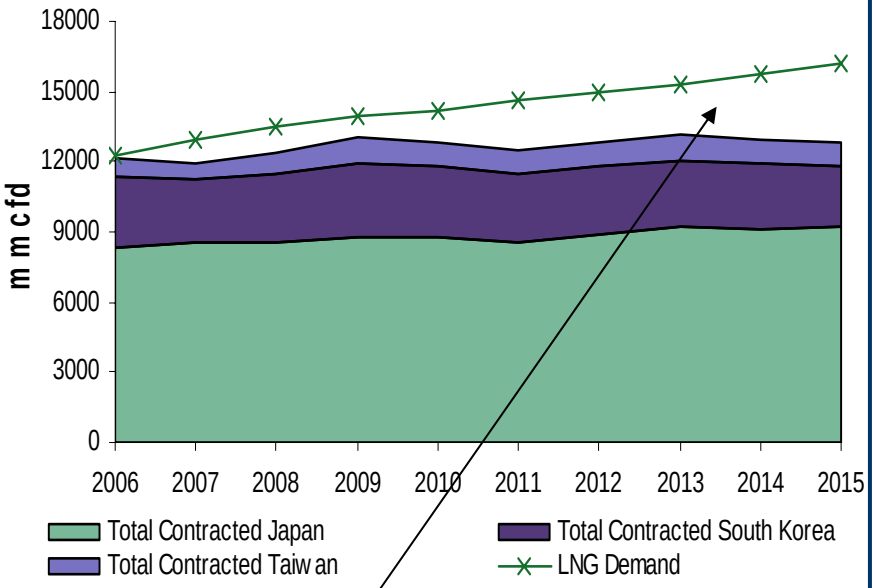


* Originally signed in Sep-02

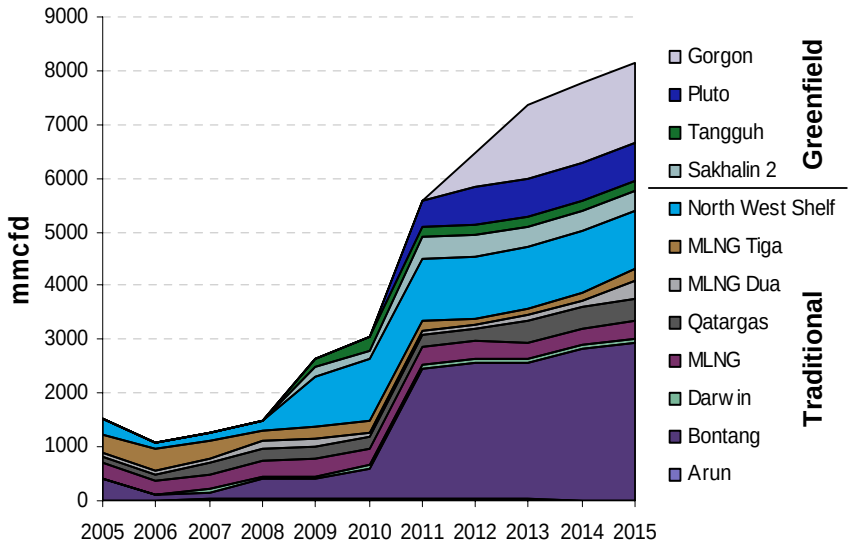
Source: Wood Mackenzie estimates

For traditional and new suppliers, there is an opportunity to fill the mid-term demand gap in North East Asia

