

OIL AND GAS EXPLORATIONS: IMPLICATIONS TO TIMOR-LESTE

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Expectations

- Basic understanding of geological setting of Timor-Leste that leads to the potentiality in petroleum.
- The exploration history (onshore and offshore)
- Prospective areas
- Current development of oil and gas in Timor-Leste (Timor Sea)
- Initial processes leading to the development (negotiations and Timor Sea Treaty)
- Where are the oil and gas fields? what are the reserves?
- How much reserve belongs to Timor-Leste (two different scenarios)?
- Who are the parties involved?
- What are the implications to Timor-Leste

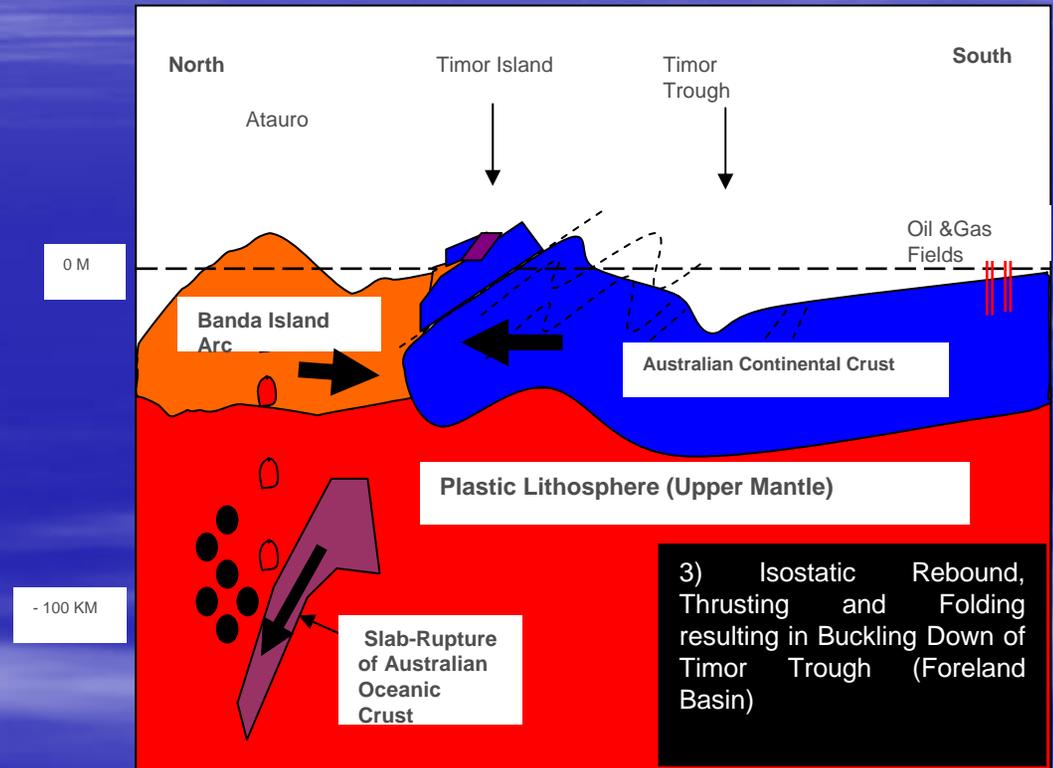
Structure of Presentation

- **Part 1 : Oil/gas explorations**
 - Geology and Petroleum Potential
 - Exploration History (onshore & offshore)
 - Prospective Areas (onshore & offshore)

- **Part 2: Current oil/gas developments and implications**
 - Timor Sea Negotiations (History of Negotiations)
 - Current Status of Negotiations
 - Timor Sea Oil/Gas Developments (Timor Sea Treaty and Production Sharing Arrangements /PSCs)
 - Timor Sea Oil and Gas Fields
 - Timor-Leste's Petroleum Reserves (two different scenarios)
 - Potential Revenues (two different scenarios)
 - Implications

Geology

- Fold-Thrust Belt island
- Large anticline structures, e.g. Aitutu, Cribas, Bazol
- Subsurface structure, Triangle zones
- Source Rocks, reservoir Rocks and traps



