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As Bayu-Undan dries up: challenges and opportunities

By Charles Scheiner, La'o Hamutuk, November 2017

Abstract

For the first 14 years of Timor-Leste's independence, revenue from oil and gas exports – primarily the Bayu-Undan field – has nourished the creation of democratic state institutions and helped people emerge from a generation of brutality, war and devastation. But the oil era is ending: 98% of expected revenue from developed fields has been received by 2017, and prospects for additional extractive revenue are uncertain. This paper explores the history of oil and gas in Timor-Leste and assesses possibilities for additional petroleum and mineral revenues. It also touches on more practical and sustainable development paths based on the country's human and renewable resources.

Timor-Leste faces tremendous challenges as the oil and gas revenue which has supported the country for the last decade comes to an end. The challenges are exacerbated by vested interests and personal and political agendas, and made more difficult to overcome by inertia, wishful thinking, and, most of all, the human instinct to deny or postpone unpleasant reality.

This paper examines the likelihood that Timor-Leste has yet-to-be-discovered, recoverable oil and gas reserves which can replace Bayu-Undan and fields which have already shut down. The author began by researching scientific evidence and interviewing geologists. But the scientists are unsure – there are too many unknowns and opinions to reach definitive, objective conclusions. Oil prospecting is like roulette: you can win big, but you are more likely to lose (and the house always takes a cut). The paper therefore explores historical lessons to help assess the future, especially past decisions by oil companies to explore (or not to explore) in Timor-Leste. Companies are motivated by profits and make decisions based on objective analysis of available evidence, even if they don't always make their data or reasons public.

From Timor-Leste's perspective as the owner of the resources, petroleum projects should only be undertaken when they will help the nation's people. They are worth doing if the financial and economic benefits -- including state revenues, jobs, and spin-off contracts for local businesses -- outweigh the investment, operational and social costs, displacement of people and livelihoods, health and safety risks, and local and global environmental impacts.

However, some people working in the petroleum sector in Timor-Leste seem to believe that oil is to be extracted merely because it's there, and that extracting it has some intrinsic value.¹ They prioritize fuel sovereignty over self-sufficiency in food or drinking water. They advocate spending billions of public dollars on dubious petroleum infrastructure ... because oil has lubricated Timor-Leste's treasury up to now.

If extracting and producing petroleum products comes at a higher net cost than using renewable energy or importing fuel, the state should not subsidize the oil sector. It's an inefficient economic engine – the petroleum industry worldwide employs fewer people per dollar spent than any other sector. Health care creates three times as many direct and indirect jobs, while education creates five times as many (Bacon and Kojima 2011, 38-40). These investments in human resources have collateral benefits of improving Timor-Leste's future workforce, making people's lives better, and diversifying an economy currently dependent on one non-renewable resource.

¹ The first objective in the draft Decree-Law regulating Onshore Petroleum Exploration is to 'Ensure maximum ultimate recovery of Timor-Leste's Petroleum resources' (ANPM 2017b, Article 2.1(a)).

Dependency and addiction

For the last ten years Timor-Leste has been one of the most petroleum-export-dependent countries in the world. Oil money dominates the economy and state finances, even though it provides few jobs for Timorese people or contracts for local companies.

Table 1. Petroleum Dependency (million current U.S. dollars)

The Economy	2013	2014	2015
Petroleum GDP	\$4,234 (75%)	\$2,591 (64%)	\$1,496 (48%)
Non-oil GDP	\$1,410 (25%)	\$1,451 (36%)	\$1,607 (52%)
Productive (agriculture & industry)	\$289 (5%)	\$295 (7%)	\$293 (9%)

State income (projected for 2017)	\$1,312 (Considering the Petroleum Fund as part of the state)
From oil and gas extraction	\$263 (20%)
From investing the Petroleum Fund	\$843 (64%)
From all other sources	\$206 (16%)

State Expenditure (appropriated for 2017)	\$1,387 (How expenditures will be paid for)
Withdrawn from the Petroleum Fund	\$1,079 (78%)
Non-petroleum (domestic) revenues	\$ 206 (15%)
Loans which will have to be repaid	\$ 102 (7%)

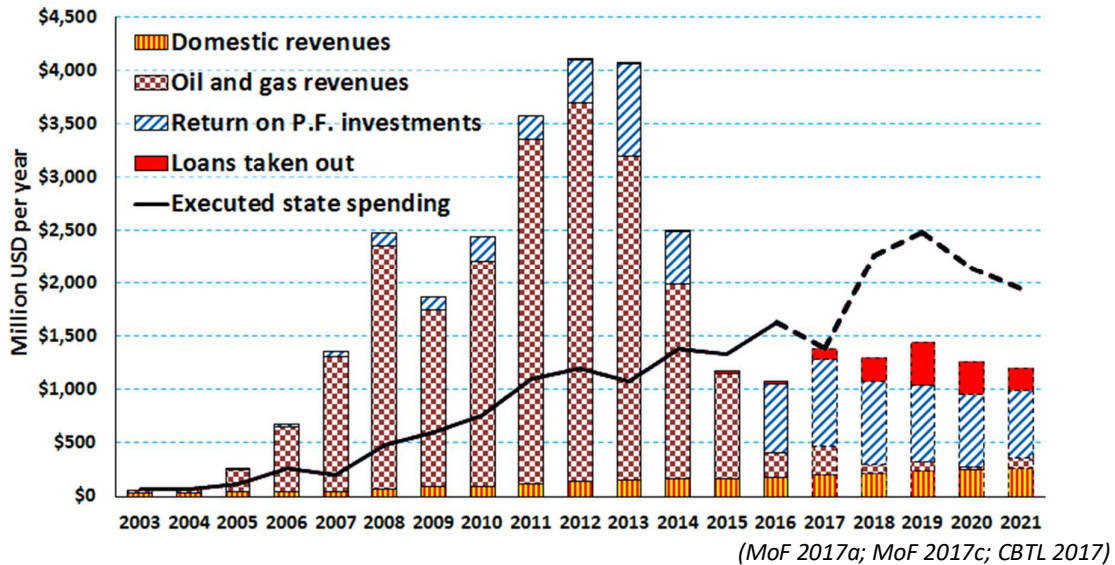
(MoF 2017c, Book 1; GDS 2017)

From 1999 through October 2017, Timor-Leste received US\$21.5 billion in oil and gas revenues from the Elang-Kakatua, Kitan and Bayu-Undan fields – and it will get only about \$0.4 billion more from those nearly-exhausted reserves (CBTL 2017; MoF 2017c).