North East Asia Supply-Demand Gap



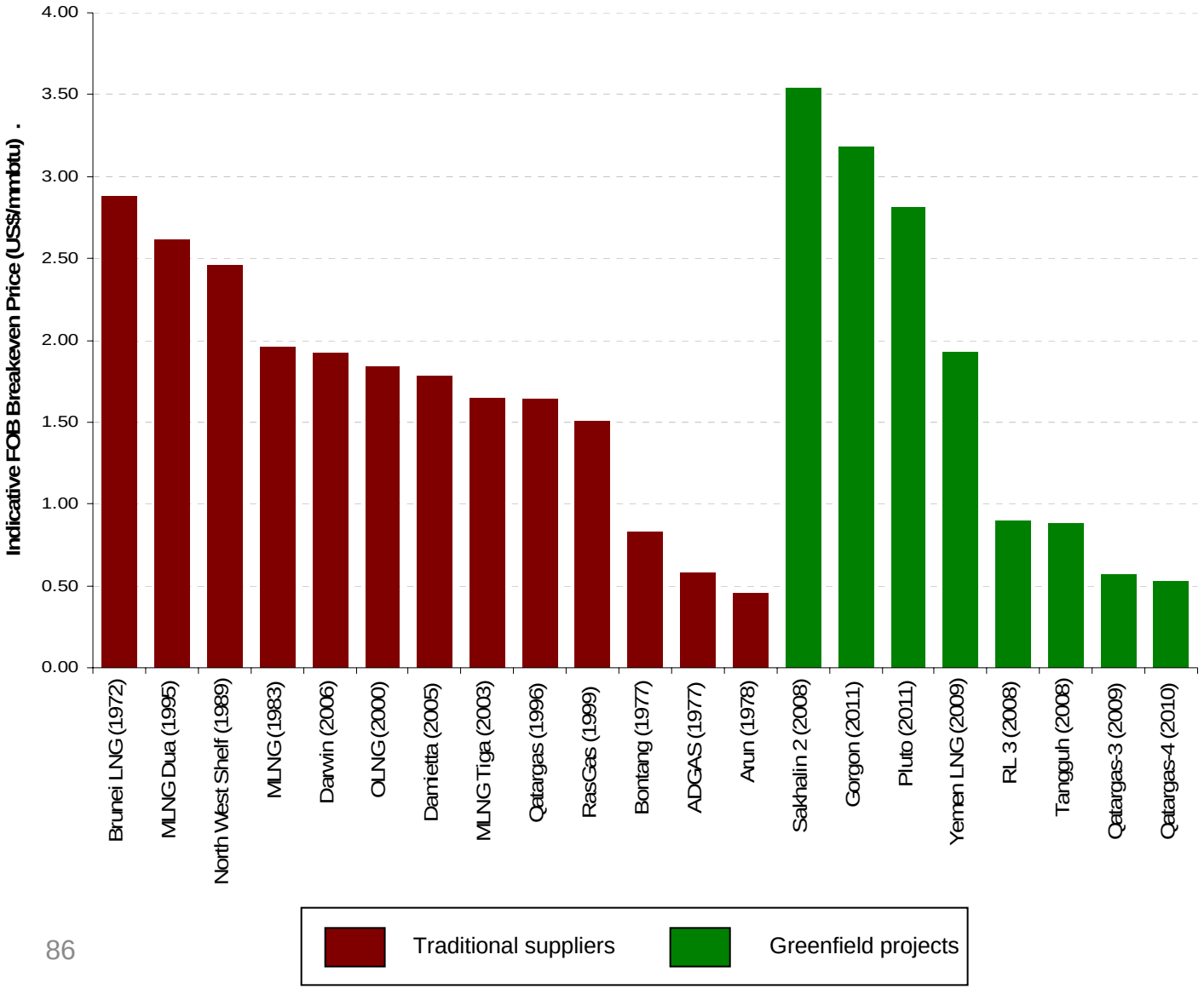
Uncontracted Supply from Pacific Basin LNG Project



- Opportunity for suppliers to meet demand of traditional Asia Pacific buyers (primarily South Korea and Taiwan).

- There is uncontracted supply in the market which could possibly fill the gap.
- However, potential delays in Greenfield projects or failure of existing projects to ensure reliability of supply (e.g. Bontang) is likely to depress actual uncontracted supply availability in the market.

Where Timor-Leste falls within the competitive cost spectrum will significantly influence its position as an attractive supplier.