Earth Structure

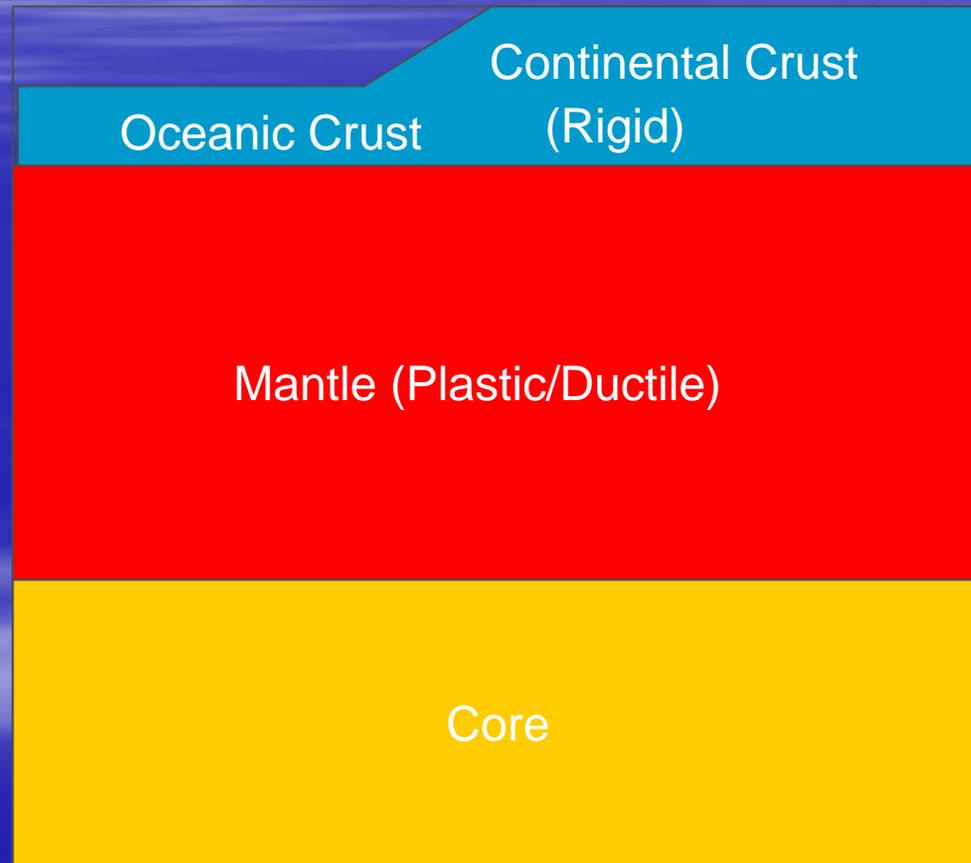
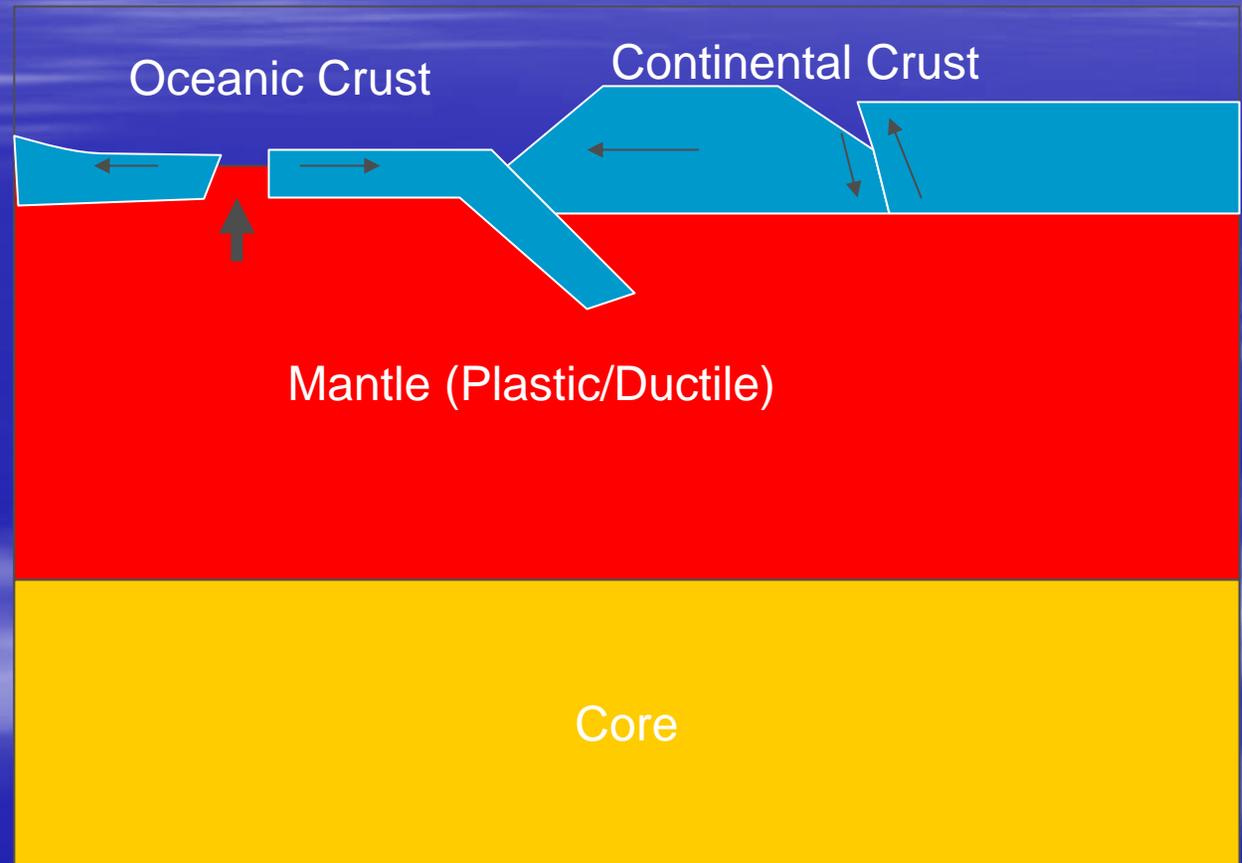


