

Fuelling the future of Timor-Leste.

Making possible future energy security and economic well-being for the children of Timor-Leste . . . through bringing in gas and liquids from the Greater Sunrise field.



Reuters Photo by Cheryl Ravelo



Photo courtesy D. Mynen / timorleste2010.blogspot.com

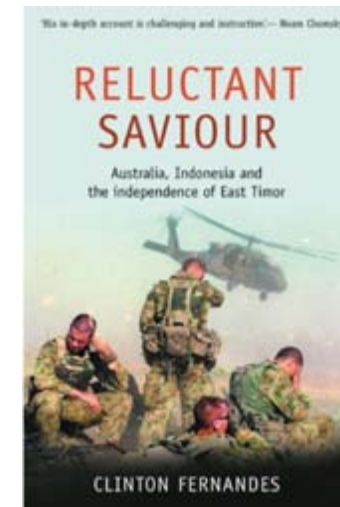
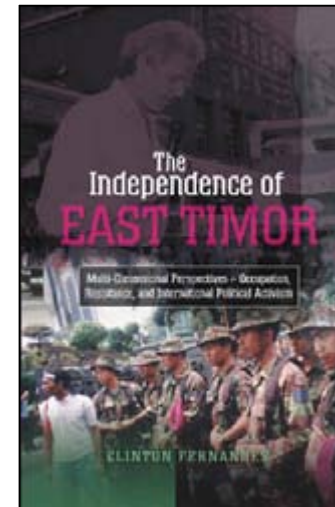
An exploration of possible ways out of the current Sunrise development impasse.



In memory of Andrew McNaughtan (1954 – 2003)



Above: Andrew McNaughtan (with Ceu Lopes Federer) at East Timor Information Centre (ETISC) press conference, September 13, 1999. Photo by H T Lee (insert right). This presentation is also in memory of HT (1945–2005). Insert above: another book that includes a dedication to Andrew, is by Juan Federer, key advisor and colleague of José Ramos-Horta during the years of occupation and resistance.



Above: books by Clinton Fernandes (insert right) that are dedicated to Andrew McNaughtan and his co-workers, whose efforts to help the East Timorese resistance were eventually vindicated by reality.



This talk - on finding a 'Middle Road' in the current Sunrise impasse – follows the pragmatic approach taught to us by Andrew McNaughtan. His commentary made in 2002 (below) provided the intellectual underpinning for what would later become the CMATS conflict-resolution treaty.

Selected postings from... **east-timor**
(reg.easttimor)

Subject: **A 'Middle Road' in Timor's Oil and Gas Options** etan.org/et2002b/may/05-11/10amidle.htm

A 'MIDDLE ROAD' IN TIMOR'S OIL AND GAS OPTIONS By Andrew McNaughtan Published May, 2002.

The Great Game of Greater Sunrise.

Some questions that may have crossed your minds and prompted you to come to this meeting tonight . . .

What factors led to the current impasse?

Who are the key players in Timor-Leste?

What are the real needs of each party in the dispute?

How might Timor-Leste better frame the public debate?

Can there be a win-win solution here?

We ask whether Timor-Leste's downstream petroleum development needs can be met through a negotiated adjustment to the Woodside JV's selected development concept (which is floating LNG facilities or "FLNG"). Timor-Leste's preferred development option is an onshore LNG export facility located at Beaçu on the south coast. It would need to be fed by a large-diameter pipeline from the Sunrise gas field. Woodside, the operator of the field, has abandoned this option, claiming it is the least commercially attractive of all options studied. It is not a political option for the leadership in Timor-Leste to compromise at this stage on their country's best opportunity to achieve economic development. But is there a way of meeting these development needs with FLNG? Its worth at least thinking about. A continuation of the current impasse may lead to the collapse of the governing treaty (CMATS) and failure for all parties involved. A creative solution is needed to avoid this scenario.



What led to the present Sunrise impasse?

Firstly, history and geography. A review of competing maritime boundary claims and petroleum exploration activities in the Timor Sea, since 1962, makes the situation a little more comprehensible.

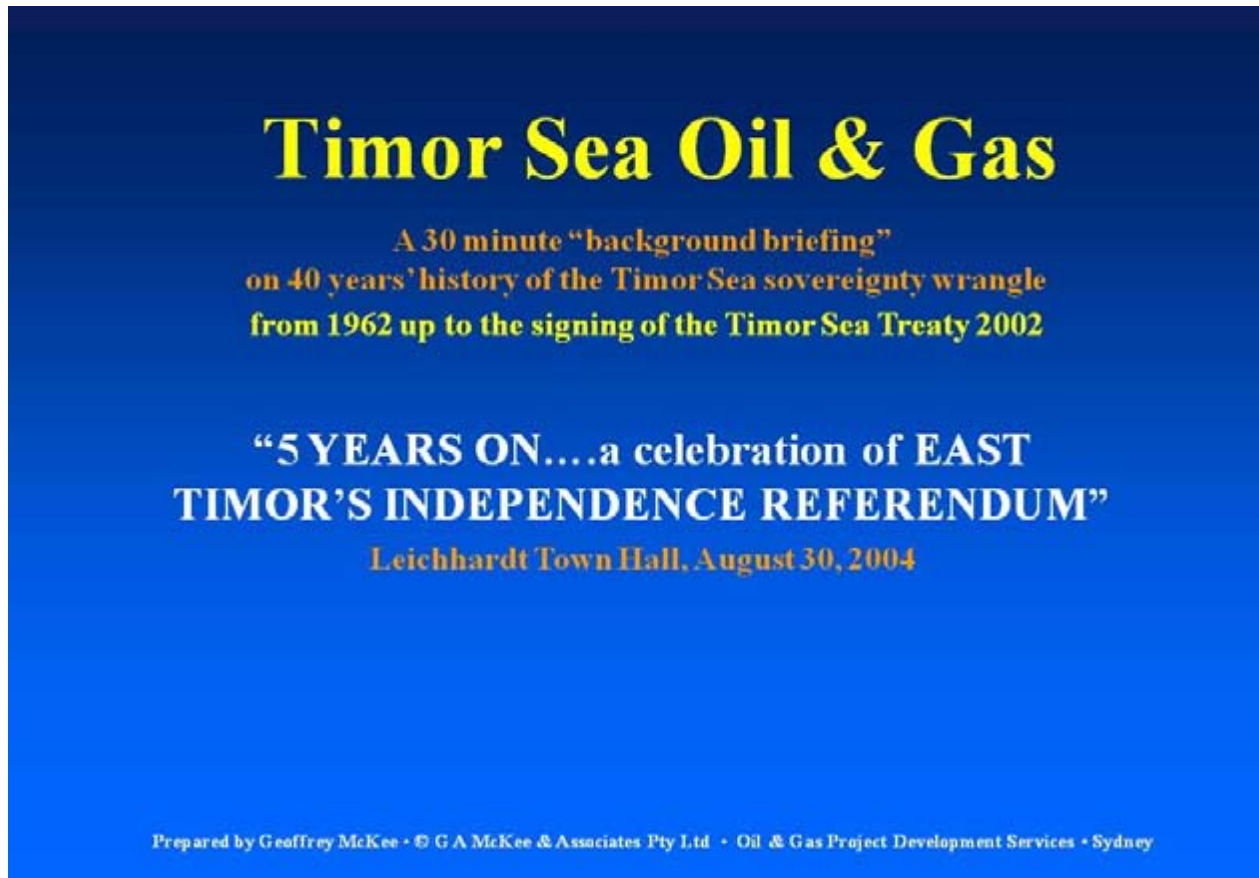
Secondly, the Timor pipeline issue. The lesser-known history of futile attempts during 1996-2002 to influence the transitional leaders of Timor-Leste to negotiate a pipeline from Bayu-Undan to their shores. That slice of history goes a way towards explaining Timor-Leste's current firm stance on the pipeline issue now.

Finally, more recent studies on a pipeline to Timor from the Greater Sunrise field, commissioned by both the Woodside JV and the government of Timor-Leste. These studies appear to have reinforced opposing opinions on both sides of the Timor Trough.

Timor-Leste's bathymetric survey seeking an optimum pipeline route across the Timor Trough indicates their strong commitment to a pipeline this time around.

Timor Sea maritime boundary & petroleum exploration issues since 1962.

We just ran through this history in the repeat of our 2004 presentation, so we can now move on.



2004 town hall
conference organised
by Jefferson Lee
(below) - long time
East Timor solidarity
activist, university
lecturer, writer, film
critic, and taxi driver.



You can view the presentation here: <http://www.scribd.com/doc/11534105/Timor-Sea-Petroleum-Exploration-over-the-past-40-years->

Failed attempts to advocate a pipeline from Bayu-Undan to Timor – that took place before the restoration of Independence in 2002.

Bits of this story can be read at the end of this online document, put together on the eve of a 2004 government inquiry by a long-time East Timor solidarity activist Rob Wesley-Smith.

AFFET: Submission to Senate on Sunrise Agreement



John M Miller



Mar 22, 2004 07:21 PST

To Senate Economics Legislation Committee

18th March 2004

Australian Parliament
economi-@aph.gov.au

re Provisions of the Greater Sunrise Unitisation Agreement
Implementation Bill 2004

Submission by Rob Wesley-Smith for Australians for a Free
East Timor (affet) c/ rwes-@ozemail.com.au
Box 2155 Darwin NT 0801

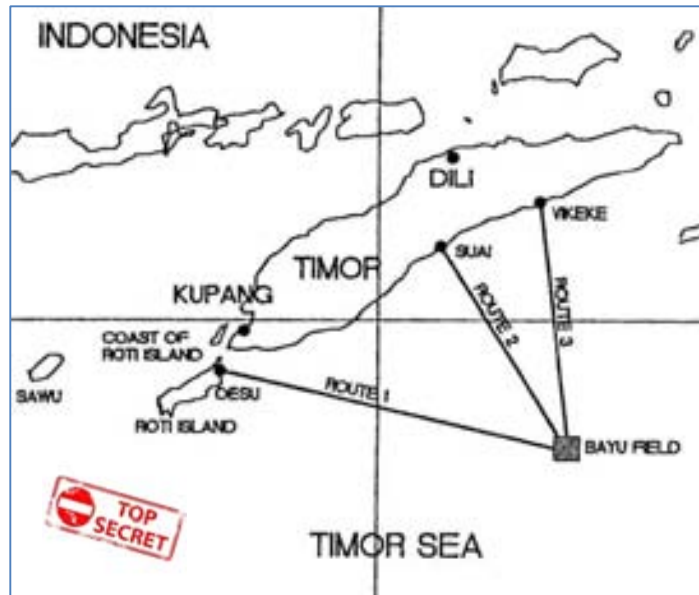


Photo: Rob Wesley-Smith invited to speak at a development conference in Darwin, September 29, 2003. Insert right: talking by short wave radio to the operator of Radio Maubere in 1977. In 1976 he was arrested trying to take medical supplies to East Timor. John Howard, then Custom's Minister, refused to release the supplies even after court requests. He later became active regarding Timor Sea maritime issues. . .

Refer "Appendix re Treaty negotiations and pipeline options", by Rob Wesley-Smith, Australians for a Free East Timor, March 18, 2004., at http://www.aph.gov.au/senate/committee/economics_ctte/completed_inquiries/2002-04/greater_sunrise_2004/submissions/sublist.htm

The idea of a pipeline from Bayu -Undan to Timor was a lost cause, but it did set in motion the series of events creating the current Sunrise standoff.

1996 *jp kenny* 



Above: excerpt from 1996 J P Jenny report. Conclusion: routes feasible for dual 26-inch, laid with Heeremac's upgraded Hermod or McDermott's DB-26.

2001 *GAM* 



Alkatiri



Above: front cover of GAM 2001 presentation to Alkatiri.