Australia
Darwin, NW Shelf, Gorgon, Pluto

Brunei
Brunei LNG

Egypt
Damietta

Indonesia
Arun, Bontang, Tangguh

Malaysia
MLNG, MLNG Dua, MLNG Tiga

Oman
OLNG

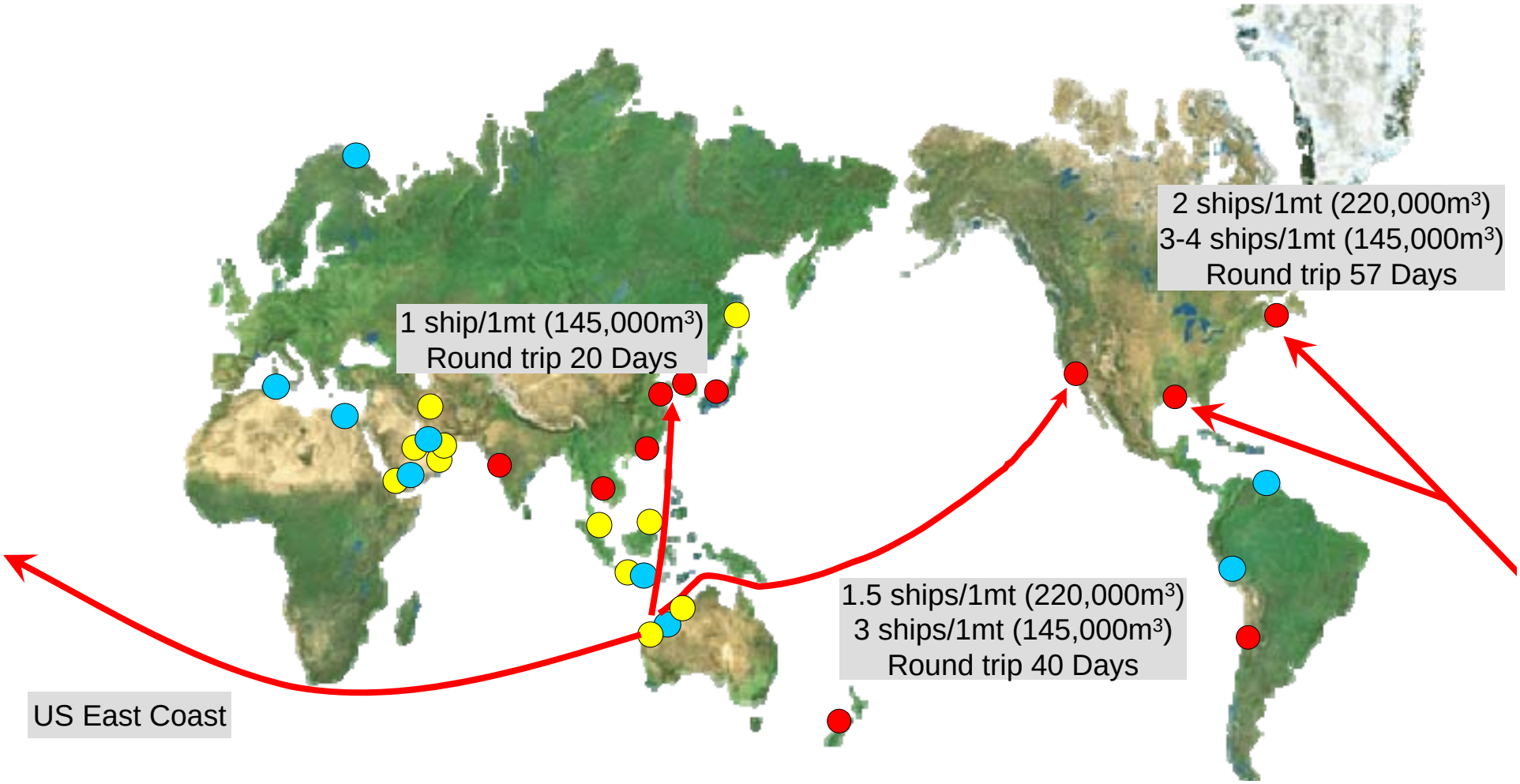
Qatar
Qatargas, Qatargas-3, Qatargas – 4, RasGas, RL3

Russia
Sakhalin 2

UAE
ADGAS

Yemen
Yemen LNG

LNG shipping



- Current or prospective LNG terminal locations
- LNG supply competition to Asia Pacific markets
- LNG supply competition to US markets

There are a number of critical success factors that Timor-Leste needs to fulfill to ensure successful entry into the LNG supply market

- Discovered and unallocated gas resources (satisfactory with Sunrise)
- Proximity to coast (satisfactory if trench issues can be overcome)
- Ability to control costs (strategies to modularize and import process components will aid)
- Liquids support (will enhance project economics)
- Gas quality (will impact and hopefully minimizes gas processing facility costs)
- Proximity to a major markets (Timor Leste will have lower transport cost to North East Asian markets than Australian or Middle East LNG supplies)
- Host country cooperation (Assistance with ports and infrastructure will aid)
- Geopolitical stability (a critical consideration for buyers)
- Limited local demand (adds confidence to longevity and availability of supplies)
- Partners/Shareholders experience
- Partner alignment