Since 2005, Timor-Leste has wisely saved most of its oil income in the Petroleum Fund, which is invested overseas in bonds and stocks which have earned \$4.5 billion for the country. The government has spent \$9.3 billion of the money it received from oil and investments, and about \$16.7 billion remains in the Fund, whose balance peaked in mid-2015. Since independence, oil revenues have paid for 83% of all state spending. The Ministry of Finance expects the Petroleum Fund to finance 75% of state activities during the next five years, although oil and gas revenues in 2016 were only one-eighth of their 2012 peak.²

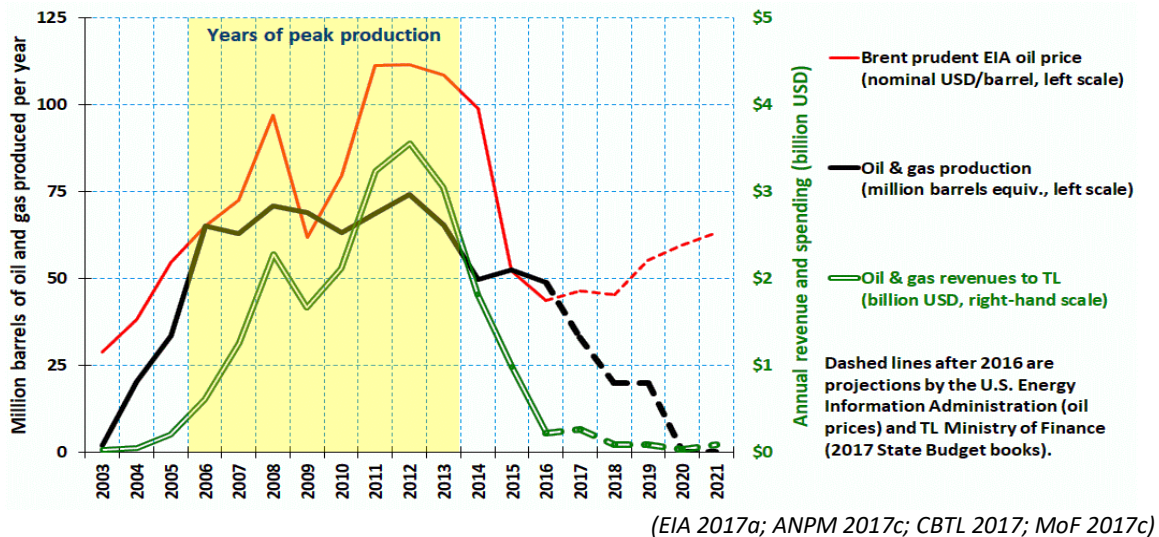
² This is after adjusting for taxes that were over-assessed in 2010-2013 and refunded to the companies in 2015-2017 (La'o Hamutuk 2017d). Actual revenue received in 2016 was only one-sixteenth as much as was received during 2012, as shown in Figure 1.

Figure 1. State income and expenditures (including the Petroleum Fund)



Timor-Leste has spent more than its income each year since 2015, and the gap will probably increase significantly after 2017 (although the policies of the newly-elected government are uncertain at the time of writing).

Figure 2. Timor-Leste’s oil and gas income



Timor-Leste was lucky -- most of its oil and gas was produced (thick black line in Figure 2) and sold while world oil prices (thin red line) were historically high. Prices dropped by more than half in 2014. At the same time, production is slowing as the fields near exhaustion, with each remaining barrel costing more to extract. These factors combined caused Timor-Leste’s oil revenues (double green line) to plunge, and they will cease after 2021.

All the numbers mentioned so far are from Timor-Leste government sources, and knowledgeable authorities know that the oil revenue is ending (MoF 2017b; MoF 2017c; IMF 2017; World Bank 2017). In September 2016, the Ministry of Finance’s Petroleum Fund Investment Advisory Board ‘recognised that the Fund’s balance will continue to decline over the [next five years] and, if those projections are extended, then the Fund will be exhausted sometime within the next 15 to 30 years’ (MoF 2017b, 13). Nevertheless, the 2017 State Budget envisions withdrawing three times the sustainable level from the Petroleum Fund from 2018 to 2021, reducing its balance by 24% (MoF 2017c).

Unfortunately, the Ministry of Finance does not publish forecasts more than five years ahead. According to a model that the author developed for La'o Hamutuk, the Petroleum Fund could be entirely empty in a decade (La'o Hamutuk 2015b).

Finding oil and gas is hard.