2001 July 5, 2001



Galbraith

Reference: details of this this history are documented in a report at aph.gov.au/house/committee/jsct/timor/subs/sub87.pdf

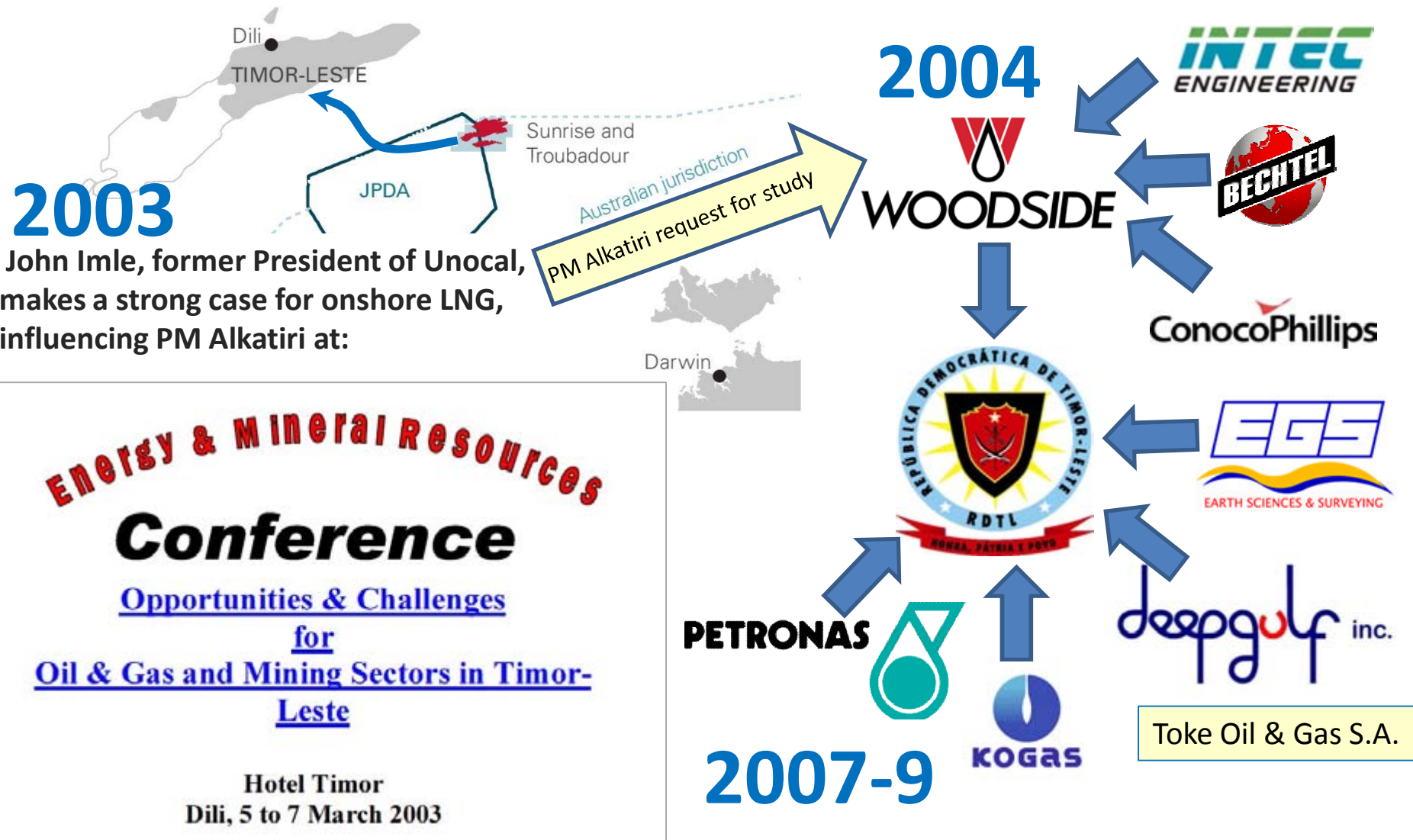


2002 June

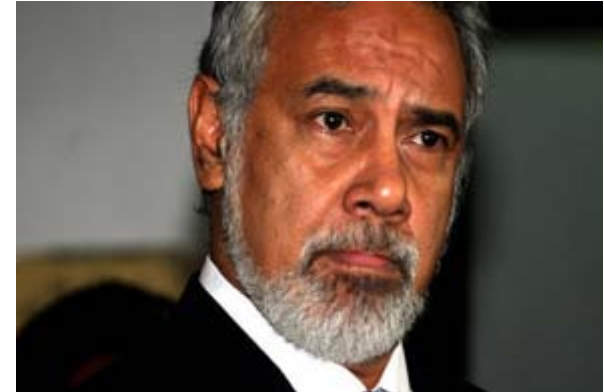


UNTAET

Later investigations into a pipeline from Sunrise to Timor-Leste appear to have done nothing to resolve the issue. The government of Timor-Leste is in a difficult position. There is no absolute “truth” on which option is “best”. It depends on selection criteria. Pragmatism may be the only way out of this logical dilemma.

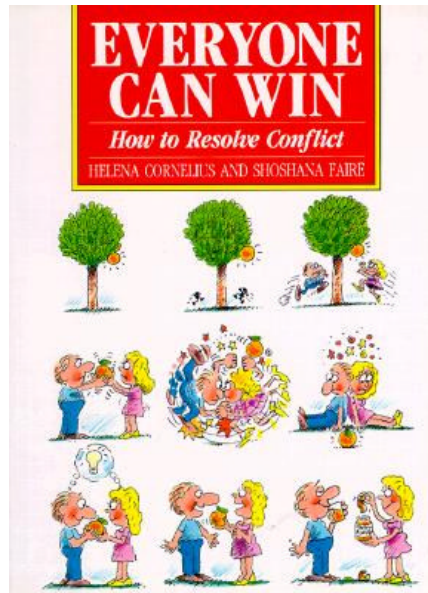


The Sunrise impasse. Who are the key players in Timor-Leste?



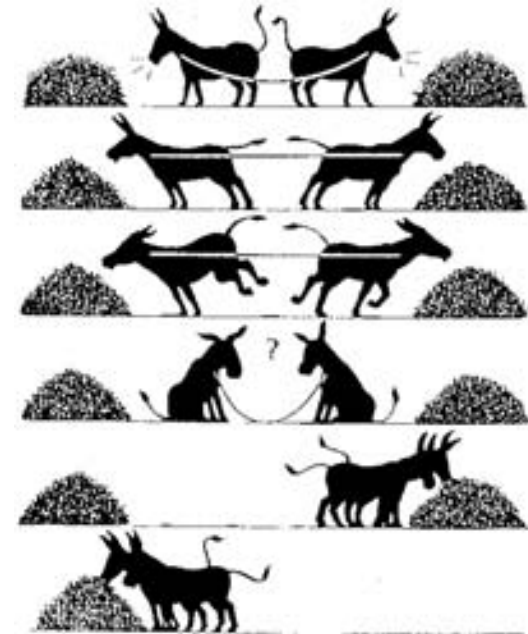
These leaders and spokesmen on Sunrise gas development have found themselves in technically demanding and politically challenging positions since the fall of the Fretilin government in 2007. They need all the moral support they can get from the Australian Solidarity movement . They have scant technical & commercial resources in comparison with those available to Woodside Energy and their JV partners. There is not an equal playing field. The government of Australia has had no option other than to absent itself from the debate, due to an internal conflict of interest. The government partners to the relevant Treaties therefore cannot deal with the Operator in a unified and consistent manner. The leaders in Timor-Leste are isolated and must deal with the Operator alone. They will be seeking to achieve a just and pragmatic outcome to the impasse, in the best interests of the people of Timor-Leste. We can help them by studying the issue so that we can better participate in an informed public debate. This might bring the mainstream media on side and at the same time help our neighbour escape from poverty and work towards energy independence and security.

The Sunrise impasse. How are conflicts resolved?



Many books* provide ideas for resolving conflicts between people. But a conflict of interest between a project stakeholder and a project developer, as in the case of the Sunrise project, may not be so straightforward.

If there is one kernel of truth we can take from this theory, it is that successful conflict resolution is possible only once each party understands and accepts the real needs of the other.



What are the real needs of Timor-Leste ?

- Energy Security
- Economic Development
- Poverty reduction



What are the real needs of the Woodside JV

- Minimum TECOP risk (all partners)**
- Maximum return to shareholders (all partners)
- Supply FLNG vessel (Shell)
- Security of supply (Osaka Gas & other customers)

* Book shown here is by Helen Cornelius, Publisher: Simon & Schuster, ISBN: 9780731812981 ISBN-10: 0731812980

** TECOP is Shell concept denoting "technical, economic, commercial, organisational and political"

How could the public debate be better framed by Timor-Leste?

By investing heavily in a new national power grid, the leaders of Timor-Leste have demonstrated their understanding of the relationship between a society's energy consumption and that society's human health, welfare and economic wellbeing. If this understanding could be better communicated to the outside world, in relation to the Sunrise dispute, it would make a strong case for an onshore natural gas & liquids energy infrastructure.

This understanding is reinforced and strengthened through studying the literature on peak oil. This dire warnings in some of this literature is disturbing to young minds, but it is a government's job to plan for worst-case scenarios. Many forecasts of global oil supply suggest a long undulating plateau with periodic 'oil shocks' (starting now). More pessimistic scenarios point to a steady decline in global oil production (starting now), causing skyrocketing oil prices and global financial collapse.

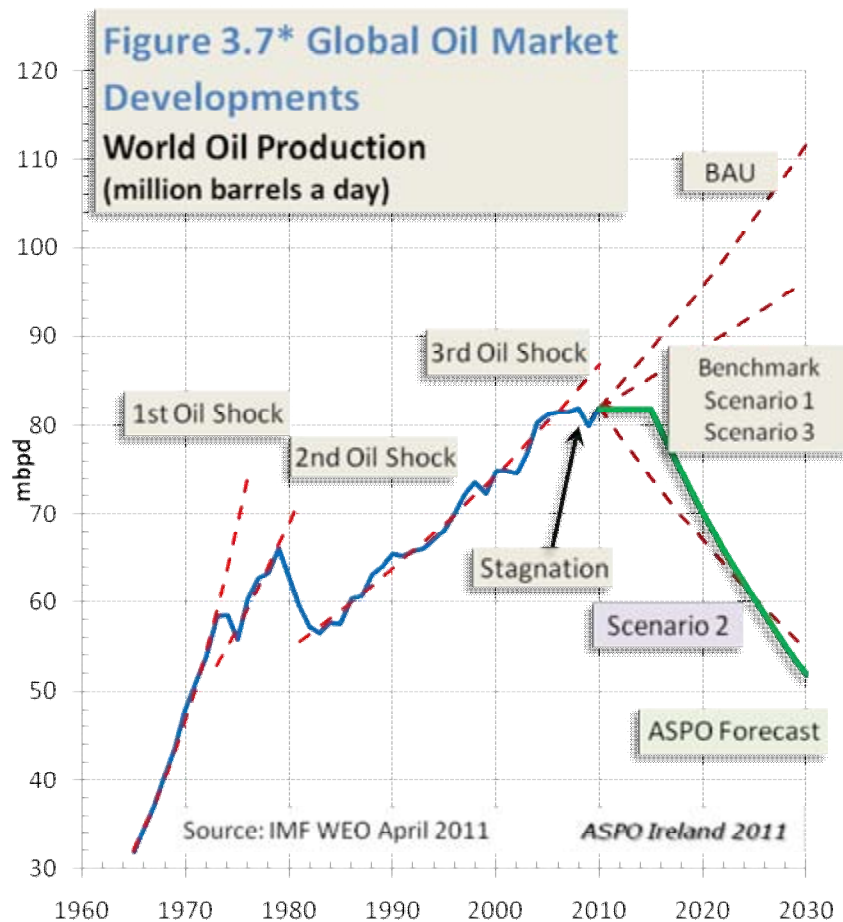
In our opinion, the imperative for Timor-Leste is to secure a reliable and affordable source of primary gas energy, as a substitute for dependency on imported liquid petroleum fuel.

It may be more effective to transform the debate away from negative language and towards positive language. I would avoid criticizing FLNG and avoid viewing an LNG export facility in Timor-Leste as the only means of achieving a particular end. I would instead use arguments about Energy Security. This issue is linked directly to the notion of National Security.*

Gas from the Sunrise field is the logical fuel-substitute for imported diesel and heavy fuel oil. Use of this gas, already partly owned by the people of Timor-Leste, will ensure energy independence and energy security for the next 30 to 50 years, while the country transitions to renewable energy. Gas also has a myriad of other industrial benefits.

* A real-world example of this linkage would be the *Carter Doctrine* ([ref en.wikipedia.org/wiki/Carter_Doctrine](http://en.wikipedia.org/wiki/Carter_Doctrine))

Timor-Leste's case would be convincing if built around the logic of peak oil.



“We are all peakists now. Conceptually the battle is over, the peakists have won” - former US Energy Secretary Dr. James Schlesinger, at ASPO6 Conference in Ireland, September 2007.