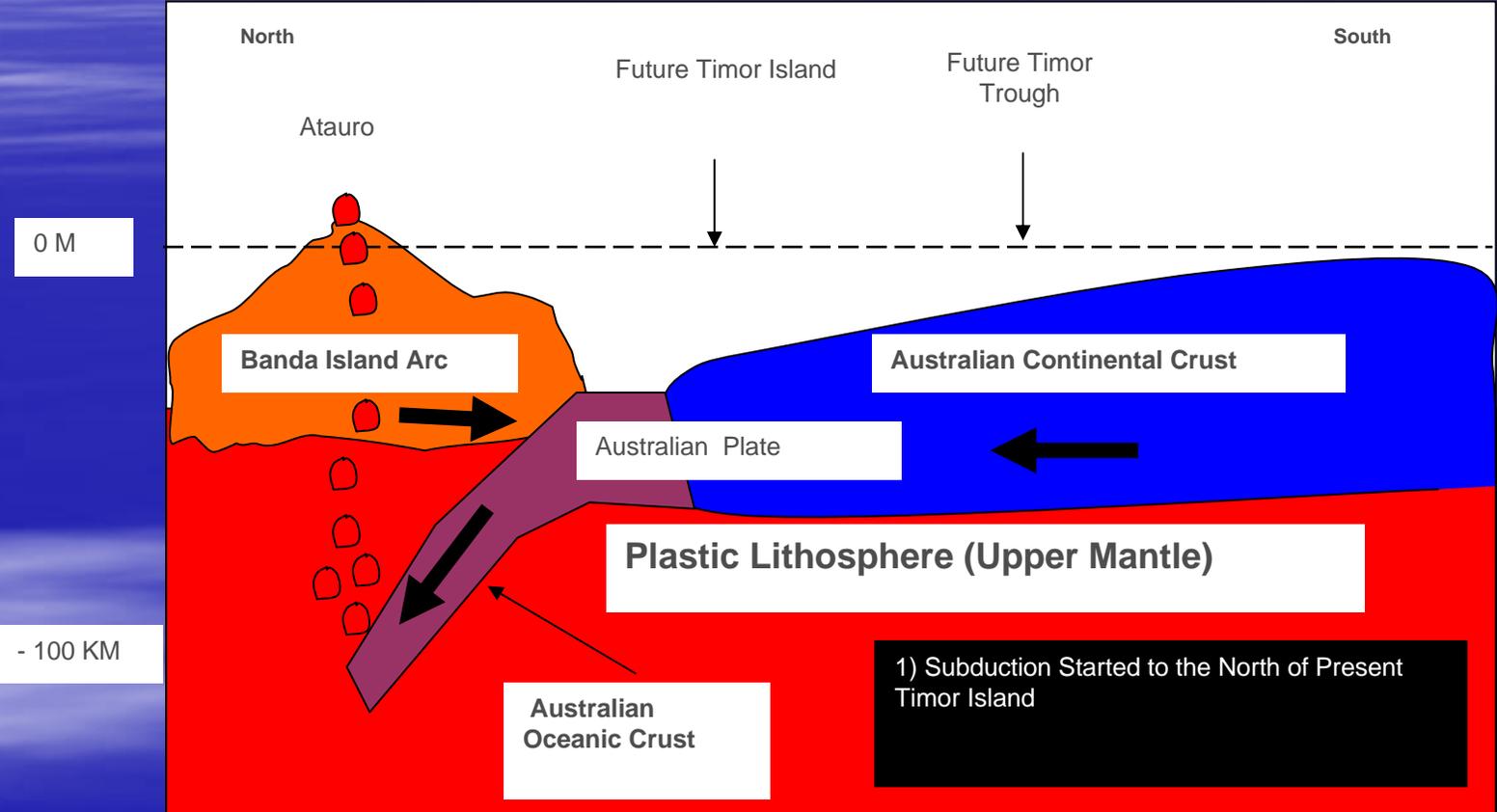
Plate Movements

The Crust Moving:

- Divergent – Oceanic Ridges, eg. Mid Atlantic Ridge
- Convergent, Collision and Subduction, e.g. Java Trench, Himalaya Collision, Timor-Banda Collision
- Transform Slip-Strike Slip Movement, e.g. San Andreas Fault, Alpine Fault



Subduction



0 M

North

South

Atauro

Future Timor Island

Future Timor Trough

Banda Island Arc

Australian Continental Crust

Australian Plate

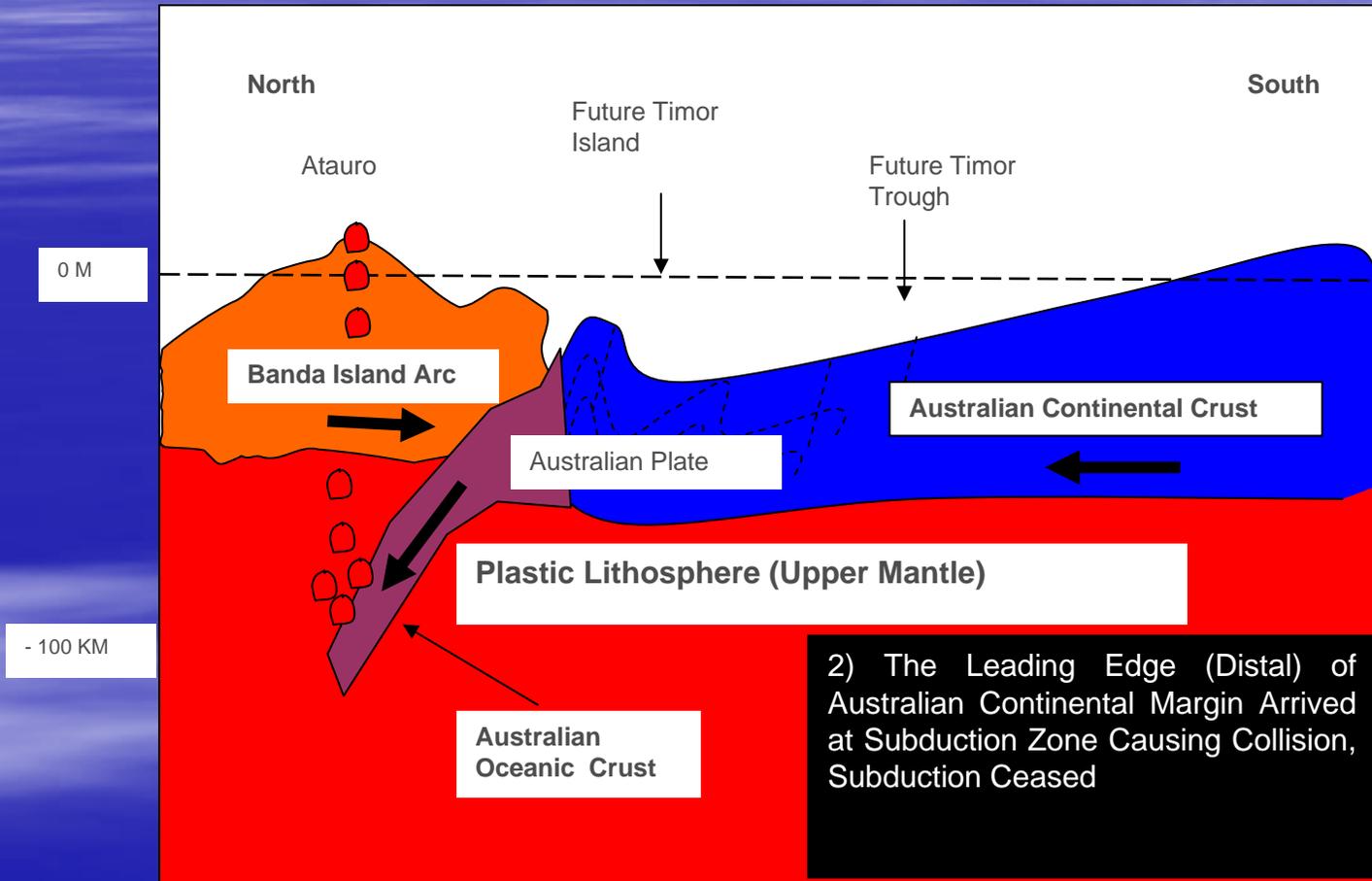
Plastic Lithosphere (Upper Mantle)