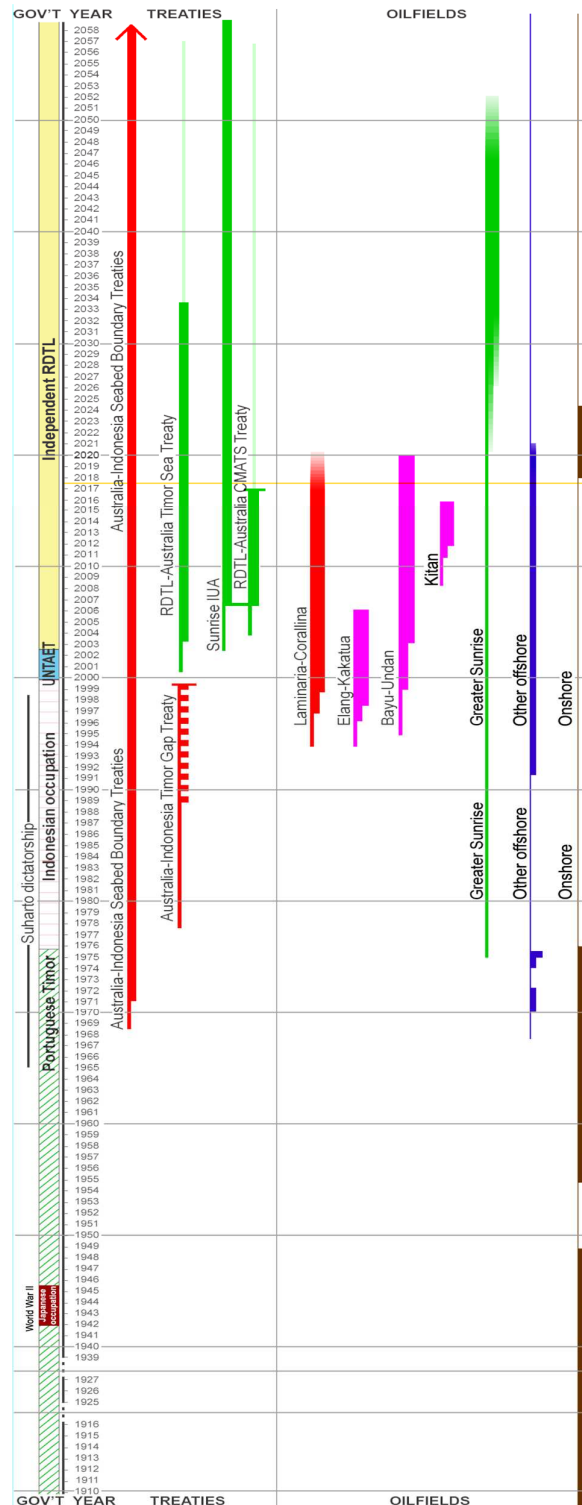
How does anyone know what's buried kilometres under the land, ocean or seabed? Geological structures, surface rocks and seismic data give hints, but drilling and pumping is the only way to be certain what's underground, especially given Timor-Leste's complex geology.

People and companies have looked for petroleum in and under Timor-Leste for more than 150 years, and what they found (or didn't find) can help assess future prospects. Their decisions, which were usually based on evidence and sought to maximize profits, can be useful guides as Timor-Leste's government decides what to do in the future.

Portuguese colonizers started looking for oil in 1856, drilling the first small well at Pualaca, Manatuto in 1892, followed by more wells and intermittent production. Aliambata, Viqueque, was more intensively developed, producing up to 36 barrels per day before becoming mired in corporate infighting in the 1920s.³

Between 1910 and 1975, Portuguese and Japanese occupiers drilled more than 30 onshore wells, mostly near oil and gas seeps, and several provided oil for local use. Although seeps can be useful sources of small amounts of oil or gas, many geologists believe that they are unlikely to indicate reserves big enough for large-scale commercial development. A seep indicates that the petroleum, which took tens or hundreds of million years to form, is leaking out, and there may not be much left under the ground.

Figure 3. Timeline of oil and gas exploration in Timor-Leste



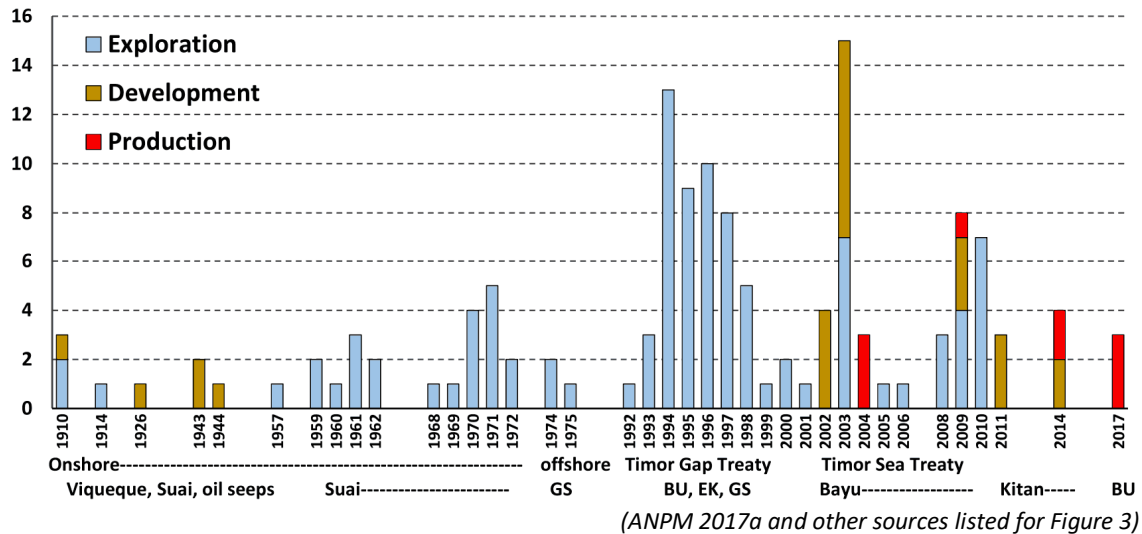
(Leme 1968; Charlton 2003; Timor Gap Joint Authority 2000; Charlton 2017; ConocoPhillips 2007; ANPM 2017a; McGrath 2015a; McGrath 2015b; TSDA 2006; Ytreland 2005)

³ José Ramos-Horta's eldest brother ran a small refinery in Pualaca in the 1970s. In 2003, the ADB, World Bank and TL Government began planning a small (300 KW) power plant fuelled by the gas seep at Aliambata, but the project was cancelled seven years later 'following tests showing that gas resources in the project areas would be insufficient' (World Bank 2013, 39).

Although wells had been drilled along the Suai coast, the Australia company Woodside/Burmah Oil drilled the first offshore well in Portuguese Timor, Mola-1, in early 1975, a year after Woodside had discovered the Sunrise field in Timor Sea waters claimed by Australia.

The illegal Indonesian invasion and occupation temporarily ended both onshore and offshore petroleum prospecting in Timor-Leste. However, Indonesia and Australia soon started negotiating to carve up the seabed resources, signing the Timor Gap Treaty in 1989.⁴ That Treaty took effect in 1991 and opened the floodgates to offshore exploration. The first contracts between companies and the Indonesia/Australia Timor Gap Joint Authority were signed one month after the 12 November 1991 Santa Cruz massacre, and more followed in 1994, 1995 and 1996 (Timor Gap Joint Authority 2000).