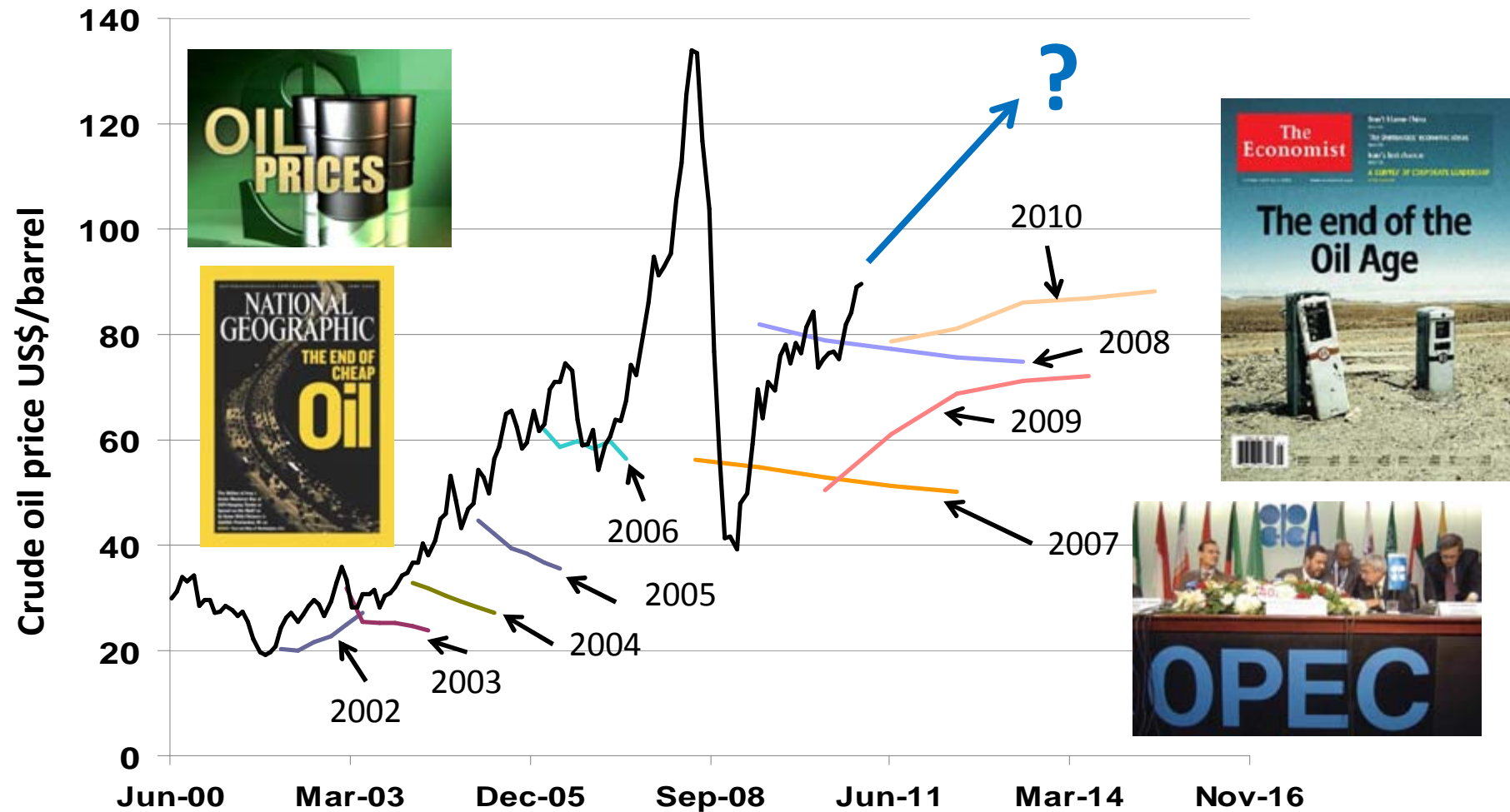
This engineer attended that 2007 peak oil conference in the town of Cork, Ireland. It heightened one's appreciation of civilisation's dependence on petroleum.

It is not an efficient use of future Sunrise gas revenue if it is spent to import expensive liquid petroleum fuel during oil shocks. The current leaders in Dili may be aware of this issue, evidenced by their decision to select Wartsilla engines for the power plants at Hera and Betano. It is assumed (but not confirmed) that these engines are “pre-designed” for later conversion from heavy fuel oil to gas operation. Ref. www.distributedenergy.com/the-latest/wartsila-brazilian--ipp.aspx

Talk by Geoff McKee (with Tomas Freitas) to HETS, Newcastle, Australia, June 17, 2011

Australia's ABARE oil price forecasts have been reliably wrong since 2002.

Energy Security awareness for Timor-Leste's leaders will, to a large degree, arise from a sense of uncertainty about future runaway costs for import of liquid petroleum fuel.



Timor-Leste currently uses similar arguments against FLNG that were used by the Northern Territory in 2002. Why is the NT govt not using these arguments in 2011?



Source: Northern Territory government publication march 2001

the Territory

Why Sunrise Gas Onshore is in the National Interest

Economic Benefits



Incremental economic benefit:
Shell's "FNLG spoiler"
compared to onshore LNG in Darwin



- GDP + \$1.0 billion/yr
- Investment +\$35 million/yr
- Household consumption +\$260 million/yr
- Government revenue +\$110 million/yr
- Plus an additional 4,400 jobs

Framing the debate: negativity or creativity? Reaction or imagination?

The Secretary of State for the Council of Ministers and
Official Spokesperson for the Government of Timor-Leste
Ágio Pereira

April 29, 2010
Díli, Timor-Leste



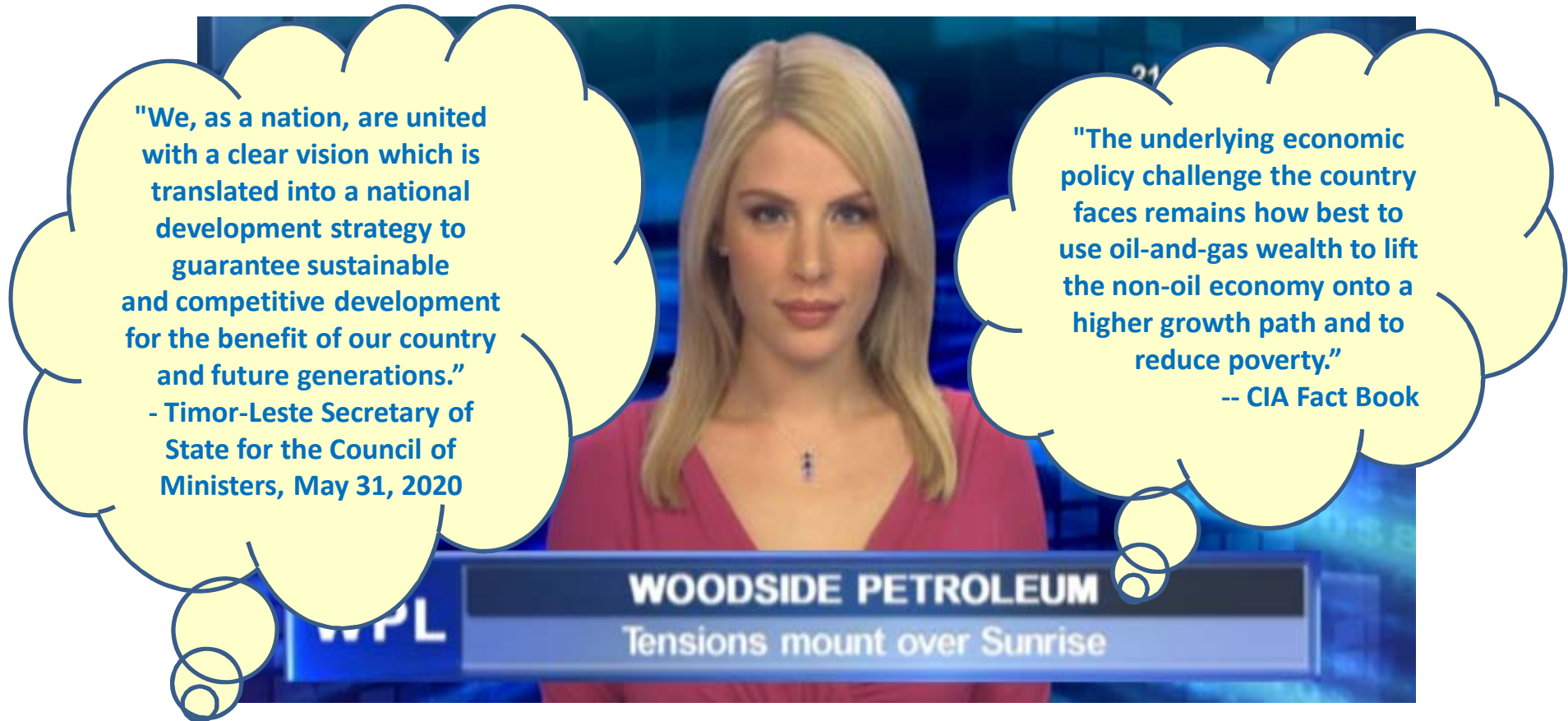
Timor-Leste Government dismisses Woodside's Sunrise Floating LNG concept

- not "in the best interests of Timor-Leste"
- not "technically and commercially sensible"
- not approvable by Timor-Leste
- not compatible with legal framework
- not "merely for commercial interest"
- not a product of consultations
- not a wise use of time & money



Emphasise the positive aspects of a vision for Timor Leste that public opinion will understand and support!

Framing the debate. In mainstream media, Timor-Leste does not yet receive highly favourable coverage on the Sunrise issue.



Oz TV: “Outgoing Woodside Petroleum Ltd’s CEO Don Voelte has accused the Government of East Timor of acting against the interests of its people by not supporting it’s \$10.3 billion Sunrise FLNG gas project.”

Can there be a win-win solution to the Sunrise impasse?

Some cause for optimism flows from the fact that we are dealing with rational players on both sides of the debate. This speaker's perspective has been derived from 45 years as an oil & gas industry facilities engineer plus an inclination to support the underdog. Here are the basic premises of our argument in simple terms.

After **Political Independence**, it is time for **Energy Independence**.

Affordable Energy + Education + Human Enterprise = Prosperity.

FLNG is fast becoming the means of producing “stranded gas”.

Gas, LPG & condensate can be shuttled from Sunrise FLNG.



Thumbnail energy comparisons

– Timor-Leste compared to **Gaza** and Australia.

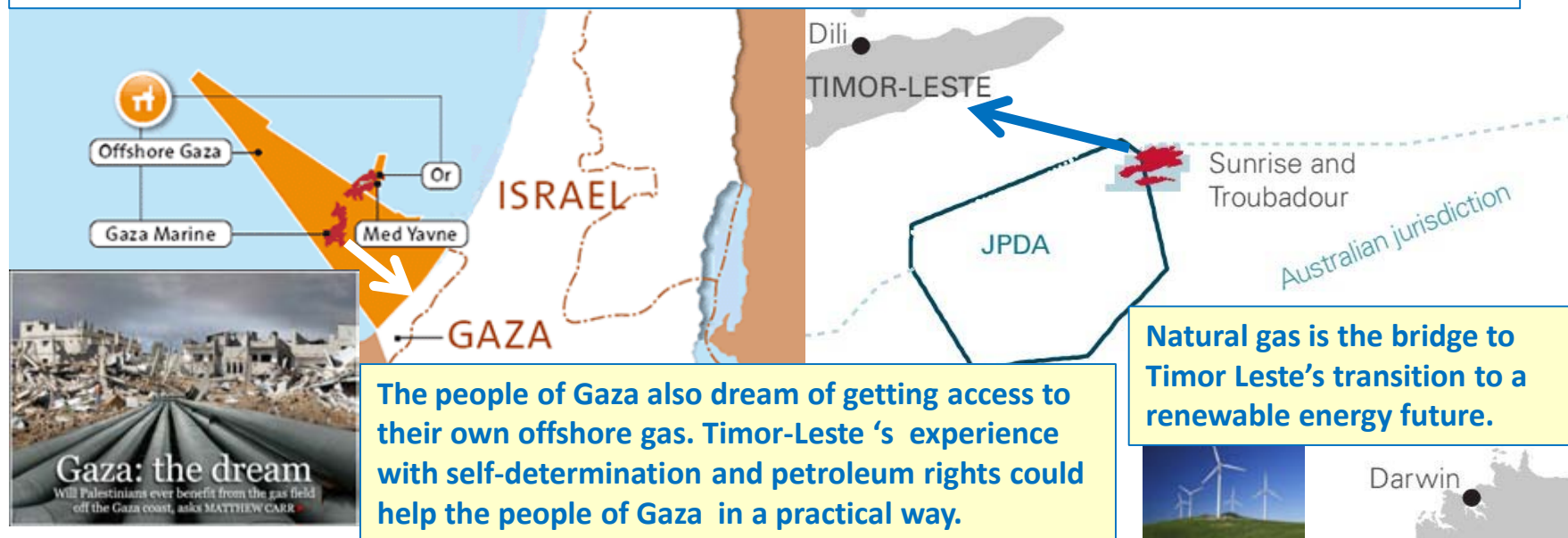
	Gaza	Timor-Leste	Australia
Population (million)	1.4	1.2	22
Electricity usage (watts/capita)	0.02	13	1,260
Uncommitted gas resources (tcf)	1.4*	0.92**	20***
“ million cu ft per capita	0.99	0.77	0.92

* Gaza Marine gas field discovered in 2000 by BG Group in Palestinian maritime area

** Assume RDTL owns *de-jure* 18% of reserves (c.f estimated 26% de-facto RDTL take after company take and CMATS distribution)

*** A high proportion of Australia's 110 TCF conventional gas resources will be exported; this figure is indicative only.

Both Gaza and Timor-Leste are well placed for a better future fuelled by natural gas. The energy policy imagined for Timor-Leste in this talk emulates that of Ghana* West Africa.



References: CIA factbook / indexmundi.com / wikipedia / Timor-Leste electricity 11,000 MW-hr/month from Deloitte report April 2011.