CORPORATE STRUCTURE

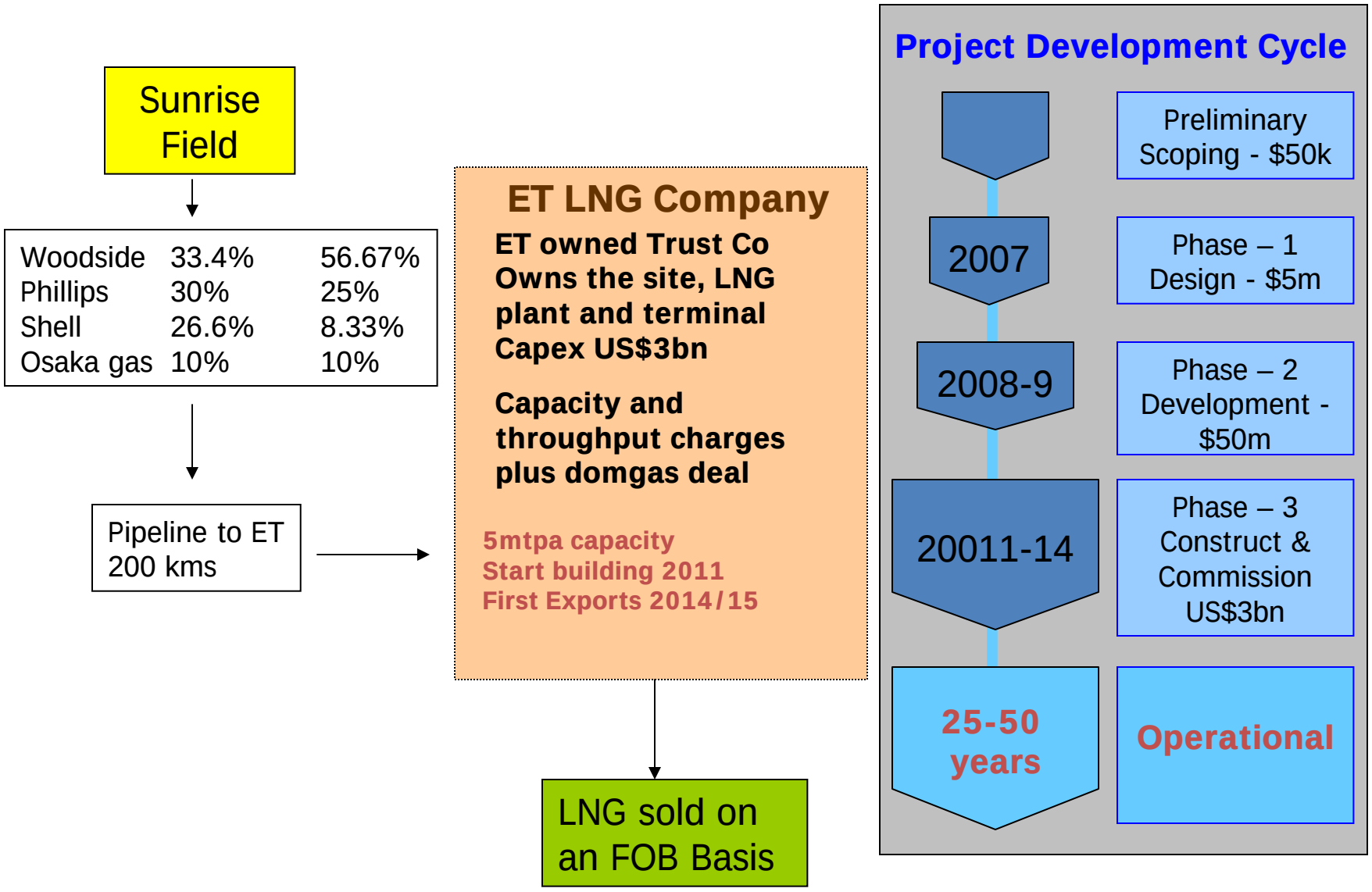
A common theme in most modern LNG plant projects is that a Special Purpose Company is set up with shareholders that include the major stakeholders.