Figure 4. Number of oil and gas wells drilled each year in Timor-Leste's territory



During the Indonesian occupation, 26 companies drilled 47 wells in the Zone of Cooperation (ZOCA) in the Timor Sea, which became the Joint Petroleum Development Area (JPDA) after 2002. Thirty-four of these tried to find new fields, and they discovered Elang-Kakatua, Bayu-Undan and Jahal-Kuda Tasi. This is consistent with the worldwide average, where one out of eight exploratory wells finds a commercially viable deposit.

Although most production was postponed until the Indonesian occupation ended, Elang-Kakatua and Laminaria-Corallina⁵ began making money for Indonesia and Australia in 1998 and 1999. In February 2000, the four-month-old UN Transitional Administration in Timor-Leste (UNTAET) agreed with Australia to continue to terms of the illegal Timor Gap Treaty (with revenues going to Timor-Leste instead of to Indonesia), and to honour contracts signed under it.

UNTAET worked to resolve boundary and revenue-sharing with Australia so that Bayu-Undan and Sunrise could move toward production, and they encouraged Timorese leaders to sign the Timor Sea Treaty on 20 May 2002, its first day as a sovereign state, establishing the Joint Petroleum Development Area and deferring a maritime boundary settlement. At that time, the world market price of oil was \$25 per barrel, and UNTAET estimated that Timor-Leste would receive \$2.5-\$3 billion from Bayu-Undan over the next 17 years (UNTAET Press Office 2002). Fifteen years later, the country has received seven times

⁴ Australia, partly motivated by petroleum possibilities, was almost alone in accepting Indonesia's incorporation of Timor-Leste as legal. Until 1999, the United Nations considered Timor-Leste to be a "non-self-governing territory" administered by Portugal, and the International Court of Justice ruled in the 1995 *Portugal v. Australia* case that its people had an inalienable right to self-determination which had not yet been realized.

⁵ Laminaria-Corallina lies just west of the Joint Development Area under waters claimed by Australia. However, a maritime boundary drawn according to international legal principles could place it in Timor-Leste's Exclusive Economic Zone.

that much. Perhaps this is one reason that ‘expert’ advice is often disregarded by Timorese policymakers.

The contracts signed under the Australia/Indonesia regime lapsed when the Timor Sea Treaty took effect in April 2003, although Annex F of that Treaty states that ‘Contracts shall be offered to those corporations holding, immediately before entry into force of the Treaty, contracts numbered 91-12, 91-13, 95-19, and 96-20 in the same terms as those contracts...’. Those contracts were offered and re-signed the following month, with joint ventures led by ConocoPhillips (JPDA 03-12 and JPDA 03-13, covering Bayu-Undan and Elang-Kakatua) and Woodside (JPDA 03-19 and JPDA 03-20, covering about one fifth of Greater Sunrise) (La’o Hamutuk 2006).

Interim contracts for other JPDA areas were signed in 2003 with ConocoPhillips and with Woodside, but they expired in 2006 after new legislation came into effect. ConocoPhillips allowed its two contracts to lapse, but Woodside signed a new contract JPDA 06-105, which included the Kuda Tasi and Jahal oil fields, too small to be commercially viable at the time. In September 2007, Woodside sold this contract to Eni, who discovered the Kitan field in March 2008 and extracted its oil from 2011 to 2015.

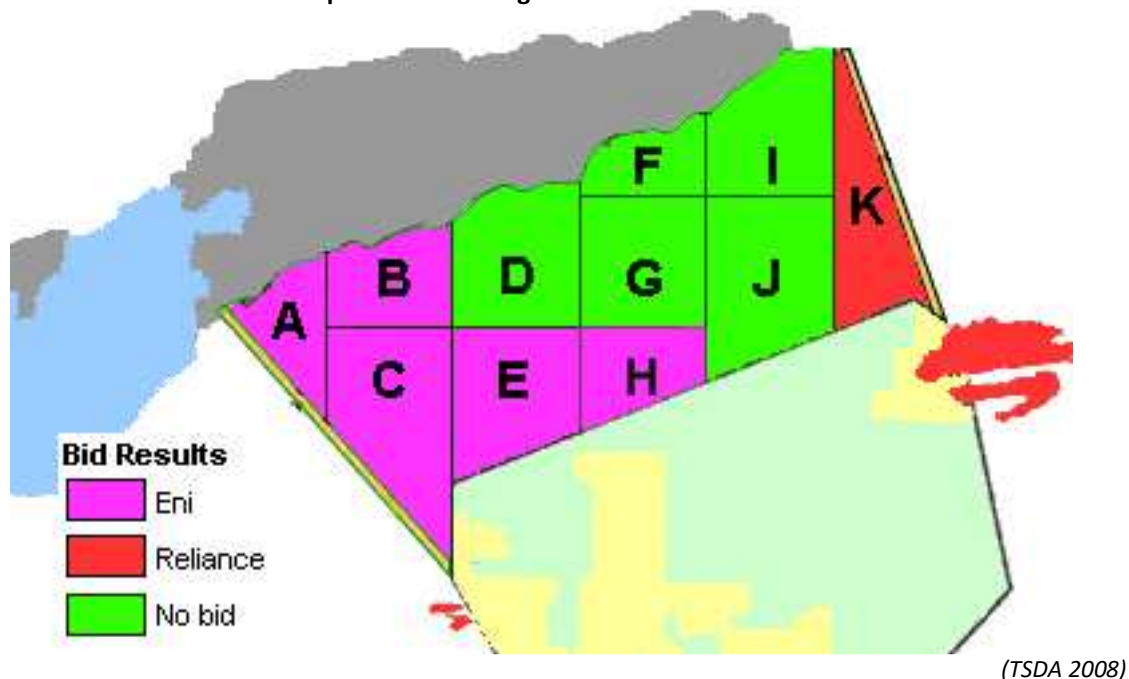
Open bidding in 2006

The most fair, transparent and common way to release areas for petroleum exploration is through an open, competitive bidding process, inviting companies to submit proposals to develop a particular area, which are then evaluated on technical and financial grounds. The details were spelled out in Timor-Leste’s Petroleum Activities Law 13/2005 and Government Decree 7/2005.