* Refer energy policy for the state of Ghana at www.ghanaoilwatch.org/images/laws/national_energy_policy.pdf

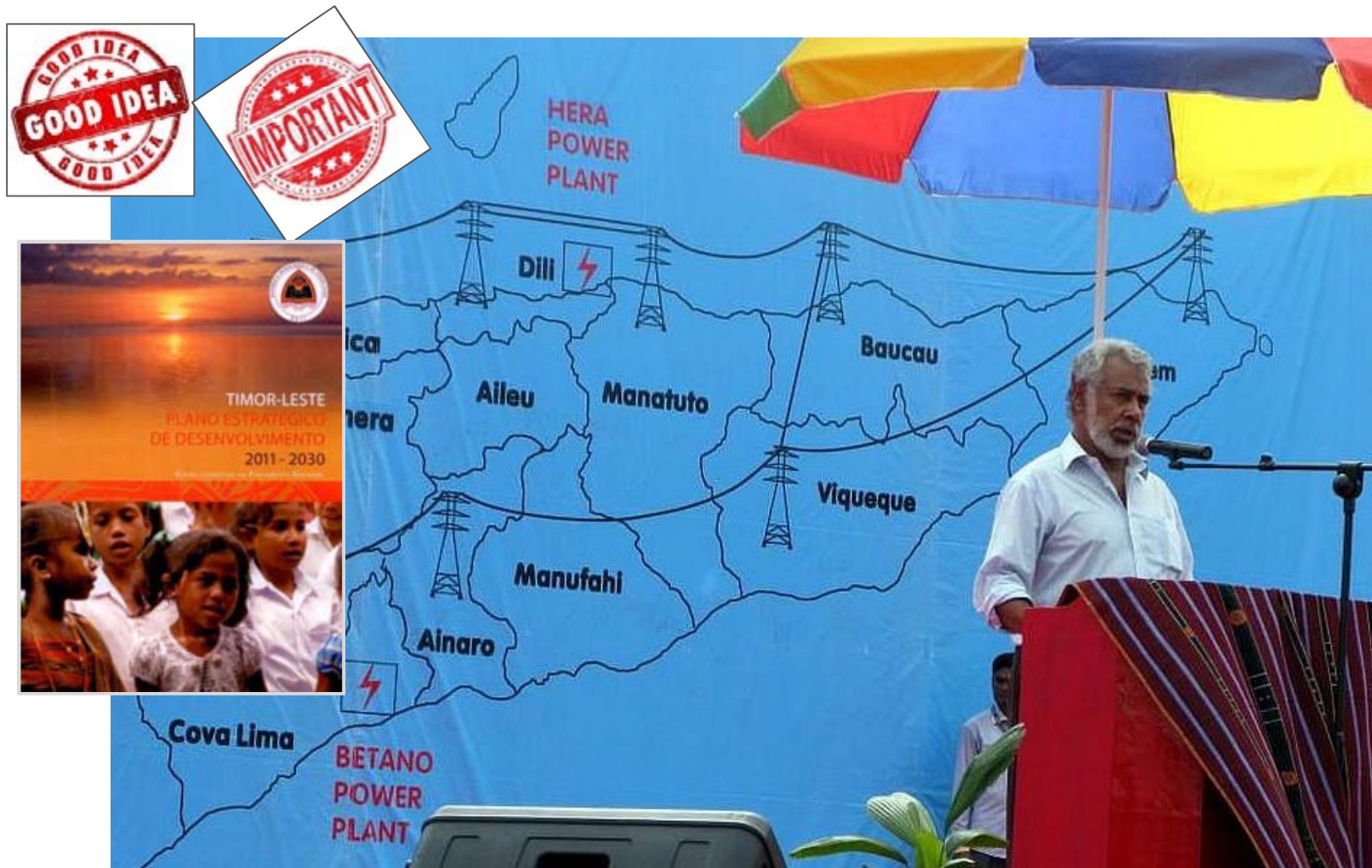
An energy future reliant on importation of costly liquid petroleum from other countries undermines energy security & independence.



Problems with Chinese plant awarded to CNI22?

- Non-compliant with Australian electrical standards
- Precludes future natural gas firing
- HFO expensive and dirty compared to gas
- Does not meet World Bank emissions standards
- High maintenance and operating costs
- Would force subsidization of electricity price

The new power stations at Hera and Betano and the accompanying high-voltage power transmission network is an essential first step.



Picture of Prime minister Xanana Gusmao courtesy timorhauniandoben.blogspot.com. Government report cover shown is *RDTL Strategic Development Plan 2011-2030* discussed at www.laohamutuk.org/econ/SDP/10SDPindex.htm

Increased GDP/capita is built on increased electricity consumption/capita.

“The power system will rely mainly on petroleum, initially heavy liquids but then transitioning to natural gas when the gas pipeline reaches Timor-Leste.”

- from "Timor-Leste's Strategic Development Plan 2011-2030", Office of the Prime Minister, April 7, 2010



Model 18V46 engine generator sets

Hera : 7 sets (120 MW maximum output)

Betano: 8 sets (135 MW maximum output)

Total ultimate generating capacity 255 MW

Assuming 80% load factor, system net maximum output 205 MW

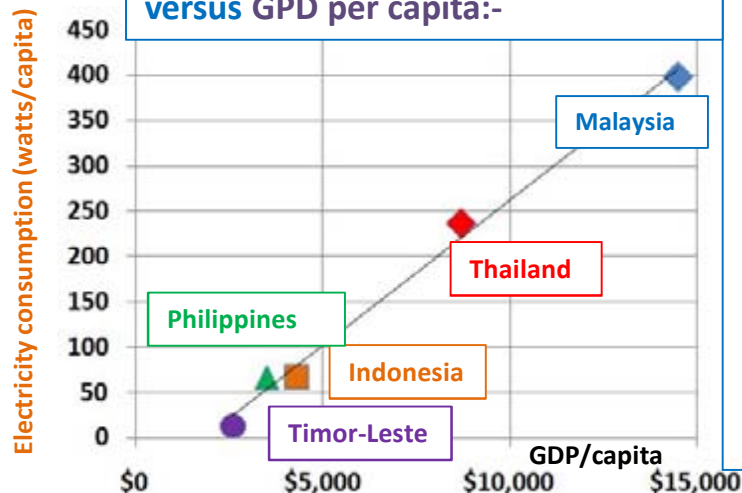


2020 POWER AVAILABLE WITH EXISTING GENERATORS

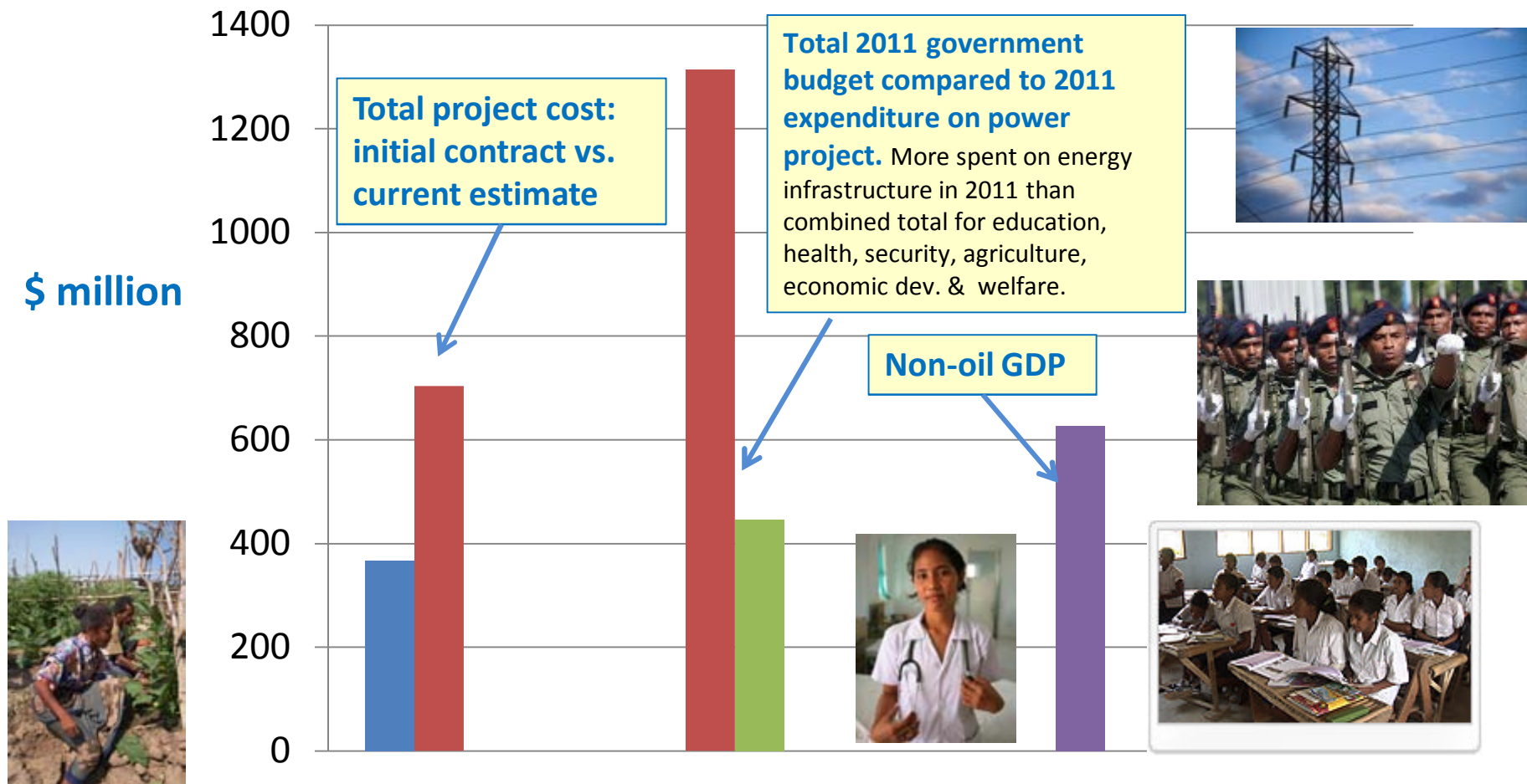
If we assume the population of Timor-Leste is 1.7 million in 2020, and, by then, the combined average yearly output from these 2 power plants is 205 MW, that works out to an electricity consumption of 121 watts/capita in 2020 (compared to only 13 watts/capita now).

Conclusion: to fully utilize the capacity of these power stations by 2020, there will have to be some significant industrial consumption. The availability of a secure source of clean primary gas energy from Sunrise to fuel the power stations, *plus education & training*, will help create the investment climate necessary for start-up of privately owned electricity-intensive businesses and industries.

Electricity consumption per capita versus GDP per capita:-



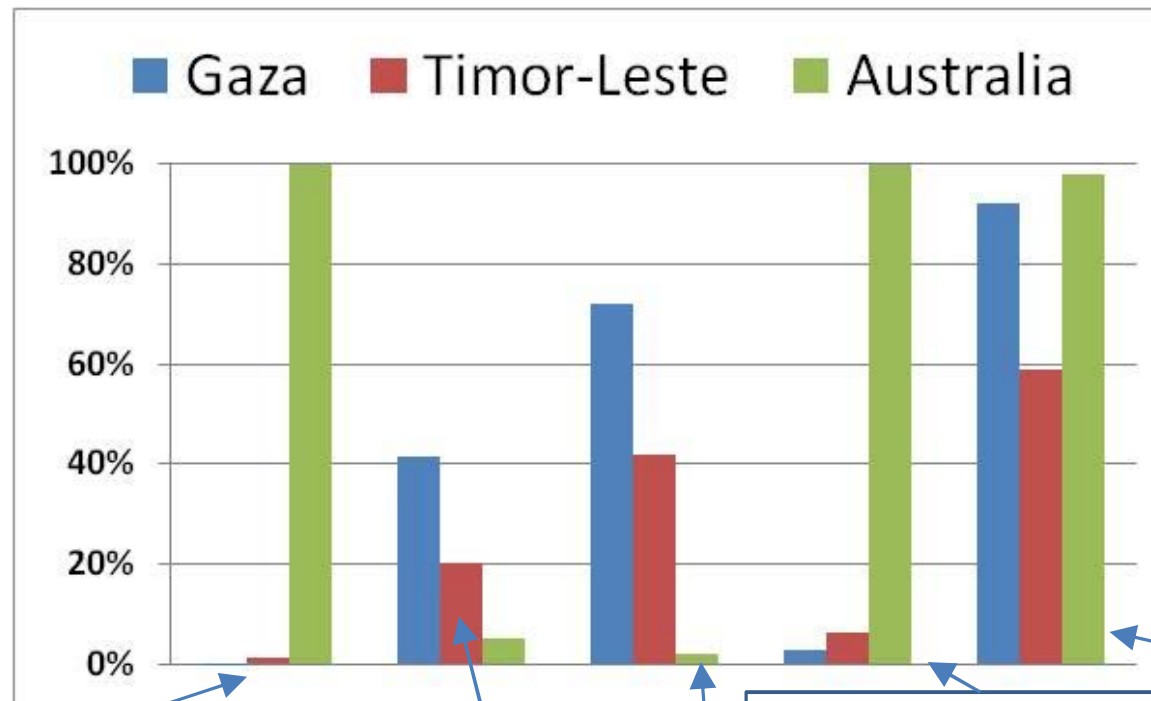
Timor Leste's new power generation and electricity transmission system is a big investment, but a necessary sacrifice of petroleum fund dollars for future prosperity.



Source of data: skype chat with Charlie Scheiner, of L'ao Hamutuk, Dili, Timor Leste, June 16, 2011

Talk by Geoff McKee (with Tomas Freitas) to HETS, Newcastle, Australia, June 17, 2011

Very low energy consumption in a society goes hand in hand with hardship and poverty.



Courtesy web.worldbank.org



Picture courtesy tdpjackie, Flickr *

National electricity use per capita.

(Compared to Australia)
Gaza has the lowest electricity consumption per capita in the world. Not by accident, but by design. It doesn't appear to the naked eye on this chart.

Unemployment

The high education of the population of Gaza does not help them reduce poverty and unemployment. Without adequate power and materials, this education cannot be harnessed to create economic wealth.

GDP per capita.

(Compared to Australia). Woodside must learn and understand why the Timor-Leste government cannot be expected to think like the the Australian government.

% below poverty line.

70% of Gaza's households are below the poverty line, due to restrictions on energy supply, imports and exports as imposed by Israel & USA.