- 100 KM

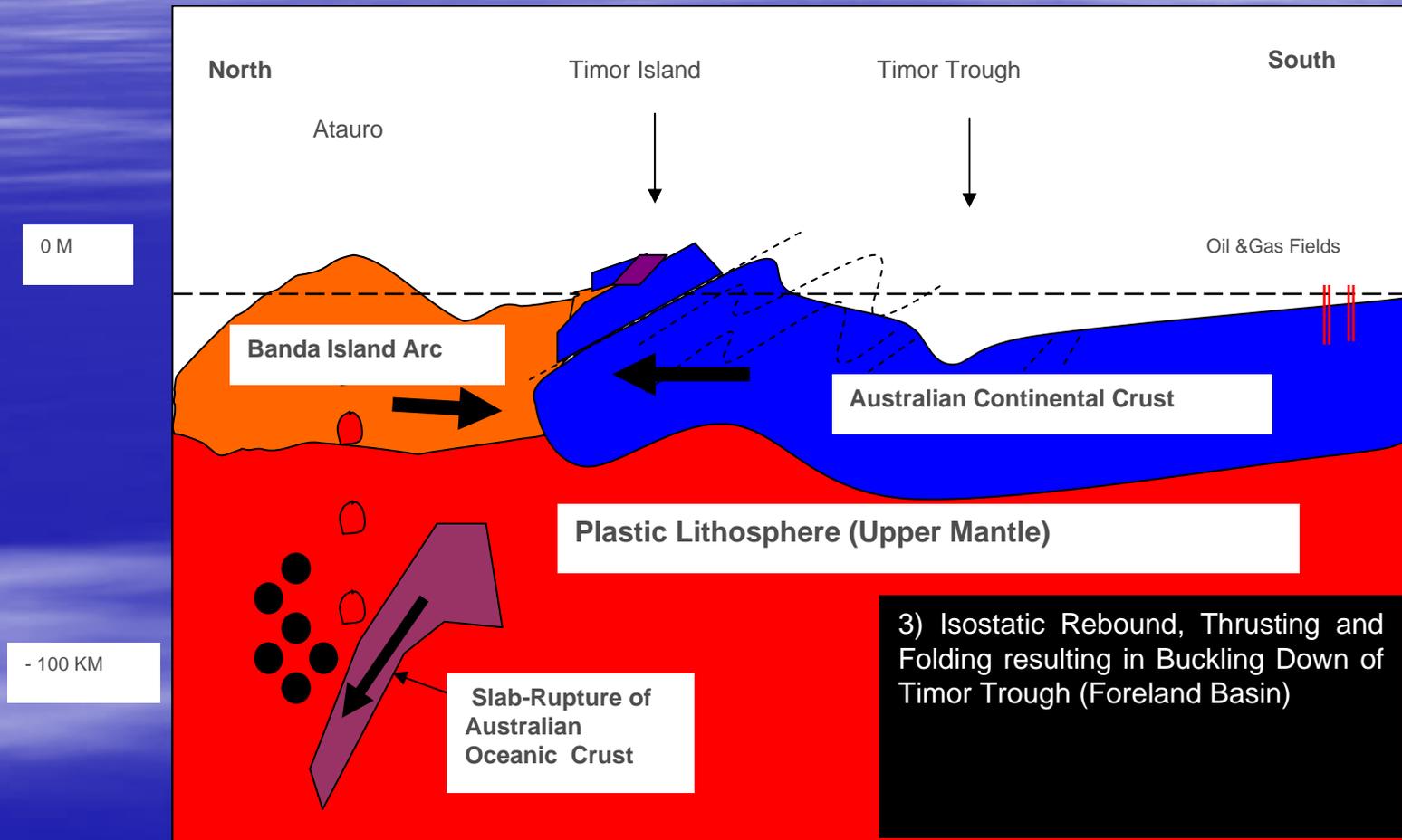
Australian Oceanic Crust

1) Subduction Started to the North of Present Timor Island

Collision



Uplifted Timor Island and Down Buckling of Timor Trough



Exploration History

■ Onshore

- 1910s with Aliambata well, Pualaca, Ranuc, etc
- During Indonesian Occupation very little

■ Offshore

- 1960s – BOCAL
- Suspended from 1975 till 1992
- Elang-1 discovery in ZOCA in Feb 1994
- Kakatua and Laminaria in 1994

Prospective Areas

■ Onshore

- Along southern coastal areas, near the oil and gas seeps
- Large domes such as Betano, Baucau, and Lospalos

■ Offshore

- Not in the north coast
- Southern offshore area, e.g, south of the Timor Trough, the JPDA, and north of the Timor Trough