In 2006, Timor-Leste held its first (and only) bidding rounds. Dozens of international oil companies had already explored the Timor Sea area for decades, accumulating deep understanding of its geology, but Santos was the only one to submit a bid. People from several other companies privately told the author that they didn’t bid because the area was less promising than other possibilities elsewhere.

However, the joint Australia-Timor-Leste TSDA awarded contracts in vacant areas of the Joint Petroleum Development Area (JPDA) to consortia led by Minza, Petronas and Oilex. Bids from Santos and Duddel Resources lost the competition (Timor Sea Designated Authority 2006). The three winning consortia explored but found nothing worth developing and have relinquished their areas.

Figure 5. Exclusive Area blocks opened for bidding and contracted in 2006.



(TSDA 2008)

Also in 2006, Timor-Leste invited bids for its Exclusive Area (TLEA), the uncontested maritime territory between the JPDA and the south coast, as shown in Figure 5. Two companies received contracts: Reliance in eastern area K, and Eni for blocks A, B, C, E and H. Although Petronas also bid for blocks C and E, nobody bid on the other five blocks (RDTL Ministry of Natural Resources, Minerals and Energy Policy 2006). Unfortunately, exploration of these areas has not been promising. Reliance and Eni each drilled one well, finding nothing of commercial value; Reliance has departed and Eni has relinquished everything except parts of blocks E and H.

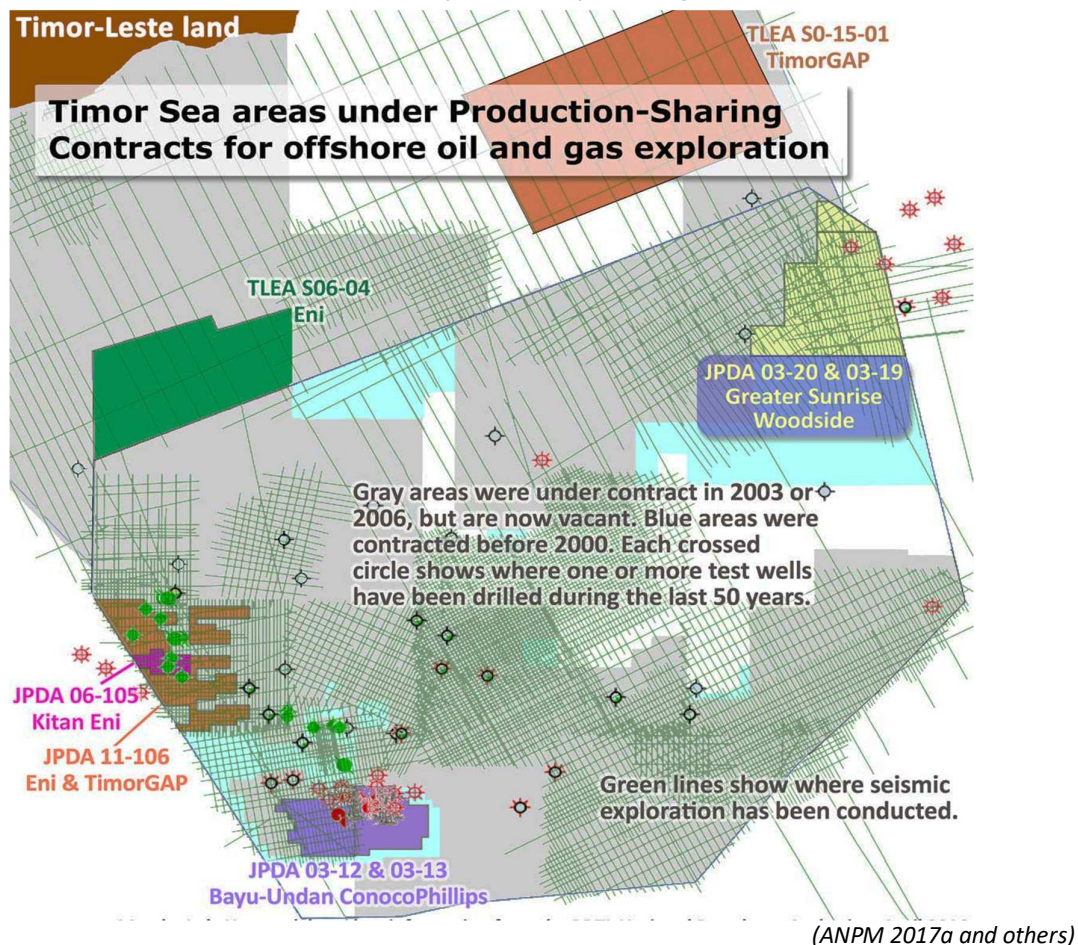
Most companies have given up.

Between 2003 and 2017, companies drilled 49 wells in the JPDA and TLEA, of which 23 were for exploration. Kitan is the only commercial discovery made since the mid-1990's.

Timor-Leste has not held a bidding round since 2006. In 2010, the National Petroleum Authority (ANP) announced that it would offer offshore acreage in 2011, but the auction has been repeatedly promised and delayed, perhaps because few credible companies are interested (ANP 2010, 47; ANP 2011, 10; ANP 2012, 36; ANP 2013; 26,37; ANP 2015, 32; Wilkinson 2014; RDTL 2015; *Rigzone* 2015; Evans 2016). Similarly, an onshore bidding round announced for 2015 never took place (TimorGAP 2015, 5).

Although ANPM (ANP was renamed the National Petroleum and Minerals Authority in 2016) and the TimorGAP National Oil Company often say that 65% of the Joint Development Area and 85% of Timor-Leste's Exclusive Area is 'open acreage' (Monteiro 2016, 8), almost all of this area has already been explored and found not to be commercially viable, as shown in Figure 6. The small white areas failed to interest past bidders, based on geological and seismic evaluation.