Literacy & education.

Without an adequate supply of affordable household and factory energy, high literacy and education by itself won't create much more employment and wealth. The Gaza statistics bear out this conclusion.

* palestinernote.com/blogs/news/archive/2011/03/17/blockade-frustrates-gaza-students.aspx

How much gas is needed to fuel new power stations in Timor- Leste?

Average electricity currently consumed in Timor-Leste = 13 watts/capita

“From the standpoint of electrical supply, the availability of natural gas for electricity generation has the potential to provide much cheaper and cleaner fuel than liquid fuels. In environmental terms, for the same amount of electricity produced, the greenhouse effect of natural gas is considerably less than that resulting from liquid fuels.” -- from external audit on EDTL by Deloitte (May 2011), courtesy La’o Hamutuk.

Maximum output

Hera power plant	120 MW
Betano power plant	137 MW
Total	257 MW

Say 205 MW effective yearly average capacity*

<u>Fuel for this output</u>	<u>CO₂ emissions</u>
Heavy fuel oil	1.06
<u>Natural gas</u>	<u>0.80</u>
Reduction in emissions	0.26 million tonnes/yr
Equivalent to removing 73,000 cars from the road.	

Gas required 33 million cu ft/day (MMcfd)***

121 watts/capita is possible in 2020**

Compare current usage in neighbouring countries

Indonesia	Philippines	Thailand	Malaysia
67	67	237	398

* This assumes a load factor of approximately 80%.

** Assume population in Timor-Leste is 1.7 million by 2020

*** Assumes 7733 kJ/hr fuel per KW engine output => 39 TJ/day (33 MMscfd) for 205 MW electrical output.

Getting gas to Timor-Leste by pipeline.

Since 1999, this engineer has been a strong advocate of a gas pipeline to Timor. This idea was always based on the belief that without a sound economic footing bought about by an energy infrastructure, the result would be a failed state. That almost happened in 2006. It could happen again if frustration and unemployment grows.

The primary benefit to Timor-Leste of a pipeline has always been seen not so much as a localized export industry, but in terms of domestic energy supply that can benefit the entire community and stimulate foreign direct investment if the right free-market type legal and commercial rules and regulations are in place.

Transporting the entire production of gas from Sunrise to Timor-Leste, only for the purpose of transporting it again to Japan, Korea or China, does not make as much sense as transporting that gas to those markets directly from the gas field.

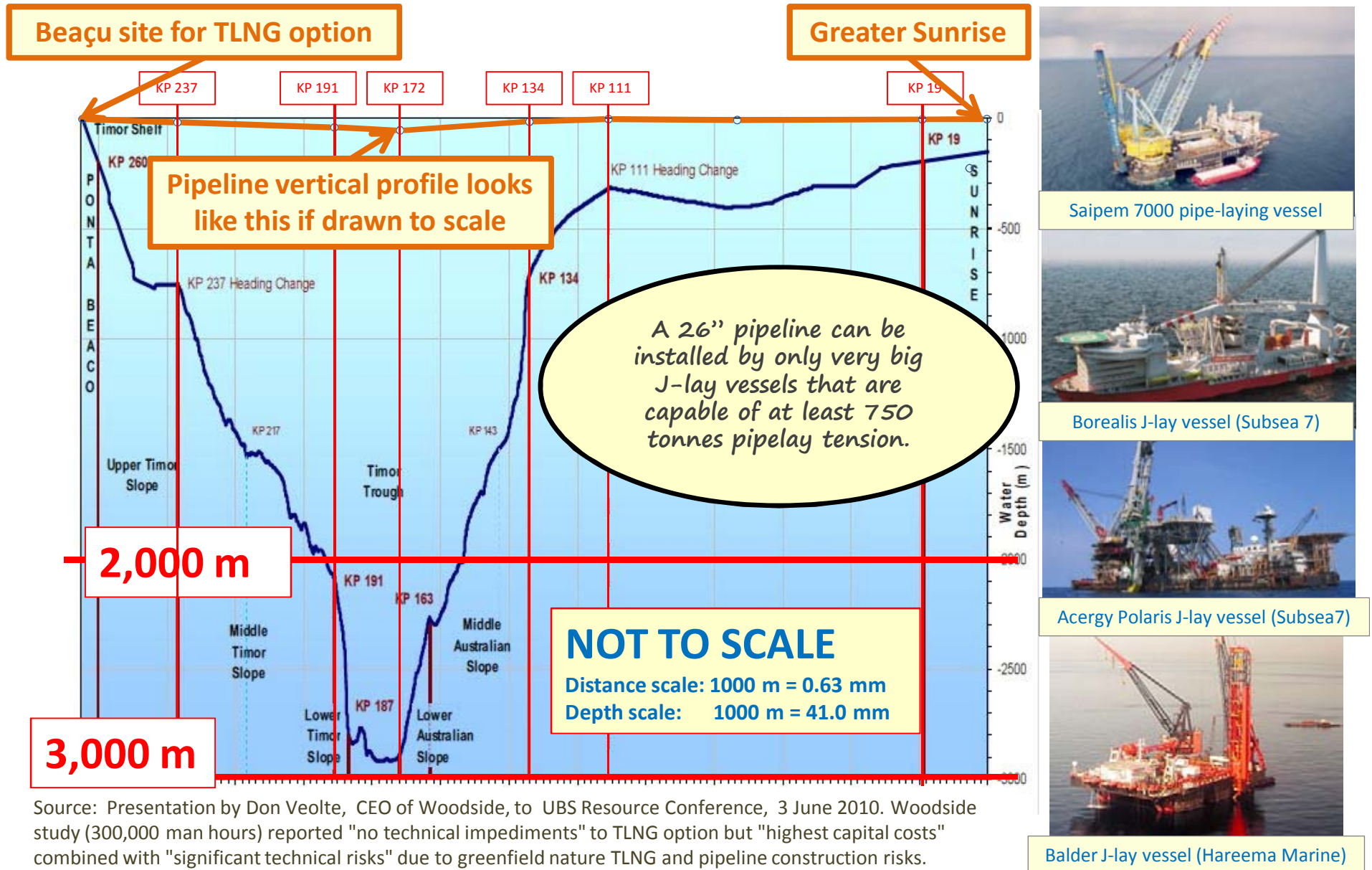
The rapid development and industry acceptance of floating LNG production facilities (FLNG) has undermined arguments revolving around pipelines for onshore processing.

In 2011, we must live with and accept the new reality of FLNG as the most economic means for commercialization of smaller and more remote offshore gas fields.

The truth of an idea is not a stagnant property inherent in it. Truth happens to an idea. It becomes true, is made true by events.

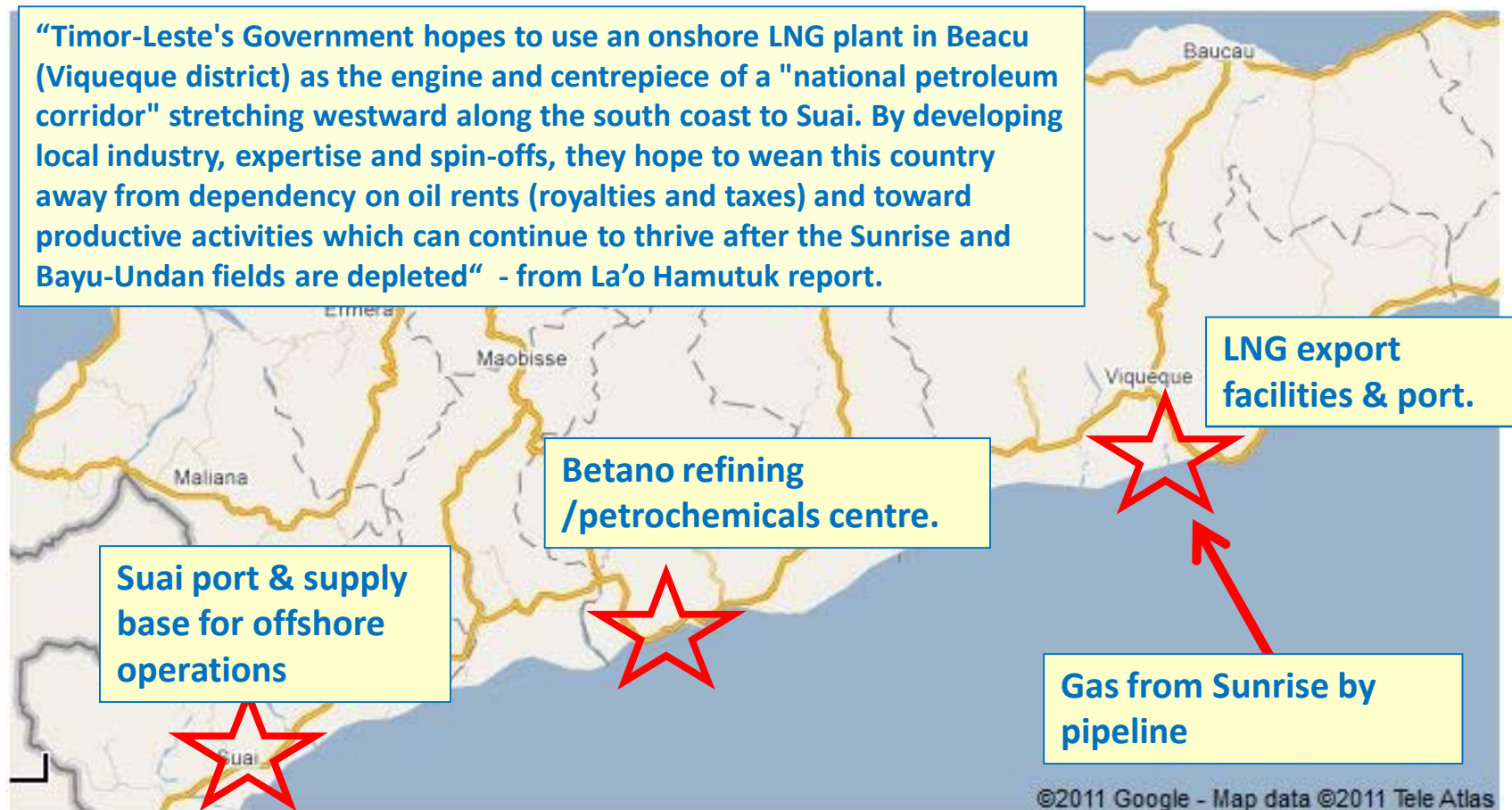
-William James, Pragmatism, Lecture VI

The Timor Trough: not a deep ocean ravine, but a gentle seabed depression.



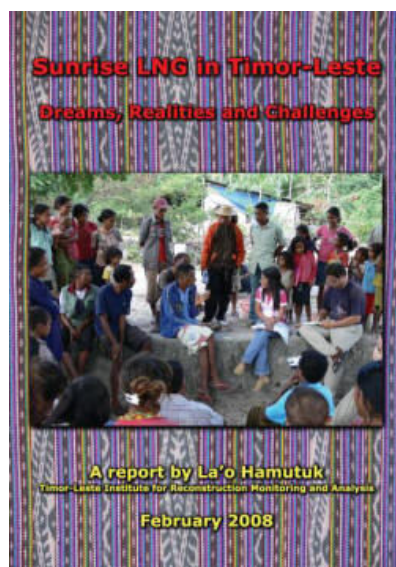
Timor-Leste planning work - for Sunrise onshore LNG export industry.

“Tasi Mane” south coast petroleum infrastructure corridor.



Source of information: Charlie Scheiner of L’ao Hamutuk, Dili, Timor Leste Refer comprehensive information on the pipeline issue from the L’ao Hamutuk website at www.laohamutuk.org/Oil/Sunrise/10Sunrise.htm

Pipeline dreams and fantasies.



A milestone report prepared by NGO La'o Hamutuk in late 2007, tended to take a hard-headed look at the social and environmental impact of a potential stand-alone onshore LNG export facility in Timor-Leste. The facilities would be fed by an ultra-deepwater gas pipeline across the Timor Trough from the Sunrise field. The report tended to dampen our dreams and fantasies about the benefits of a single-location gas-processing *mega-project* run by foreigners. The report was based on the concept that Timor-Leste would be treated by the Woodside JV Partners only as a convenient platform – an alternative to Darwin - for hosting the required Sunrise LNG export trains and port facilities. The facilities might be “in” Timor-Leste, but not “for” Timor-Leste, the NGO warned. The unanimous acceptance by the Woodside JV of offshore processing by means of floating LNG facilities (FLNG) will have an indirect consequence of eliminating most of L’ao Hamutuk’s environmental and social concerns.

Finding the middle way.

What we explore in this talk is something quite different than an onshore LNG export industry confined to a single *enclave*. We contemplate a development concept involving importation of LNG, LPG and condensate to Timor-Leste directly from the proposed offshore FLNG facility. This would necessitate the construction of a lower-impact LNG storage and regasification terminal at Beacau, in the place of a greenfield LNG export plant. The adjusted Sunrise development concept would be aimed at achieving the economic development objectives desired from an onshore LNG-export mega-project, but tailored more to the energy-security and supply needs of the entire country. It would be both “in “ and “for” Timor-Leste.

Ref.