These are more efficiently handled by the private sector, with the host State obtaining social and economic benefits indirectly

We suggest that a company, which could be called TimorLNG, be incorporated (not necessarily in Timor-Leste), with an exclusive mandate from the Government. This company could then enlist equity funding from new shareholders, including the Greater Sunrise partners, potential buyers, financial institutions as well as Timorese interests.

This process could be started immediately, with the intention to fund the next steps through the initial seed capital.

Conceptual Timor Leste LNG scheme



SUMMARY AND CONCLUSIONS

- Economics
- Greater Sunrise Development Options
- Next Steps

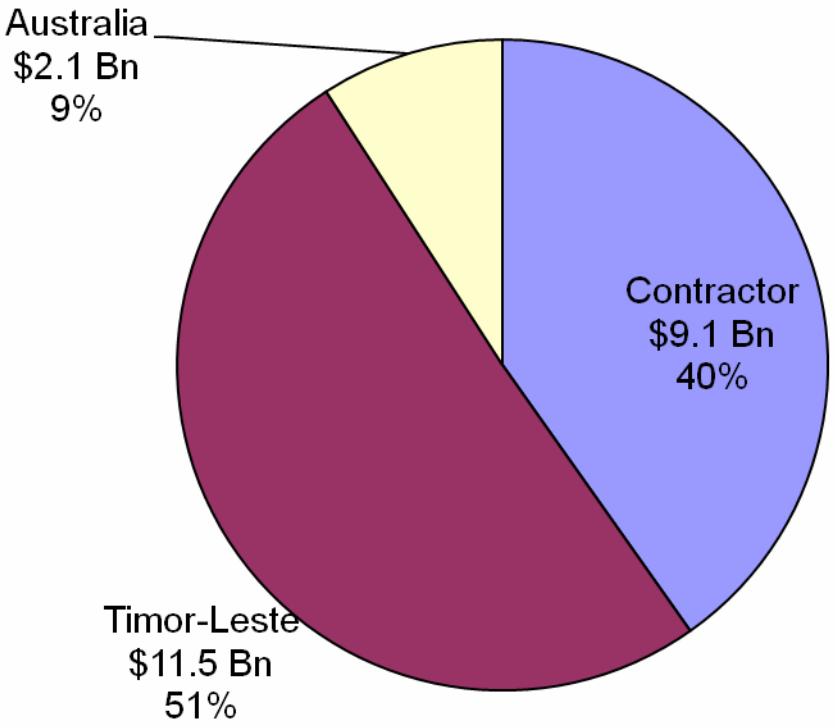
Economics

- Review of economic rent
- Slide of Bayu-Undan
- Slide of fiscal terms
- CMATS
- Slide of revenue from zBayu-Undan