Figure 6. Timor-Leste's maritime areas currently covered by oil and gas contracts



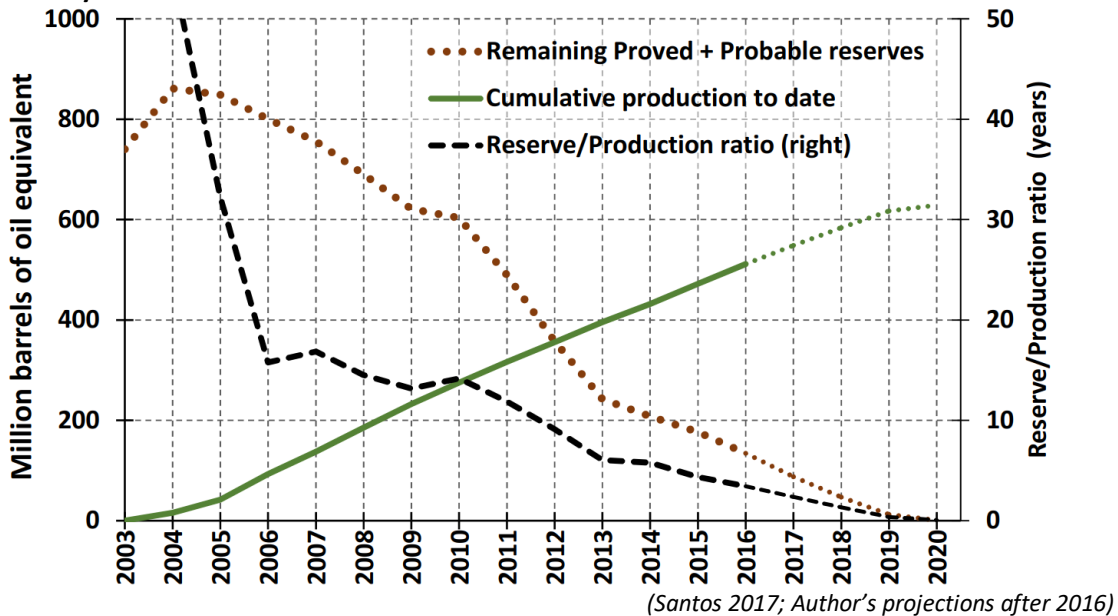
After oil prices crashed in 2014, the industry cut back its prospecting plans worldwide. Companies are reluctant to resume, given increasing concerns about climate change, the declining cost of renewable energy, and the recent influx of unconventional ‘fracked’ natural gas. In addition, formerly ice-bound Arctic areas are more attractive to oil prospectors than the Timor Sea (Rascouet, 2016).

Three oil and gas fields have provided revenue since independence.

Elang-Kakatua/Kakatua North (EKKN) produced 32 million barrels of oil starting in 1998, providing about \$100 million in revenues to Timor-Leste. It was expected to shut down in 2002, but ConocoPhillips repeatedly extended production, while oil prices rose from \$25 to \$72 per barrel. In 2007, ConocoPhillips finally decided that the field was no longer profitable and shut it down. Timor-Leste tried for about six months to find another company to keep EKKN going, but was unsuccessful (La’o Hamutuk 2008a). TimorGAP resurrected this goal in 2013, promoting a ‘project to drain the field of its remaining producible oil,’ but it has not materialized (TimorGAP 2014, 20).

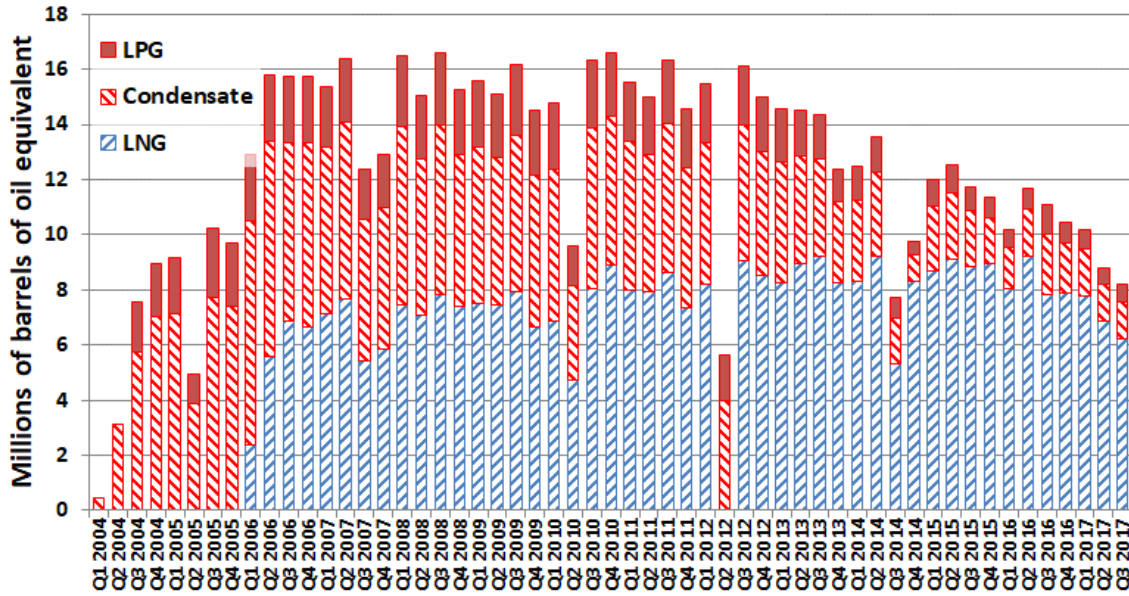
Bayu-Undan’s commercial life is nearly over; it has produced 700 million barrels equivalent of oil and gas and brought in \$20 billion to Timor-Leste, with less than half a billion more expected. Liquids production has dropped to one-fourth of what it was in 2006. Although gas is produced at a roughly constant rate to match the capacity of the pipeline and Darwin LNG plant, it will drop off sharply in 2-3 years (Santos 2017).