Floating LNG production facilities (FLNG)

"Nothing is as powerful as an idea whose time has come." - Victor Hugo



PRELUDE FLNG. Shell's Malcolm Brinded, left, Resources Minister Martin Ferguson, WA Premier Colin Barnett and Shell chair Ann Pickard in Perth on May 20, 2011 **

Prelude / 3.6 mtpa
Operator: Shell



Illustration Courtesy of Samsung Heavy Industries

Graphic of FLEX FLNG vessel

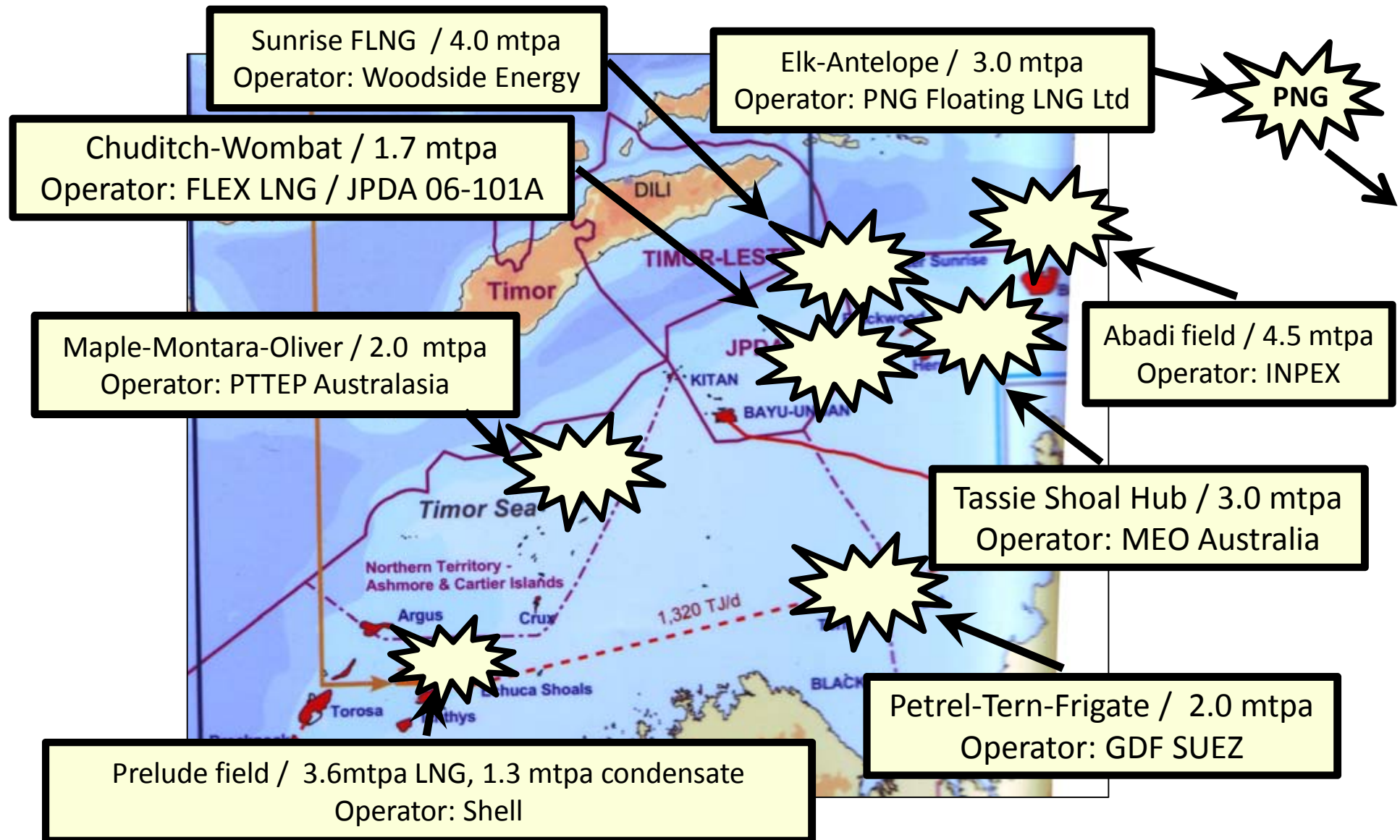
Chuditch and Wombat / 1.7 mtpa
Operator: FLEX LNG / JPDA 06-101A



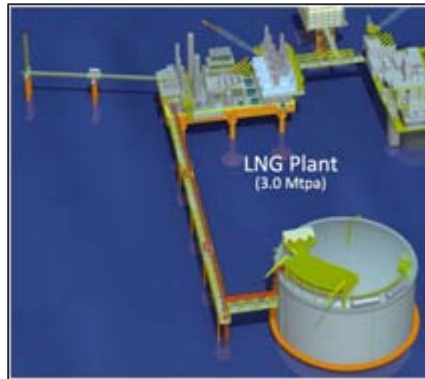
** Picture by Marie Nirme courtesy *The Weekend Australian*, May 21-22, 2011.

*** From presentation by FLEX LNG at SEB Enskilda Nordic Seminar on 7 January 2010

Floating LNG production facilities are here to stay.
After Shell's Prelude, another 7 FLNG projects are on the way, in our region.



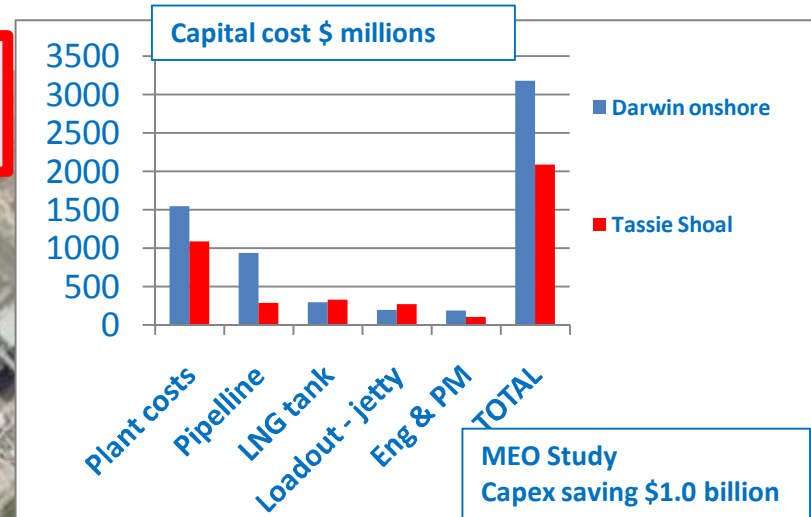
Offshore LNG production – a technological break-through aimed at lower overall capital costs and reduced environmental footprint.



Tassie Shoal Hub / 3.0 mtpa
Operator: MEO Australia



Planned 3.0 mtpa (MEO Australia) offshore plant superimposed on aerial photo of ConocoPhillips Darwin LNG plant (3.7 mtpa).

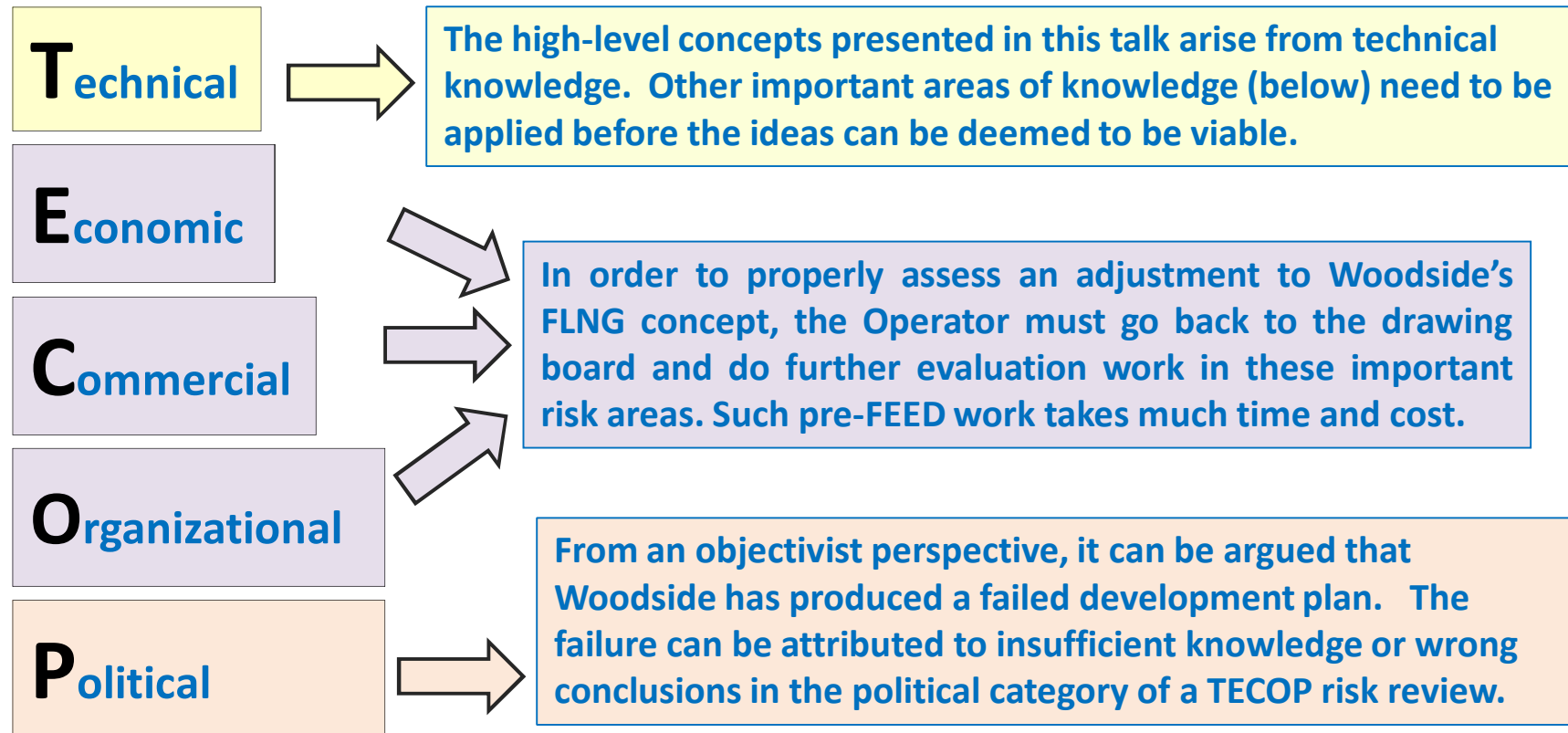


FLNG has inherent engineering advantages

1. Pipeline to shore & onshore storage, not required
2. Onshore environmental & land problems solved
3. Offshore compression for pipeline not required
4. Separate offshore condensate FPSO not required
5. Compact equipment modules
6. Small footprint due to water cooling in lieu of air
7. No offshore and onshore abandonment costs


Source: presentation by MEO Australia, Australasian FLNG/FPSO Forum, Perth, 21-22 September 2009

Technical considerations are only one piece of the jig-saw puzzle needed to be solved in order to get any major project approved by investors.



Due to unanimous approval by the JV partners of the floating LNG development concept for Sunrise, the leader's of Timor-Leste will understand that this proposal has come out on top after a well-resourced and highly professional TECOP analysis by Woodside's evaluation team and consultants. Engineering man-hours expended on this analysis are reported to exceed 300,000! Therefore, if the FLNG concept recommended by the JV can be modified or adjusted so as to satisfy Timor-Leste's development needs, rather than outright rejection, the JV partners may come to the party with a politically acceptable proposal..

Timor-Leste needs an adjustment to Woodside's FNLG development plan, rather than its outright rejection. CMATS has taught us that agreements between governments, made hastily, can be fine-tuned by negotiation.



FLNG: win win win

- Maximises total petroleum revenue for Timor-Leste and Australia
 - Timor-Leste: approx US\$13 billion# for its 18.1% share (adjusted upwards from approx US\$6 billion due to revenue sharing agreed under CMATS)
 - Australia: approx US\$19 billion# for its 81.9% share
- Delivers the best return for the Sunrise JV
- High profile international project paves way for further foreign investment
 - Successful execution of a "mega project" under an international treaty regime will enhance Timor-Leste's attractiveness for foreign investment
- Stimulates further social development in Timor-Leste

Based on Sunrise JV modeling assumptions which include but are not limited to

- Resource = 5.13 Tcf dry gas and 226 mmstb condensate, field life ~ 30 years
- Peak production rate = 4 mtpa LNG per annum and 10.3 MMbbl per annum
- LNG price = indicative Asia-Pacific pricing inflated by CPI
- Royalties = as per current regulatory and contractual regime

More work is needed to make this development concept a win-win-win-win (4 wins). The last win is to satisfy Timor-Leste's energy security and real economic development needs.

Bottom-up energy security (supply of gas molecules) represents a higher need for Timor-Leste than top-down revenue (supply of money).

This is the primary factor for JV acceptance. No argument here. At least 15% rate of return (ROR) needed.

This argument would hold more weight for Timor-Leste if the FLNG barge were moved from Australian territory into the JPDA (90% Timor-Leste sovereignty).

Social development is vague and unquantifiable. What is required is clean and affordable natural gas fuel from Sunrise, to underwrite Timor Leste's economic development and reduce energy poverty.

Source: Presentation by Don Veolte, CEO of Woodside, to UBS Resource Conference, 3 June 2010.

Imagined LNG facilities at Beaçu: mega project that is confined to one location, or manageable project that distributes energy throughout entire country?