PART 2
CURRENT PETROLEUM
DEVELOPMENT
AND IMPLICATIONS TO TIMOR-
LESTE

Timor Sea Negotiations

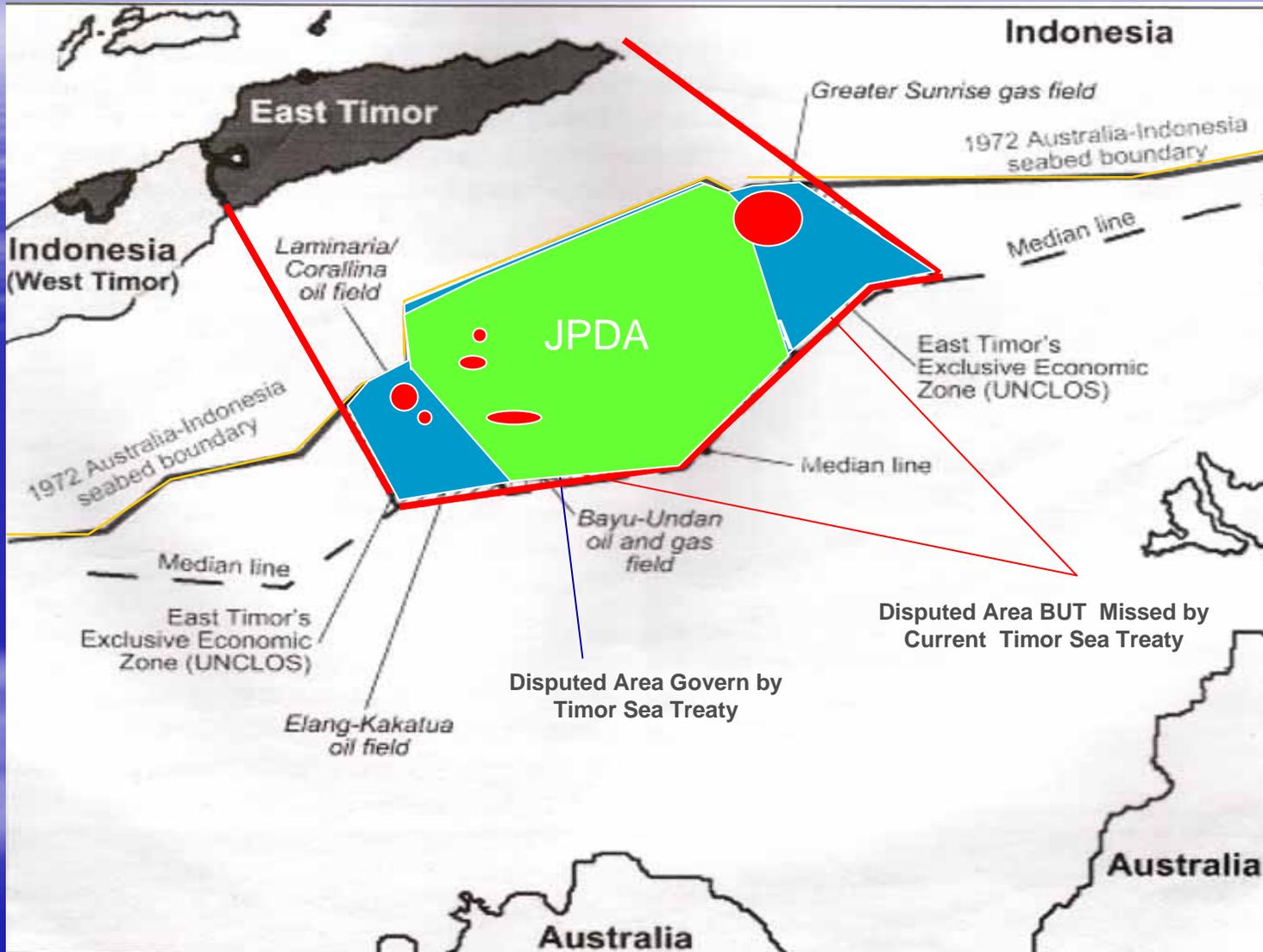
1. History of Negotiation

- Delicate, time consuming, and intricate processes
- Australia-Indonesia agreed 1972 boundary, based on Australian Natural Prolongation of Continental Shelf – Not valid in the light of Geological History of Timor
- Portugal refused to negotiate – Timor Gap
- 1978, changes in political authorities in TL
- Australia wanted Indonesia to joint the 1972 points
- Indonesia refused based on new laws-midline solution
- SO, ZOC was formed. However, the lateral boundaries of ZOC was probably mistakenly or “intentionally mistakenly” drawn

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- The treaty for this cooperation signed in 1989- Timor Gap Treaty
- Recent Independence of Timor-Leste in 1999, UNTAET on behalf of Gov. Timor-Leste negotiated with Australia to continue the terms of Timor Gap
- In late 2000, negotiation on the agreement to replace the interim arrangement began
- On July 2001, ETTA signed MoU to adopt an agreement as Timor Sea Arrangement
- This Arrangement established JPDA and changed the shares to 90:10 in favor of Timor-Leste
- Under TSA, the Greater Sunrise is 20% JPDA and 80% outside
- Timor-Leste argued that it may own the field under International law
- Australia in 2002, withdrew from ICJ and ITLOS
- 20th May 2002, Timor-Leste gov. signed the treaty, the Timor Sea Treaty, effectively adopted the TSA.