Figure 7. Bayu-Undan Reserve and Production



The dotted brown line in Figure 7 shows company estimates of the remaining Bayu-Undan resource each year, while the dashed black line shows how many years the reserve will last at current production rates. The field is down to one-fifth of its highest estimated level, and only two years of production remain.

Figure 8. Bayu-Undan gross production by quarter



(Santos 2017)

In 2017, ANPM approved ConocoPhillips' request to drill more wells in Bayu-Undan. Timor-Leste will pay for these wells, which are needed to extract the last puddles from the nearly-exhausted field. When the cost of extracting a barrel exceeds the price it can be sold for the project will shut down, regardless of how much oil and gas remains in the ground.

Kitan, operated by Eni, produced 26 million barrels of oil between 2011 and 2015, providing nearly \$900 million to Timor-Leste. Nearly all of the reserve had already been extracted when prices dropped in late 2014, and Eni closed the field in 2015, as it was no longer profitable. Although its processing ship sailed away early in 2016, Timorese officials consider the project 'suspended' (Monteiro 2016, 3; MoF 2016a, 7). They think that its remaining infrastructure could extract a few more barrels or support future development of smaller nearby fields (see JPDA 11-106 below).

Laminaria-Corallina is just outside the JPDA, in waters claimed by Australia. Woodside began extracting its oil in November 1999, recovering more than 200 million barrels before 2016, when it sold the nearly-depleted field to start-up company Northern Resources. Laminaria-Corallina has generated about \$2.5 billion in revenues for Australia and not one cent for Timor-Leste (La'o Hamutuk 2016c).

Greater Sunrise and the Tasi Mane project

Development of the Greater Sunrise oil and gas field, which is somewhat larger than Bayu-Undan, has been delayed due to disagreements with Australia about maritime boundaries and disagreements with the oil companies about where to liquefy the natural gas. As of this writing, the two countries are close to agreement, but details have not been disclosed (La'o Hamutuk 2017b).

For the last decade, Timor-Leste has insisted that Sunrise be developed with a gas pipeline to Beçu on its south coast, where the gas will be liquefied into LNG and mostly exported. The companies say that it would be more profitable to have a floating LNG plant above the field or to use the existing one in Darwin which currently processes the nearly-depleted gas from Bayu-Undan (La'o Hamutuk 2008b). Although the diplomatic impasse may be resolved soon, declining LNG prices and increased competition may threaten Sunrise's commercial viability, especially if it is developed with a more costly option.

The Beçu LNG plant would be a key component of the Tasi Mane project in southwest Timor-Leste, which will also include a supply base for offshore oil operations, a 156-km highway, two seaports, two airports, onshore oil and undersea gas pipelines, and an oil refinery. Timor-Leste has already spent \$300

million on this project, and it could cost \$10-\$20 billion more to build. Private investors and lenders have stayed away because they don't believe that the financial return will repay their investment.

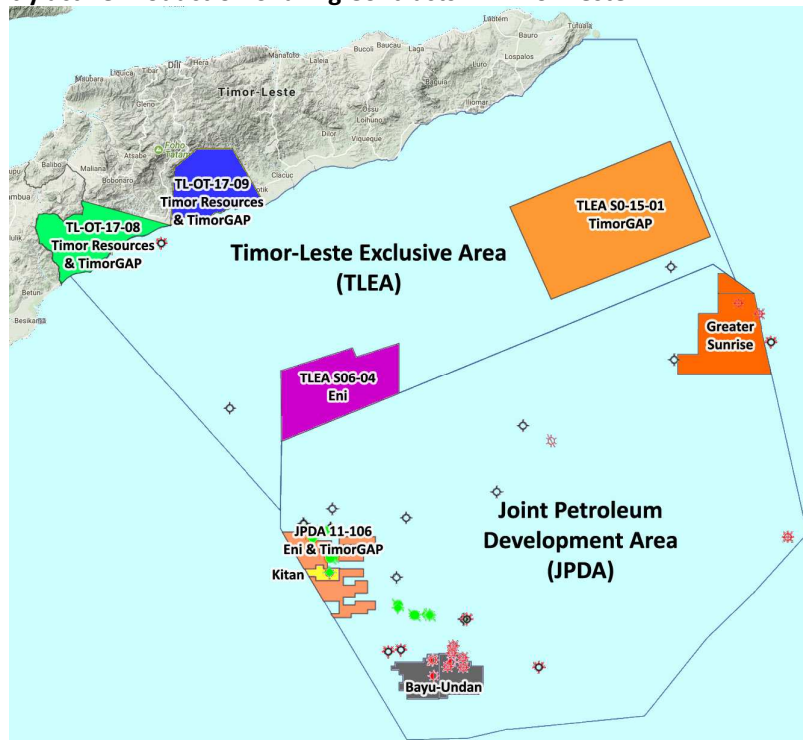
Woodside reports that Sunrise contains 5.1 trillion cubic feet (tcf) of gas and 226 million barrels of oil, lower than they estimated before 2007 (Woodside 2008, 36). However, Timor GAP believes that Sunrise has 6.9 tcf of gas which could feed an LNG plant for 25 years, followed by 1.3 tcf at lower production rates to supply domestic customers for another 24 years.

If TimorGAP is right, and if investment capital can be found without large expenses or debt burdens, Sunrise and Tasi Mane might be commercially viable. However, the lack of interest so far from lenders, potential investors and oil companies indicates otherwise. Even if the project shows a net financial gain, the environmental and social costs could make it a poor choice for Timor-Leste (La'o Hamutuk 2016a).

Privately-awarded new exploration

In the decade since the 2006 bidding rounds, Timor-Leste has awarded four petroleum exploration contracts to companies, all without competitive tenders, and all involving the TimorGAP state-owned oil company. TimorGAP has little experience or access to private financing, so this is an expensive, risky path.