The vision incompatible with FLNG

Full scale LNG export facility requiring a large diameter ultra-deepwater pipeline from Sunrise.

Without an imaginative alternative onshore development vision compatible with FLNG, the CMATS Treaty will, more likely than not, be terminated causing failure for all parties.



Picture: Bontang LNG plant, East Kalimantan, Indonesia.

A scaled-down vision, compatible with FLNG and more appropriate for Timor-Leste's economy and energy future.

LNG receiving and regasification terminal to fuel Timor-Leste's electricity network and future industrial, residential, and transportation needs.

Requires a negotiated amendment to current development plan but without jeopardising the use of Shell's FLNG vessel.



Picture: LNG import terminal, Saint John, Canada

What might be Timor-Leste's share of Sunrise production?

Plateau FLNG production

LNG 4.0 million tonnes/yr

LNG 540 million cf/day

LPG 1400 tonnes/day

Condensate 23,000 b/d

(0.72 mtpa)

(100 MMcfd)

(250 t/d)

(4,000 b/d)

Timor Leste share @ 18%*.

In theory, Timor-Leste could plan to use a proportion of this *de-jure* endowment for domestic energy supply, in preference to costly liquid petroleum products imported from other countries.

Gas required for Hera and Betano power plants running at maximum capacity (say at an average output of 205 Mwe in 2020) would be approximately 33 million cubic feet per day (33 MMcfd). This is about one-third of the gas flow rate that Timor-Leste might have access to under a "take or sell" arrangement with the Woodside JV.

* We assume here that Timor-Leste is entitled to claim de-jure ownership of 18% of Sunrise reserves, this quantity being 90% JPDA share of 20% reserves that are deemed to lie within the JPDA under the original Sunrise IUA. It can be argued morally that under CMATS, the reserves attributable to Timor-Leste would be about 26% after company take and 50-50 CMATS split (see La'o Hamutuk commentary "Burning natural gas, and selling it too" at laohamutuk.org/econ/SDP/10SDPindex.htm). However we assume the conservative position here

How might Woodside's FLNG proposal and Timor-Leste's "Tasi Mane" proposal be "married" as an integrated development?



* This picture is of a min-refinery at Eromanga, in outback Queensland, Australia.

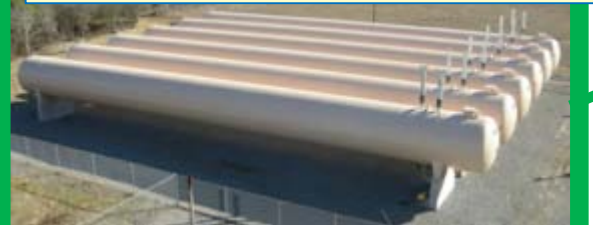
A petroleum product mix satisfies market demands better than a single type of primary energy.

Small-scale LNG receiving & regasification terminal



1. Clean and lower cost fuel for existing power stations
2. Fuel for combined cycle power station for export of electricity to West Timor?
3. Gas for towns by pipeline (compression required)
4. Gas distributed by LNG or CNG road tankers
5. Private investment in CNG fuelling of cars and busses.
6. Fuel gas for industrial & commercial heat & power
7. Potential petrochemical (fertilizer) and cement factory

LPG receiving & distribution terminal



- Private investment for bottling and distribution
1. Domestic and industrial cooking & heating
 2. Fuel for vehicles

Mini-refinery for processing condensate



Motor gasoline (petrol) for vehicle fuel

Kerosene for cooking and heating

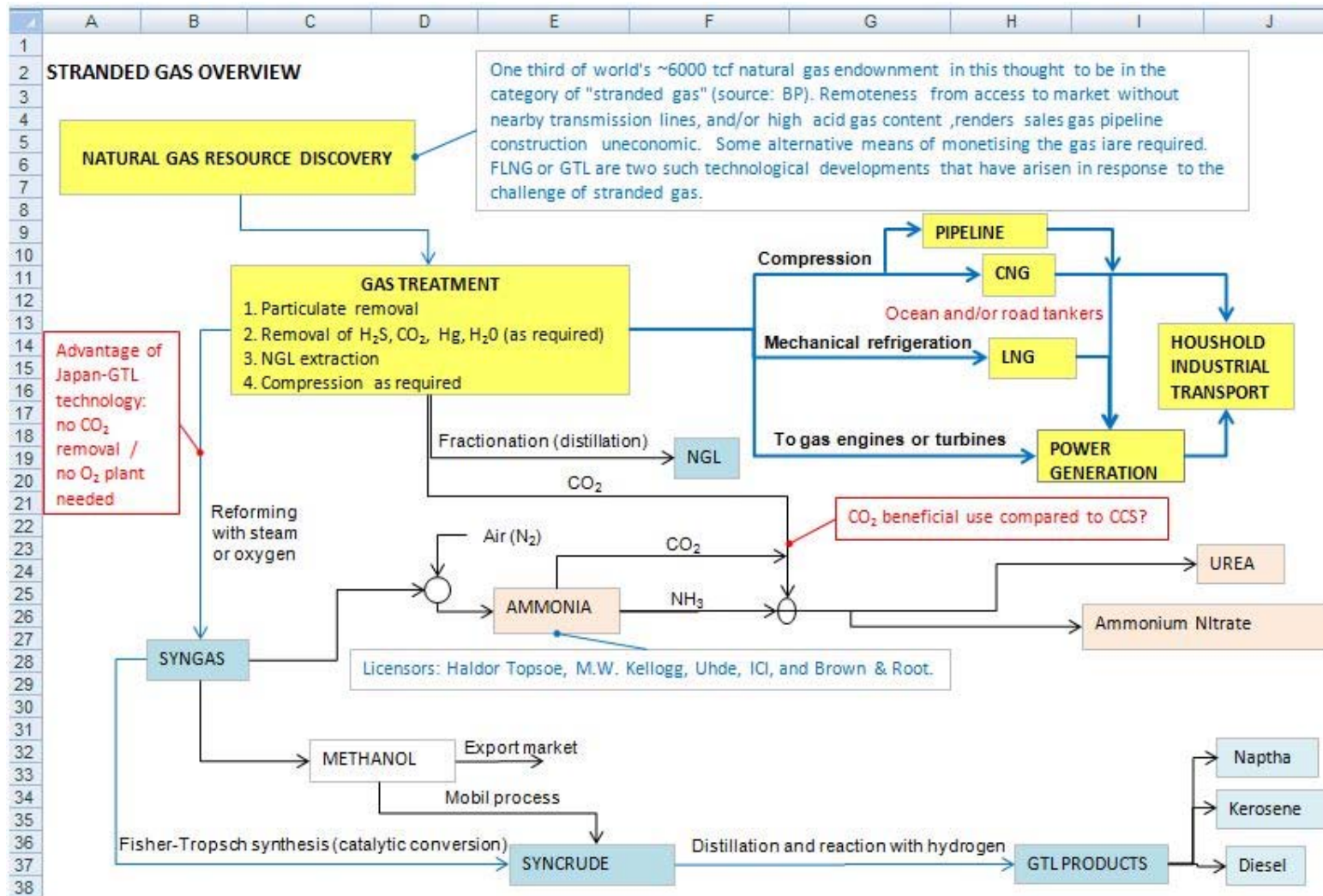
Diesel for power generation and vehicle fuel

Heavy residual stock (fuel oil) for industrial fuel

* We assume

Natural gas: a versatile and clean primary energy source for Timor-Leste.

It also has potential uses in the future as a chemical feedstock.



Reference

Distribution of future natural gas in Timor-Leste.



Natural gas can be moved around Timor-Leste by pipeline

Learn about quick pipeline installation from Queensland's coal seam gas industry!

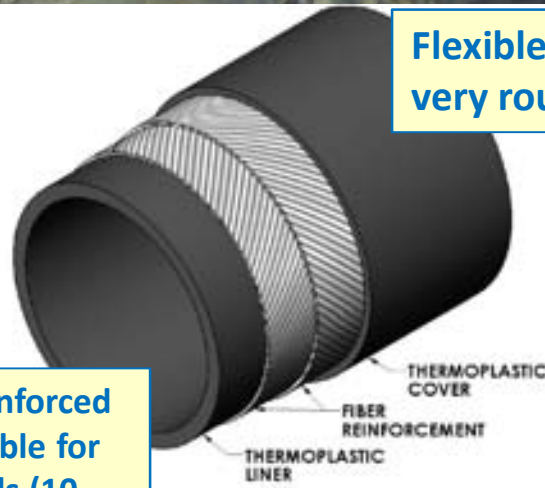


Timor-Leste is fortunate to own natural gas produced offshore! No difficult land issues caused by conflict between energy production and food production.

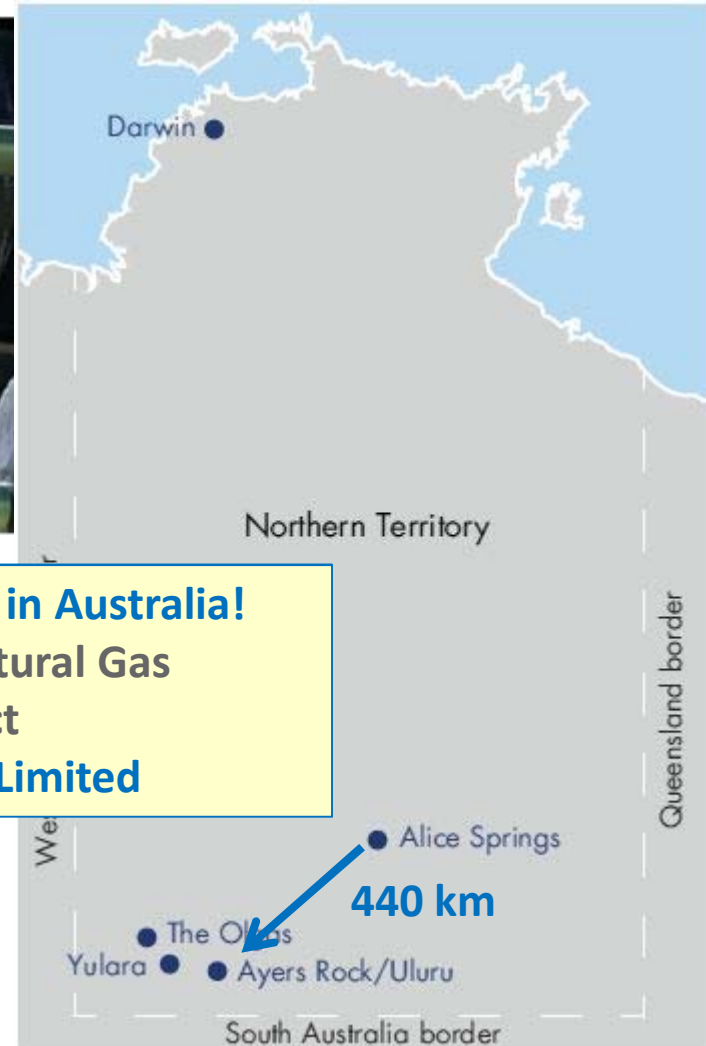


Flexible pipes can be laid rapidly and cost-effectively in very rough terrain with new-technology ploughs

New-technology spoolable reinforced composite pipelines are available for pressures up to 10 megapascals (10 MPa or 1500 psi)



Natural gas can be moved around Timor-Leste by road, as CNG



Learn how this is done in Australia!
Yulara Compressed Natural Gas (CNG) Transport Project
Energy Developments Limited



Energy for cooking: children pilfering gas for their families in China!.

Natural gas can be moved around Timor-Leste by road, as LNG.



Road tanker moves fuel from micro-LNG plant at Karratha



Broome power station and LNG storage terminal



Learn from Australian experience!

West Kimberley Power Project

- delivering LNG to remote power stations by road tanker



reference

LNG-fuelled power stations in Australia

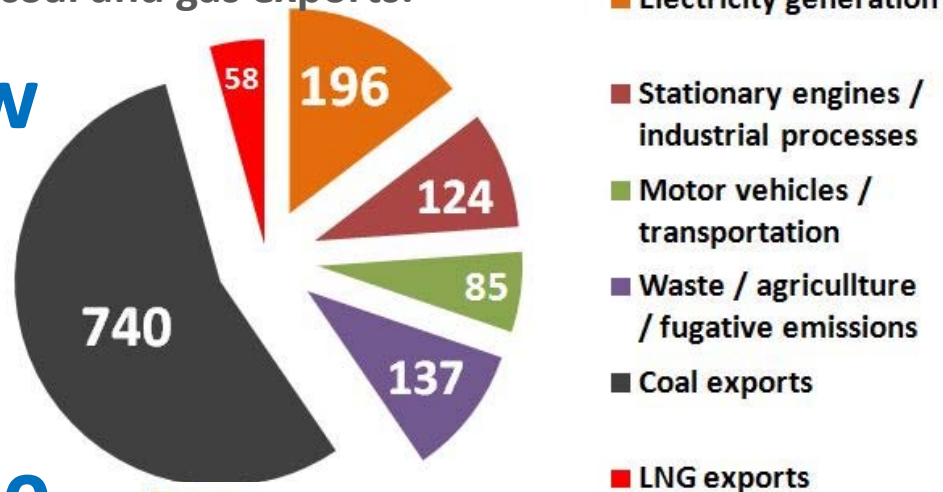
- Broome (32 MW)
- Derby (15 MW)
- Fitzroy Crossing (5 MW)
- Halls Creek (4 MW)

“Carbon pollution” – PM

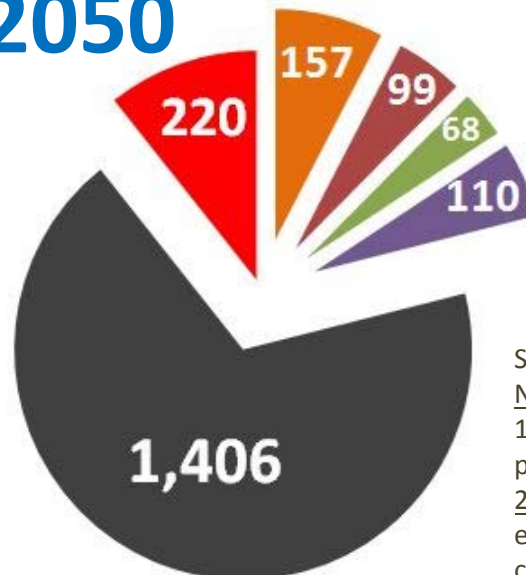
Why Timor-Leste does not need a tax on ~~carbon dioxide emissions.~~

Even with a “carbon tax”, Australia’s *de-facto* CO₂ emissions are expected to grow by over 50% by 2050, due to coal and gas exports.