Joint Petroleum Development Area



Current Negotiations

- Timor-Leste Proposed Monthly meeting
- Australia agreed twice a year – on resource limitation

- Timor-Leste position is:
 - Timor-Leste Inherited NO boundary
 - Settle maritime boundary gives Certainty
 - Timor-Leste seeks No more under UNCLOS
 - Timor-Leste Needs Oil/Gas more than Australia

- Australia is dragging the Process
 - Next Neg. in Dili, 19-22 April

Developments

- Timor Sea Treaty establishes Designated Authority(DA), Joint Commissioners(JC) and Ministerial Council (MC)
- Important documents are PSCs (Production Sharing Contracts)
- This governs, the shares of petroleum between DA and the Companies, and right and obligations
- Methods of Sharing:
 - First Trench Petroleum (FTP)
 - Recovery Costs
 - And Profit Petroleum

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- **First Trench Petroleum (FTP)**

FTP amounts to 10% of petroleum production during the first five years of the production from PSC area and thereafter increases to 20% for the life of the PSC. The arrangement is such:

- A. **For crude oil and condensate** production up to 50,000 barrels per day, the FTP is share in the ratio 50:50 between Joint Authority/now Designated Authority (Contracting States) and the PSC contractors (the Companies). For the next 100,000 barrel per day of production the ratio of share is 60:40 between Joint Authority/ now Designated Authority and the PSC contractors, and for production above 150,000 barrels per day the respective sharing ratio is 70:30.
- B. **For natural gas** the FTP is share in a fixed ratio that is 50:50 between Joint Authority (now Designated Authority) and the PSC contractors.

- **Cost Recovery**

Cost recovery provisions provide an allowance to the contractors to enable the recovery of actual operational costs incurred plus reasonable return on investment, as much as 227% of the value the initial investment. The operational costs are defined to include all exploration costs, costs for day-to-day operations in the PSC area, and office administration costs. **Timor-Leste will have to pay with its petroleum reserve as much as 90%.**

- **Profit Petroleum**

This is a sharing of the balance of petroleum production (after FTP and cost recovery provisions). The split of this residual production is based on the same sharing arrangement between the Designated Authority and the PSC contractors as apply to the allocation of the FTP.

Example

If in the first year an oil field produces 100,000 barrels of oil per day,
How much petroleum share (FTP) Timor Leste entitle to every day?

- - Because FTP for the first 5 years is 10% of the production rate, so it becomes 10,000 bbls/day.
- - Because the production is between 50,000 to 150,000 barrels, the split between Contractors (companies) and Designated Authority (Timor-Leste and Australia) is 40%:60% respectively, so Designated Authority's take is 6,000 bbls/day.
- - Because Timor-Leste has 90% split in the Designated Authority, Timor-Leste's take of FTP is 5,400 bbls/day
- The rest 90,000 bbls/day goes for recovering the investments of the companies (recovery cost).

Timor Sea Oil/Gas Fields

- Locations
- Operators
- Estimated reserve
- Timor-Leste's reserve under current Timor Sea Treaty
- Timor-Leste's reserve under midline UNCLOS
- Development status

Fields Wholly in JPDA

1. Elang-Kakatua Kakatua North

- Estimated reserve : 27 million barrels (mmbbls) of oil
- Under current Timor Sea Treaty, Timor-Leste's reserve is 3 mmbbls of oil (worth 60 Million US \$ before companies' share and investments) (TST in act when the field depleted already)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 27 million barrels
- Status: on production- almost finish
- Operator : Conoco-Phillips

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2. Bayu-Undan

- The estimated reserve is 3.4 Trillion Cubic Feet (TCF) of gas and 440 million barrels (mmbbls) of condensate
- Under current Timor Sea Treaty Timor-Leste's reserve is 3.06 TCF of gas, and 396 mmbbls of condensate (**worth 14 Billion US \$ before companies' share and investments**)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 3.4 Trillion Cubic Feet (TCF) of gas and 440 million barrels (mmbbls) of condensate
- Status: started to produce condensate and LPGs
- Operator: Conoco-Phillips (JVs: Eni/Agip, Santos Australia, Inpex Japan & Tokyo Gas)
- Pipelines and LNG-plant to Darwin

Continue....

3. Jahal-Kuda Tasi

- The estimated reserve is 25.4 mmbbls of oil
- Under current Timor Sea Treaty Timor-Leste's reserve is 22.8 mmbbls of oil (worth 684 Million US \$ before companies' share and investments)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 25.4 mmbbls of oil
- Status: suspended-to decide the storage facility
- Operator: Woodside Australia (JVs: Inpex Japan & Santos Australia)

Fields Outside or Partly Within the JPDA but subject to maritime boundary claims

1. Greater Sunrise

- The estimated reserve is 7.6 TCF of gas and 300 mmbbls of condensate
- 20,1% within JPDA, 79,9% is in Australian-claimed water
- Under current Timor Sea Treaty Timor-Leste's reserve is 1.4 TCF of gas and 59.4 mmbbls of condensate (worth 4 Billion US Dollar before companies' share and investments)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 7.6 TCF of gas and 300 mmbbls of condensate
- Status: suspended-yet to decide the development plan
- Operator: Woodside Australia (JVs: Shell, Conoco-Phillips, Osaka Gas)

Continue....

2. Laminaria-Carolina

- The estimated reserve is 178 mmbbls of oil (**worth 5.35 Billion US \$ before companies' share and investments**)
- Under current Timor Sea Treaty Timor-Leste's reserve is 0 (zero)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 178 mmbbls of oil
- Status: currently being exploited unilaterally by Australia – No single centavos to Timor-Leste
- Operator: Woodside Australia

Continue....

2. Laminaria-Carolina

- The estimated reserve is 178 mmbbls of oil (**worth 5.35 Billion US \$ before companies' share and investments**)
- Under current Timor Sea Treaty Timor-Leste's reserve is 0 (zero)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 178 mmbbls of oil
- Status: currently being exploited unilaterally by Australia – No single centavos to Timor-Leste
- Operator: Woodside Australia

Continue....