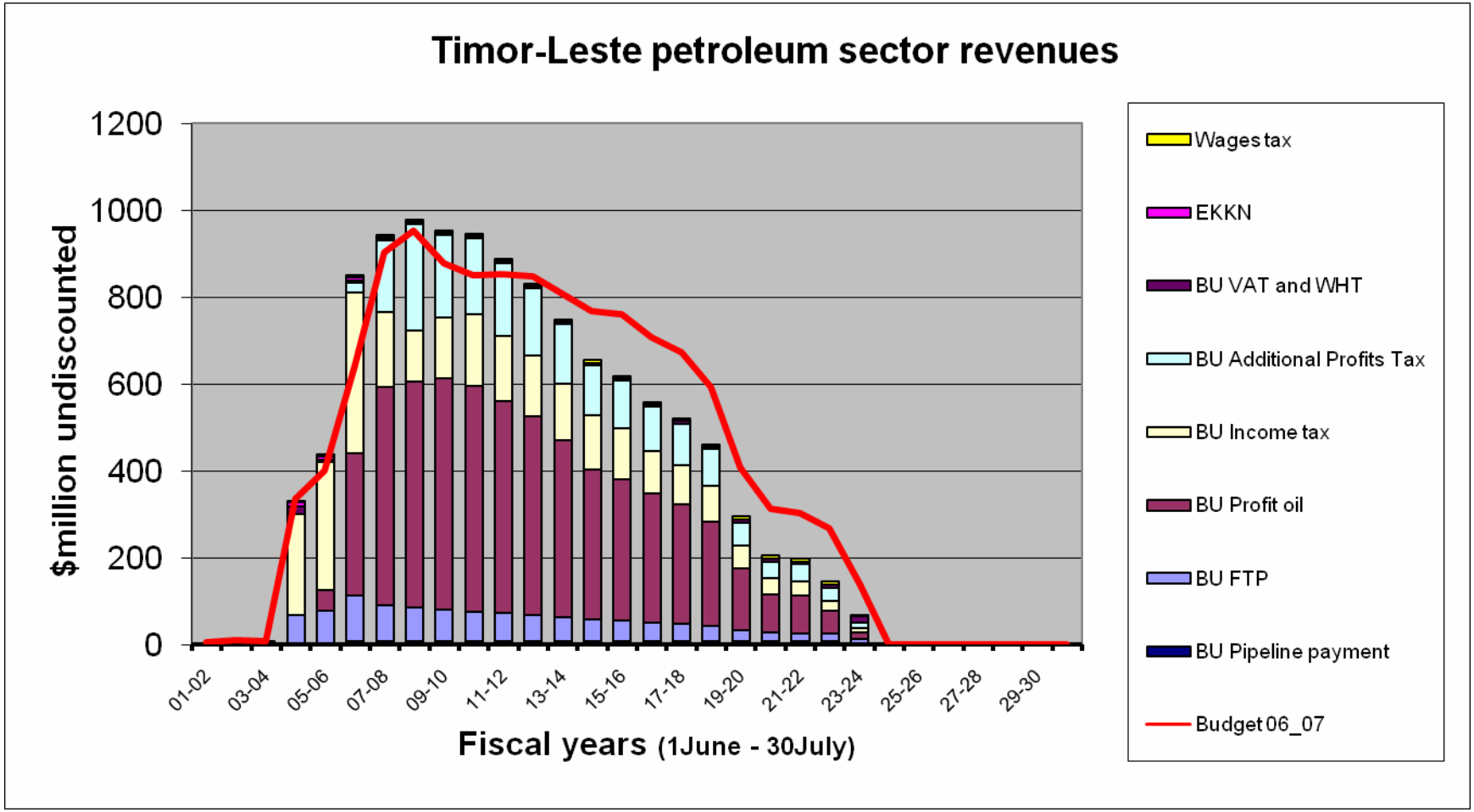
LNG Value Chain

EXPLORATION & PRODUCTION	LIQUEFACTION	SHIPPING	REGASIFICATION & STORAGE

Bayu-Undan share of total project $Billion



Source: Alistair Watson, March 2007.
These are undiscounted figures


Timor-Leste petroleum sector revenues
$million undiscounted
1200
1000
800
600
400
200
0
01-02
03-04
05-06
07-08
09-10
11-12
13-14
15-16
17-18
19-20
21-22
23-24
25-26
27-28
29-30
Fiscal years (1June - 30July)
Wages tax
EKKN
BU VAT and WHT
BU Additional Profits Tax
BU Income tax
BU Profit oil
BU FTP
BU Pipeline payment
Budget 06_07

Sunrise fiscal arrangement

JPDA 20.1%

Gas valuation - IUA

- Fixed downstream pre tax return
- 10.5% if pipeline/LNG; 14% if FLNG

PSC
Annex F - ZOCA

- FTP 10-20%
- Profit oil 50-70%
- Profit Gas 50%
- Inv.Credit 127%

T.L. PSC "A"

Australia PSC "B"

Contractor income tax

90% T.L. JPDA Tax "C"

- Indonesia 1999
- 30% tax;15% BPT = 40.5%

10% Australia JPDA tax "D"

Flat 30%

Non-JPDA 79.9%

Gas valuation - ATO rules

- downstream share of revenue?