Now



2050



Numbers in charts are millions of tonnes of CO₂ per year

“There’s a great future for coalmining in this country” – PM

Source of data.

Now: Australian onshore CO₂-e 545 mtpa 2009-10, from Dept of Climate Change; add coal production 250 mtpa and LNG production 20 mtpa
2050: assume 20% cut in Australian onshore emissions due to CO₂ tax; LNG exports 80 mtpa; coal exports 190% current, per Treasury forecast.

Over half of Australia’s contribution to global CO₂ emissions is generated by coal exports.

The Australian government encourages coal exports, forecasted to grow by 190% up to 2050!

Australia’s tax on domestic carbon dioxide emissions is being marketed as an anti-pollution and an anti-climate-change policy. This is bogus, for the policy will not impact the climate and carbon dioxide is not a pollutant in the strict sense of the word. *The tax does make sense however when seen as an energy policy.* It will encourage the development of renewable energy to assist Australian future energy security after exporting as much of our coal and natural gas as possible.

Timor-Leste is in a position to do more than Australia (on a per capita basis) to reduce her carbon dioxide emissions. This can be achieved by switching energy source for electricity generation from heavy fuel oil to natural gas.

Timor-Leste is in a position to help the Woodside JV avoid Australia's planned tax on carbon dioxide released from the Sunrise FLNG vessel.

smh.com.au
The Sydney Morning Herald

Carbon price should wait, says boss of Woodside

Clancy Yeates
April 11, 2011



APPEA - LNG exports will do more to reduce global emissions than a carbon tax

Nick Evans, Business Reporter | PerthNow | April 10, 2011 3:17pm | 9 comments

A⁺ A⁻ | Share  

Carbon tax a risk to LNG exports, warns Woodside Petroleum

Andrew Burrell | The Australian | April 20, 2011 12:40PM

A⁺ A⁻

Call for LNG exemption

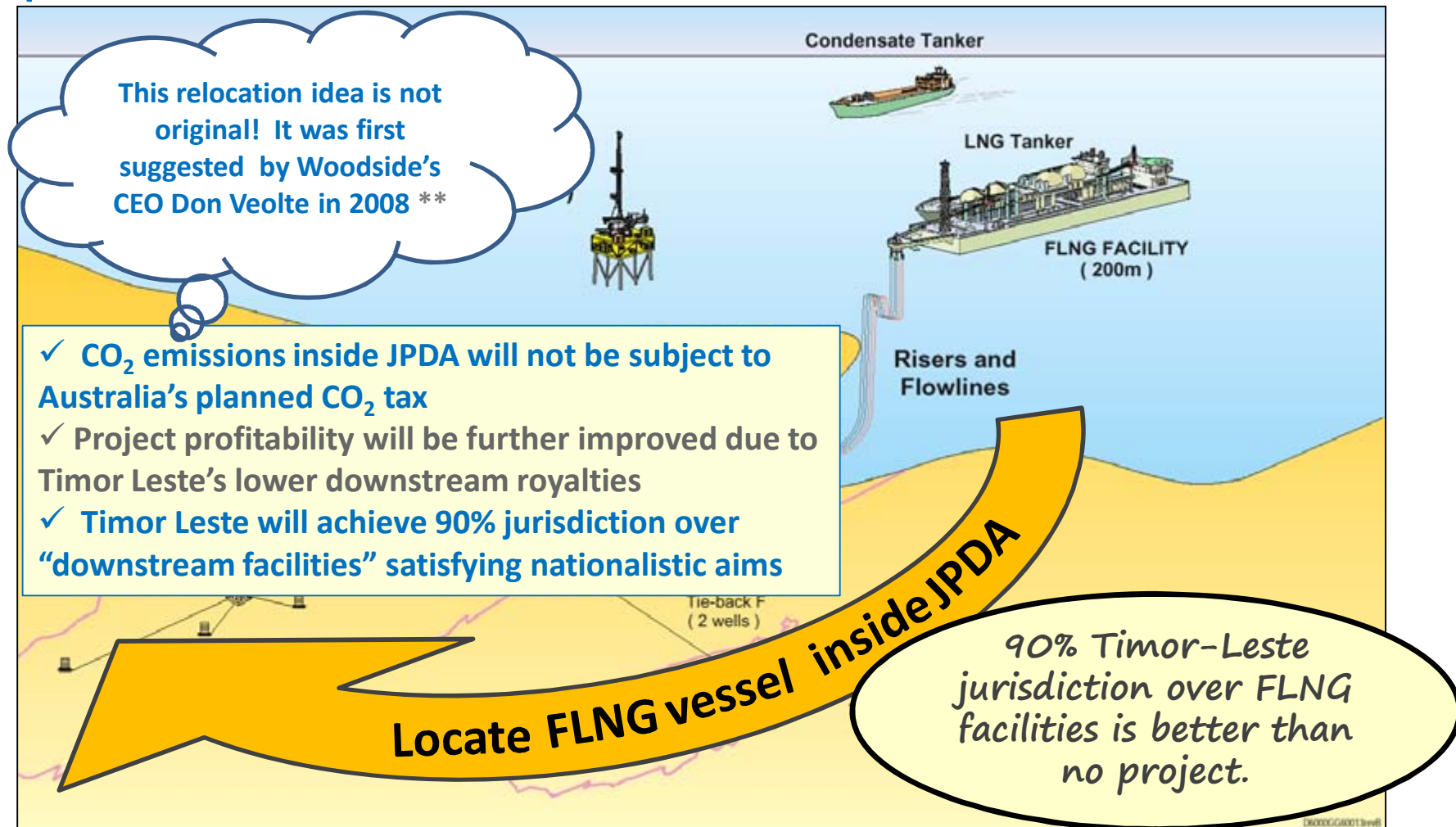
Jared Lynch
March 7, 2011

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LIQUEFIED natural gas exports should be exempt from the Gillard government's carbon tax, Woodside Petroleum said yesterday

The FLNG vessel could be located a few kilometres westward, within Timor-Leste's Joint Petroleum Development Area (JPDA). This would benefit both parties for different reasons.



Source of background artwork: J. Kernaghan, Woodside Energy Ltd., Energy and Mineral Resources Conference, , Dili, Timor Leste. March 5-7, 2003

** refer suggestion by Mr Don Veolte as reported in *The Age*, November 14, 2008 "Woodside floats an idea of setting sail with Sunrise gas project"

Timor-Leste has something worthwhile to offer the Woodside JV in return for cooperation and conflict resolution. Avoidance of Australia's CO₂ emissions tax!

Component	"Most Likely - Rich" (mol%)
	Dry Wellstream
Water*	0.000
CO ₂	5.250
N ₂	0.740
Methane	77.800
Ethane	4.650
Propane	2.390
Iso-Butane	0.650
n-Butane	0.980
Iso-Pentane	0.530
n-Pentane	0.470
n-Butyl Cyclohexane	0.600
n-Decane	0.960
n-Nonyl Benzene	0.137
n-Hexadecane	0.031
Hexanes	1.834
X-180	0.001
X-350	0.000
Pseudo 28B	0.006
Total	100.0

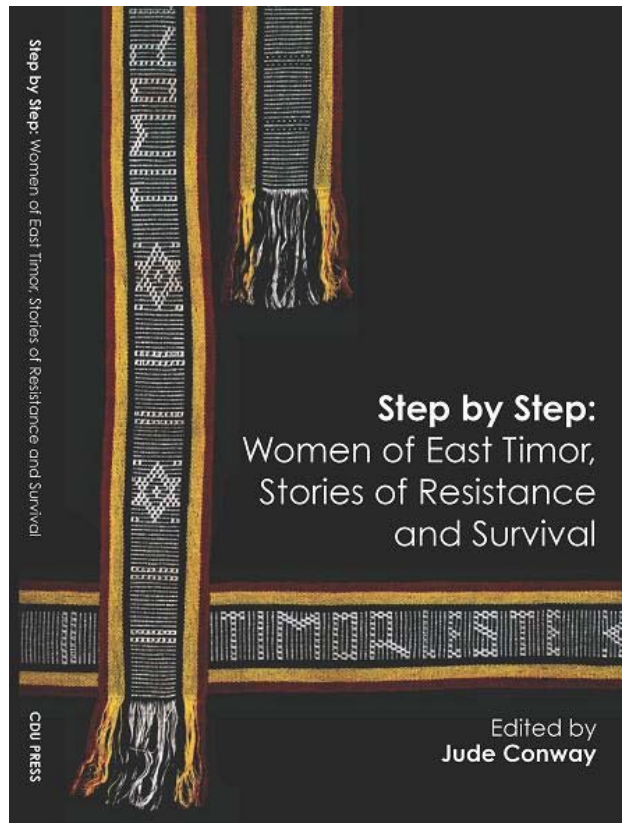
	A	B	C	D	E
42	SIMPLE MATERIAL BALANCE FOR 4.0 mtpa LNG TRAIN				
43	LNG production		mtpa		4.0
44	Molecular weight		kg/kgmol		17.0
45	LNG production		MMscfd		539
46	CO ₂ content, scf per scf LNG produced				6.3%
47	Fuel usage, scf per scf LNG produced				17%
48	Inlet sales gas		MMscfd		632
49	Inlet CO ₂		MMscfd		43
50	Total inlet sales gas + CO ₂		MMscfd		674
51	Amine plant CO ₂		MMscfd		43
52	Amine plant CO ₂		mtpa		0.8
53	Fuel CO ₂ emissions		MMscfd		92
54	Fuel CO ₂ emissions		mtpa		1.8
55	Total plant CO ₂ emissions		mtpa		2.6
56	LNG product combustion CO ₂ emissions		mtpa		10.4
57	Grand total CO ₂ emissions		mtpa		13.0

At \$23/tonne CO₂ tax, potential savings are \$60 million/yr if FLNG facility is located in JPDA? **

FWS gas composition courtesy confidential source (June, 2004)

** There may be some Australian government compensation to the LNG production industry – details to be confirmed.

Step by step towards energy security



X,

The men, women, teenagers & children of Timor-Leste need access to more affordable gas and electricity for their economic and material welfare. We in Australia take this energy for granted. We have never had to contemplate life with little energy for our home, our work and our transportation.

Ask the Palestinians in Gaza how a lack of energy affects their daily lives! Then ask yourself why after all these years they have so little power when they have theoretical ownership of natural gas resources within their offshore maritime territory.

Energy is needed by the women and mothers of Timor-Leste who must cook and wash and keep their children fed, clean and healthy. Women in the remote villages cooking over wood fires results in health and environmental deficits. Good lighting is required for those teenagers who are studying for scholarships or educating themselves for its own sake.

The leadership of Timor-Leste has shown extraordinary courage and vision to press ahead with a national electricity grid. That is the first step.

Now for the second step: securing clean natural gas from Sunrise as a primary energy source to underwrite Timor-Leste's development.

Ten advantages of a Sunrise gas & liquids import infrastructure compared to a Sunrise onshore export industry.

Importation of energy to fuel growth in Timor-Leste – through an adjustment to the current Sunrise development concept - has the potential to achieve:

1. satisfaction of the real needs of both Timor-Leste & Woodside JV
2. superior economic benefits for Timor-Leste
3. Long term energy security for the population of Timor-Leste
4. enhancement of RDTL Strategic Development Plan 2011
5. a less ambitious but more realizable “Tasi Mane” project
6. improved mix of fuel types for homes, businesses and transportation
7. chemical feedstock for possible fertiliser production
8. export of electricity to West Timor
9. significant reduction in Timor-Leste’s CO₂ emissions without a carbon tax
10. improved upstream profitability by avoidance of Australia’s carbon tax

As members of the Australian East Timor solidarity movement - whose roots go back to the catastrophe of December 1975 - we all hope and pray that Timor-Leste will succeed economically. Thank you. Any questions?



Picture courtesy David Ewing / worldofstock.com



UN Photo/Martine Perret



UN Photo/Martine Perret



Picture courtesy BBC News / news.bbc.co.uk/2/hi/in_pictures/5016138.stm



UN Photo/Martine Perret



Picture courtesy timorhauniandoben.blogspot.com