3. Buffalo

- The estimated reserve is 32 mmbbls of oil (**worth 960 Million US \$ before companies' share and investments**)
- Under current Timor Sea Treaty Timor-Leste's reserve is 0 (zero)
- Under Mid-line UNCLOS, Timor-Leste's reserve is 32 mmbbls of oil
- Status: currently being exploited unilaterally by Australia – No single centavos to Timor-Leste
- Operator: BHP Billiton Australia

Formulas Used:

- 1. Gas Product:

.....US\$ = Heat Content of Petroleum Product (in MMBtu/bbl) x Reserve (bbl) x Average gas price in the last three years (US\$)

Heat content of :

- Crude oil is 5.8 MMBtu/bbl
- - Condensate is 5.418 MMBtu/bbl
- - **Natural Gas 3.735 MMBtu/bbl**

Average price of the gas is **US\$ 3 per MMBtu**

- 2. Condensate Product:

.....US\$ = Reserve (bbl) x Average condensate price

Average condensate price is taken at **US\$ 20 per bbl**

- 3. Oil Product:

.....US\$ = Reserve (bbl) x Average oil price

Average oil price is taken at **US\$ 30 per bbl**

Conversions:

- **1 Trillion Cubic Feet (TCF) of gas** are approximately equal to **176.7 million barrel (mmbbls)** of oil equivalent (BOE).
- **1 Barrel (bbl)** is equivalent to approximately **159 liters (l)**
- **1 Cubic Feet (CF)** is equal to **0.0283 cubic metres (CM)**
- **1 Barrel** is equal to **0.15 cubic metres**
- **MMBtu** stands for **Million British thermal unit**

Total Timor-Leste Reserve

1. Under Current Arrangements (Timor Sea Treaty and IUA)

- ⑩ Gas = 4.46 Trillion Cubic Feet = 748 Million Barrels of Oil Equivalent (BOE)
- ⑩ Condensate = 455.4 Million Barrels
- ⑩ Oil = 25.8 Million Barrels
- Total, is 1,229.2 Million BOE, worth more than **19 Billion US Dollar** with average current oil and gas prices.

2. Under UNCLOS Mid-line Principle

- ⑩ Gas = 11 Trillion Cubic Feet = 1,870 Million BOE
- ⑩ Condensate = 770 Million Barrels
- ⑩ Oil = 264.4 Million Barrels
-
- Total, is 2,904.4 Million BOE, worth more than **45 Billion US dollar** with average current oil and gas prices.

Implications

- => Timor-Leste is currently compromising its resources and is in a position to lose at least 57% of its hydrocarbon reserve (**1.67 Billion BOE**) under the current Treaty in place. This is worth of at least US \$ 26,000,000,000 (26 Billion US Dollar) cash, before the company's share and operating costs

Potential Revenues

1. Under Current Timor Sea Treaty & the coming IUA

- According to the projection, Timor-Leste will accrue up to **3.662 Billion US Dollar** from the Elang-Kakatua & Bayu-Undan fields currently on production. Source : Government Report in the Development Partners Meeting, Dec. 2003
- If adding the revenues that potentially come from Greater Sunrise development, which is 18% taxes of upstream activities plus Australian annual payment under the term of IUA amounted to about US\$ 1.142 Billion, then the Total Revenue that Timor-Leste may collect for the next 30 years is approximately **4.803 Billion US Dollar**.

2. Under UNCLOS Mid-line Principle

- There is no projection yet to date on the possible revenues from the development of Timor Sea oil and gas reserves
- But using the analogous method which is that, with 19 Billion US\$ worth of reserve under the current Timor Sea Treaty Timor-Leste will get at least **4.8 billion US\$ meaning 25%**
- Then it follows that in the case of maritime boundary is settled under UNCLOS, Timor-Leste will get at least **11.25 Billion US\$** over the next 30 years time because the reserve worth is 45 Billion US\$.

Pipelines and LNG-Plants to Timor-Leste

- **Rationale to Bring the Pipelines and LNG-plant of Greater Sunrise Gas to Timor-Leste:**
 1. Timor-Leste has lost one opportunity, that was the Bayu Undan gas pipeline and LNG-plant, which was all landed in Darwin despite the distance to Timor-Leste is shorter and therefore cheaper. The benefits that Darwin enjoys now are huge. The country has more than 1.5 billion US\$ direct capital investment, over than 700 million US\$ in exploration expenditures, plus approximately 1700 direct and indirect jobs. The Northern Territory government can get more taxes from the influx of contractors and subcontractors that operating their business as oilfield suppliers.
 2. Pipeline to Timor-Leste is **POSSIBLE and CHEAPER**. Recent study by INTEC, a world leader deepwater pipeline lay company, confirmed that pipeline to Timor-Leste is possible and is cheaper than to Darwin because of its shorter distance.
 3. Timor-Leste is in a desperate need of employments. Estimated 3 Billion US\$ direct capital investment and 2000 direct and indirect jobs can be generated in Timor-Leste if pipeline and LNG-plant is established on onshore Timor-Leste, this includes the basic construction jobs which do not require too much qualifications. Benefit & multiplier effect of having LNG-plant in Timor-Leste will be numerous.

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4. Floating Liquefied Natural Gas (FLNG) plant as proposed by Shell and Woodside Petroleum is a new untested technology. Although it is possible, the construction and the maintenance of it will be very costly, compared with the conventional onshore LNG plant. An environmental risk such as leakage of the plant in the sea is also of concern. Moreover, with its remote location in sea may be very vulnerable to maritime terrorist attack as very little or no security control is in place. In addition to that, FLNG has no direct benefits at all to the community, no multiplier effect because of its far location in the sea. Also, because of the very high-tech nature of it, the project will leave no single job to Timorese.
5. Gas from LNG-plant on onshore Timor-Leste will be closer to the main market (Japan, China, Taiwan, and South Korea) than it is from FLNG or LNG-plant in Darwin.
6. As one developing country post-conflict, Timor-Leste may be eligible to Financial accesses, which are not accessible by the developed countries, therefore will be easy to finance the Greater Sunrise project LNG-plant in Timor-Leste.
7. Another reason to bring the gas in Timor Leste is that gas can be used to generate “clean electricity” and can be cheaper. This is inline with Kyoto Protocol, therefore will get support from industrial countries. Timor Leste is now desperately need energy for electricity as well as domestic household use, which are now, rely heavily on the imported petrol from Indonesia and Australia. Timor-Leste might as well use some of its own resources.