Upstream Australian tax rules

- Petroleum Resource Rent Tax 40%
- Income tax 30%
- Combined rate 58%

Australian Tax "E"

CMATS

- Total government revenue from upstream = **A** + **B** + **C** +**D** + **E**
- Each government to end up with 50% of total
- Each quarter, Australia pays Timor 50% of total minus **A** + **C** already received

Example – using 07/08 budget oil prices

PSC	T.L. PSC "A"	$ 3.1 Bn
	Australia PSC "B"	$ 0.4 Bn
Contractor income tax	T.L. JPDA Tax "C"	$ 1.5 Bn
	Australia JPDA tax "D"	$ 0.1 Bn
	Australian PRRT + Income Tax "E"	$ 16.9 Bn

Revenue collected

T.L. 4.6

Australia 17.4

Total 22.0

+ Downstream ~2bn tax

CMATS

- Total government revenue from upstream
  = **A 3.1** + **B 0.4** + **C 1.5** + **D 0.1**
  + **E 16.9 =** 22.0 bn **(**undiscounted)
- Australia pays T.L. 11.0 – 4.6 = 6.3
- T.L. ends up with 4.6 + 6.3 = 11.0
- Australia ends up with 17.4 – 6.3 = 11.0

T.L 11.0 Bn
= Petroleum Wealth of 4.8 Bn (NPV4.7%)

= Sustainable Income of 147mm (3% x P.W)

Greater Sunrise Development Options

- Pipeline
  - To Darwin LNG
  - To Timor-Leste LNG and domgas
- Offshore
  - LNG
    - Floating
    - Gravity-based structure
  - CNG
- Delay and wait for further discoveries to enhance the economics

Greater Sunrise Development Options

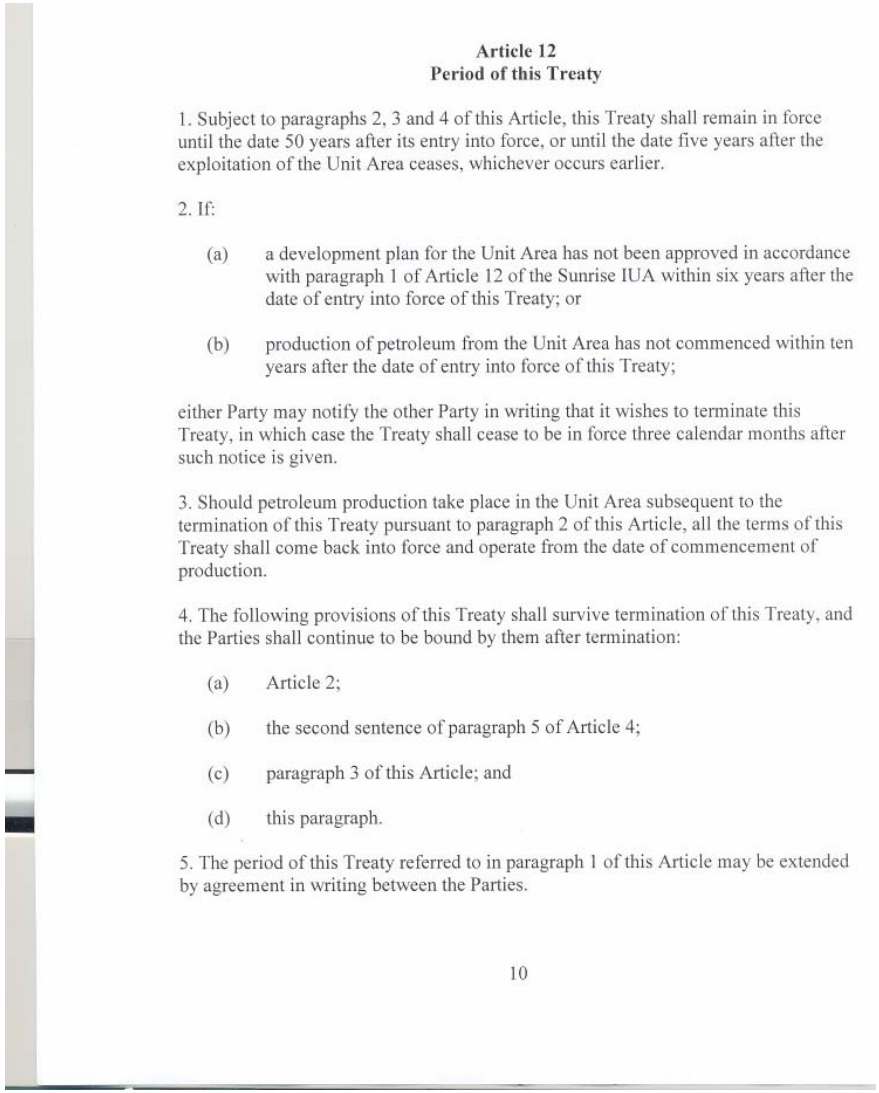
- Pipeline
  - To Darwin LNG – easiest option
  - To Timor-Leste LNG and domgas – T-L needs to devote resources now!
- Offshore
  - LNG
    - Floating – technology issue
    - Gravity-based structure – location?
  - CNG
- Delay and wait for further discoveries to enhance the economics – how will this effect CMATS Treaty?