Figure 9. Currently active Production-Sharing Contracts in Timor-Leste



(ANPM 2017a)

JPDA area 11-106, which surrounds the Kitan field, has been under contract since 2003, but was relinquished by Eni from because its small Jahal-Kuda Tasi oil fields (estimated at 20 million barrels) were not commercially viable. In 2011, Eni (operator), Inpex and TimorGAP were awarded a new contract for this area without inviting other companies to bid. They had hoped to use Kitan infrastructure after that field finished, and planned to drill in 2014. However, worldwide reluctance to spend on exploration while prices are low, compounded by Kitan's shutdown in 2015, caused the companies to defer the drilling campaign until 2018 (TimorGAP 2017).

In 2015, TimorGAP was awarded contract S0-15-01 without public bidding or consultation. It is in the offshore Timor Sea Exclusive Area, partly in acreage abandoned by Reliance and partly in an area

uninteresting to 2006 bidders. TimorGAP has spent \$12 million to collect seismic data, and preliminary examination has shown 31 possible prospective oil or gas deposits. If deeper analysis is promising, they may drill an exploration well in 2020 (Granger 2017).

In April 2017, Timor-Leste awarded its first two contracts for **onshore** exploration, covering 2,000 km² in Covalima and Manufahi municipalities, to a 50-50 partnership between TimorGAP and the Australian company Timor Resources. TimorGAP had asked more than 30 companies to work with it on this project, but there was little interest because prospects are limited and quantities are small. Although Timor Resources, part of the family-owned Nepean group, also has no oil and gas experience, it agreed to invest \$65-\$100 million in the project (La'o Hamutuk 2017e). The two companies have identified more than 60 natural or drilling-induced oil and gas seeps; they hope to begin seismic exploration in 2018 and may drill the first test wells in 2019. The ANPM is developing new legislation to regulate onshore exploration and production activities, something Timor-Leste's people have never experienced on an industrial scale (ANPM 2017b; La'o Hamutuk 2017g).

More petroleum

The state-owned oil company TimorGAP is very optimistic about additional undeveloped reserves, telling audiences that Timor-Leste's onshore and offshore fields (including Sunrise) still contain around 15 billion barrels of oil and gas, of which more than six billion could be recovered -- six times as much as Bayu-Undan. They dangle more than \$200 billion in future spending to develop these fields which might be captured by the Tasi Mane Project and local industries, and \$150 billion more for company profits and government revenues (Monteiro 2016, 11). However, hardly anyone believes these numbers, including most of the TimorGAP people whom the author spoke with off the record. No oil companies, investors or lenders have been willing to share the risks in hope of sharing the profits.

The National Petroleum and Minerals Authority (ANPM), which is responsible to promote and regulate oil and gas projects, estimates that the country has up to 2.6 billion barrels yet to be recovered -- less than half as much as TimorGAP predicts (da Silva 2016, 2, 6). A TimorGAP official explained to the author that his estimates are more optimistic than ANPM's because TimorGAP wants to entice companies to come here, while ANPM is required to regulate in the public interest.

Alternatives to relying on possible petroleum

Petroleum sector officials say they're not opposed to investing in other sectors, but that their area should also be included. However, public expenditures have disproportionately favoured the petroleum sector. During 2015-2017, state budgets appropriated \$380 million for oil and gas (including the Tasi Mane project), \$90 million for agriculture (which supports 60% of the country's people), and less than \$120 million for all other non-petroleum economic development. The state appropriated \$214 million for health care services and \$410m for education, far less than these human investments require (MoF 2015b; MoF 2016; MoF 2017).

While giving lip-service to economic diversification, policy-makers dream of economic gains without addressing the daunting challenges of developing Timor-Leste's workforce, agriculture and productive sectors. Parliament is discussing a mining law, and the government is creating a state-owned Mining Company, although Timor-Leste's limited reserves of minerals are worth far less than already-exploited petroleum fields (La'o Hamutuk 2017c). Other politicians expect foreign investors to underwrite the economy, overlooking the reality that foreign investors expect to take more money out of the country than they bring in (La'o Hamutuk 2016b).

Nevertheless, Timor-Leste can have a promising future, provided that policy-makers prioritize sustainable sectors. These include:

- Food production, primarily for local consumption, to reduce the billion-dollar annual trade deficit.

- Agricultural processing, so that more of the money people spend on food stays in the country, and food is available after the oil money is gone.
- Light industry, to manufacture products used locally and to substitute for imports.
- Eco-tourism which makes use of Timor-Leste's unique advantages and potential markets, rather than trying to compete with Bali's luxury resorts.

Timor-Leste's greatest resource is its people, and history has proven that they can endure tremendous hardships while achieving victory against overwhelming odds.

Consequences of making the wrong choice

It is foolhardy to gamble Timor-Leste's future on the possibility that lucrative oil reserves were missed during more than half a century of exploration. If Timor-Leste still has valuable oil, gas or mineral deposits, they can be developed later. Even without the Tasi Mane project, the country will get most of the financial benefits from oil and gas extraction. If Timor-Leste spends its finite Bayu-Undan wealth to provide health care and education, diversify the economy, and strengthen local infrastructure, its people will be better off.

But if the government continues to under-invest in human resources while spending freely on the faint hope of capturing slightly more of the possible oil revenues, and the reserves turn out to be small or non-existent, the nation and its people will be in very serious trouble. Timor-Leste's people may have to pay higher prices for fuel and energy to subsidize the local petroleum industry – or suffer under an austerity budget which cuts essential services like schools, hospitals, police and roads.

A reasonable compromise would be to trust the market. The nation should encourage legitimate companies to invest to prospect for petroleum and build the infrastructure that they need, while ensuring that they hire Timorese people and protect its fragile environment. Let private companies take the risks, in return for a share of the profits. They have more knowledge, experience and capital than the state, will be prudent with their own money, and are less susceptible to political and personal preferences. If their analysis indicates that a field is not likely to be profitable, they won't spend their own money to develop it -- and neither should Timor-Leste.

If a company invests and finds something commercially viable, Timor-Leste will make money and so will they.

But if no company is interested, or if the oil and gas reserves are smaller than imagined, Timor-Leste's people will be no worse off – and much better off than if their leaders had squandered public wealth by bankrolling non-viable speculation.

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Many documents are referenced on both *La'o Hamutuk* and official websites, as the latter don't always work or endure. All were accessed between March and October 2017.

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