Possible Objections to TL-LNG-plant – Arguable!

- There are two current tentative development plans (recently become three options) for Greater Sunrise gas processing that, is either process the gas onshore in Darwin (supported by Conoco-Phillips) or offshore on a newly introduced-Floating Liquefied Natural Gas (proposed by Shell and Woodside Petroleum). None of the companies has ever considered Timor-Leste as a possible LNG-plant destination (until recently requested by Timor-Leste Prime Minister). It is not clear yet as to why Timor-Leste has been excluded from even only consideration, but few arguable reasons may have become the main engine of this exclusion.
- First, may be the fact that Pipeline *was deemed impossible to cross the Timor Trough; therefore building a LNG-Plant in Timor-Leste is not viable.* But this argument is no longer valid with the current technology in place. Recent advances in technology have made pipelines across extreme deepwater condition possible. The **Blue Stream Project** (completed in 2002) is an example. This 350 km pipeline project brings the gas from Southern Russia to Ankara (Turkey) across 2150 meters deep Black Sea. Turkey is considered as one of the most active seismicity zone in the world. Earthquakes of more than 6 Richter Scale occur almost every now and than. Timor Though, for comparison, has rough topography ranging in depth of 1,500 to 3,000 meters, and seismically relatively quiet.
- Second, perhaps, the fact that Timor-Leste has very minimum to no infrastructure. This is arguable, because build a LNG-plant on onshore or anywhere constitutes provisions to set its own supporting infrastructures anyway. For instance, provision for power/electricity (infrastructure), a LNG-plant in Darwin has to provide its own electricity. This happens to FLNG as well, with its remoteness location in the sea, no other alternative of power generation but to provide its own. **So, in this case LNG-plant in Timor-Leste is not and shall not be less favorable than FLNG or LNG-plant Darwin in term of infrastructures provisions.** We ought to remember that, the now world-class LNG-Plants of Bontang (Kalimantan) and Arun (Aceh) in Indonesia were all built on a very remote jungle with very limited infrastructures in place. How do they look like now after 20-30 years time? Incredible changes have happened in term of infrastructures and socioeconomic impact.

Continue....

- Third, maybe country risk, as long as this of concern, the major recipe to overcome it, is the close communication and cooperation between all parties involved, including the general community. It is not new that the success of a major project is often determined by the acceptability of the community where the project is located. And this acceptance is more often comes when community realized the benefits of the project itself. The government, also have big role to maintain security and wellbeing of the operation of the projects.
- Timor-Leste in a “chicken and egg situation”. Usually, in country where unemployment rate is high and many poor people, civil unrest may exist and makes the country become very high risk. However, with the big investments that create jobs and improve the infrastructures and public services may form as very essential basis for creating stability on a country.
- Therefore, assessing a country risk is very subjective. The precedent experiences, however, have shown that wherever the oil and gas is/are corporate/companies will come soon or later anyway, even if it there is risk. Multibillions dollar projects were launched in Sub-Saharan countries in Africa on oil and gas development although rebel fights and civil wars exist. Nigeria and Angola are some of the examples, although internally the two countries were rampaged by the often civil wars and ethnic conflicts, the major oil companies did not give up to grab even more multibillion dollars out of oil and gas. Aren't these countries risky?
- Timor-Leste, although has not had a proven record of its stability therefore risky, but most of instabilities existed in Timor-Leste were mainly contributed by the colonial powers. The last two successful and peaceful elections can be used as sign and major step toward more peaceful and stable country. Having multibillion projects that provide direct benefits such as employments, and infrastructures could even enforce the foundation for stability.

Implications

- **1. The Development proceeds with the current Arrangement in the Timor Sea Treaty & IUA, Timor-Leste bargaining position is very weak.**
- **2. The Development of Greater Sunrise is to be halted until Permanent Maritime Boundary is settled under UNCLOS Mid-line Principle.** In this case Timor-Leste will have full control over the Greater Sunrise and other fields in the JPDA, and therefore has more power to require and or request the companies to bring the gas to Timor-Leste without Australia's impedance. **This is the case Timor-Leste will have a very strong bargaining position.**
- **3. The Development proceeds with Timor-Leste and Australia agree to place the Greater Sunrise Field into the JPDA. In other word extending the Lateral Boundaries of the present JPDA.**

In this case **Timor-Leste can still have a full control** over the Greater Sunrise and may require the companies to bring the gas to Timor-Leste. The companies should not reject the idea because Timor-Leste has 90% interest in Greater Sunrise by then. Also Timor-Leste could argue to get some downstream benefit of the fields in the area because downstream benefits of the previous fields (Bayu Undan, Elang-Kakatua Kakatua North, Laminaria-Carolina and Bufallo) have all been going to Australia.

Strategies?

1. Not Ratifying the IUA
2. Negotiate with Australia to include the areas to the West and East of JPDA into the area of joint petroleum development (JPDA), until Permanent Maritime Boundary is delimited.
3. And or Negotiate with Australia to conclude quickly the maritime Boundary Delimitation based on the UNCLOS middle line principle before Greater Sunrise Development Plan is approved.

EXPECTATIONS

Fulfilled?

- Basic understanding of geological setting of Timor-Leste that leads to the potentiality in petroleum.
- The exploration history (onshore and offshore)
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END