CNG
TRANS OCEAN GAS

Major Risks

	Risk	Mitigation
Operational	Completion	Experienced contractors
	Natural gas price volatility	Some hedging in tariff structure
Sovereign	Currency	USD denominated
	Expropriation	Multilateral involvement
Financial	Cost of debt	Involvement of substantive stakeholders

Risk of delay



Article 12
Period of this Treaty

1. Subject to paragraphs 2, 3 and 4 of this Article, this Treaty shall remain in force until the date 50 years after its entry into force, or until the date five years after the exploitation of the Unit Area ceases, whichever occurs earlier.

2. If:

(a) a development plan for the Unit Area has not been approved in accordance with paragraph 1 of Article 12 of the Sunrise IUA within six years after the date of entry into force of this Treaty; or

(b) production of petroleum from the Unit Area has not commenced within ten years after the date of entry into force of this Treaty;

either Party may notify the other Party in writing that it wishes to terminate this Treaty, in which case the Treaty shall cease to be in force three calendar months after such notice is given.

3. Should petroleum production take place in the Unit Area subsequent to the termination of this Treaty pursuant to paragraph 2 of this Article, all the terms of this Treaty shall come back into force and operate from the date of commencement of production.

4. The following provisions of this Treaty shall survive termination of this Treaty, and the Parties shall continue to be bound by them after termination:

(a) Article 2;

(b) the second sentence of paragraph 5 of Article 4;

(c) paragraph 3 of this Article; and

(d) this paragraph.

5. The period of this Treaty referred to in paragraph 1 of this Article may be extended by agreement in writing between the Parties.

Conclusions and “Next Steps”

- Articulate a mission for Timor-Leste to become energy self-sufficient
  - Accelerate onshore oil and gas development
  - Develop Greater Sunrise gas market and pipeline to Timor-Leste
- Put together a devoted implementation team immediately with appropriate authority and responsibility

The next steps - Costs and Funding

1. Site surveys leading to selection of a suitable site for an LNG Plant
2. Survey of possible pipeline routes from Greater Sunrise Field to the LNG plant. This survey should cover direct and near-direct routes, and cover both water depth surveys and seabed surveys.

When the surveys are complete, then 2 Engineering Studies need to be made.

1. A study of the LNG Plant based on actual site information leading to improved cost estimates.
2. A study of the alternative pipeline configurations, leading to selection of the lowest cost / lowest risk option which would be competitive with alternative pipeline options (to Australia).

An Environmental Impact Assessment and baseline study needs to be instituted

In addition it is desirable to have 2 further studies made as input to the decision making Process of the Woodside Partners:

1. A study of the socio-economic benefits which would accrue to RDTL from having an LNG Plant established in Timor-Leste (Multiplier effects)
2. A Study of the Market potential for RDTL LNG in the Asia-Pacific region – to quantify any price consequences for Timor-Leste LNG supplies (country risk, Customer requirements etc. (initial studies by Wood Mackenzie indicate that RDTL has a favourable market position at this time)

It is estimated that the costs of the above work could be:

1.	LNG Plant site survey	$ 0.5 million	
2.	Pipeline route surveys	$ 1.5 million	
3.	Eng. study for LNG Plant	$ 2.0 million	
4.	Eng Studies for pipeline	$ 1.0 million	
5.	Socio – economic review	$ 0.5 million	
6.	EIA		$1.0 million
7.	LNG market survey		$ 0.2 milli**on**
	TOTAL	**$6.7million**	

The work needs to be completed within about 15 months if it is to meet the timetable of the Woodside partners for “Concept Selection” decisions prior to moving forward to “Front-end Engineering (FEED) studies.

This LNG site was a swamp in Kalimantan 30 years ago