

Timor-Leste: 2021 economic survey: The end of petroleum income

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ABSTRACT

As Timor-Leste nears the end of its petroleum-exporting era, the transition to a sustainable economy has become even more challenging due to partisan political competition, disastrous flooding and the pandemic. This article describes the current economic context, and deteriorating trends. After a brief discussion of the political situation and the impacts of COVID-19, it explores expenditure and income trends in recent state budgets, with a particular focus on dependency on oil and gas revenues and their investments, which pay for 86% of state spending and may run out within a decade. It then assesses in detail revenue prospects from current and future oil and gas activities, including Greater Sunrise and the planned Tasi Mane petroleum infrastructure project. The analysis shows that it is highly likely that resource revenue will continue to decline. Diversification is not an option; it is the only way forward.

INTRODUCTION

In 2002, Timor-Leste emerged from centuries of autocratic foreign rule and violent Indonesian occupation. Its people have created a vibrant, peaceful society and a democratic government under the rule of law. Economically, the country has evolved from depending on foreign aid, through exporting oil and gas, to living on the returns from investing revenues received from extracting non-renewable resources.

There have been three governing coalitions since 2017, and the current one was formed in May 2020. Although the changes were nonviolent and followed legal processes, they disrupted normal governance. The state budgets for 2017, 2018 and 2020 were enacted many months late, curtailing state spending on which much of the country's economy depends.

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Bele hetan versaun artigu ida ne'e iha Tetum husi <http://www.laohamutuk.org/econ/TLEconSurveyCurrentTe.pdf>

Petroleum revenues have drastically declined, and other reserves will probably not produce revenues comparable to the US\$23 billion already received. This heightens Timor-Leste's major challenges: import dependency, unemployment, lack of economic diversification, poverty, inequality, inadequate public services and COVID-19 (da Cruz Cardoso, 2019; Neves, 2016, 2018; Lundahl & Sjöholm, 2019, Ch. 6).

As the term "resource curse" means different things depending on the writer's perspective, this article will not use it. However, Timor-Leste's overwhelming reliance on revenues from exporting oil and gas for the last 15 years has influenced most leaders' thinking: many approach every issue by spending extractive assets, see money as the solution to every problem, and are unable or unwilling to realistically plan for the future. As a result, agriculture and other productive economic sectors have been neglected, and little has been done to strengthen the country's most valuable resource—its people.

Many international academic writers have looked at the implications of petroleum money in Timor-Leste (John et al., 2020; Lundahl & Sjöholm, 2019, 2020), but few use primary sources or fully explain the country's specific historic, cultural and economic contexts. Reports and data from international financial institutions (Asian Development Bank [ADB], 2020a, 2020b; International Monetary Fund [IMF], 2019; World Bank, 2020a, 2020b) are frequently cited, but the information in them is often dated, incomplete, out of context, shoe-horned into global methodologies or filtered through free-market ideology. Furthermore, some government and donor agencies are reluctant to collect and/or publish information which may not reflect well on their work—no poverty or labor market studies have been released for more than five years.

Timor-Leste-based NGOs (Fundasaun Mahein, 2021a, 2021b, 2021c; La'o Hamutuk, 2008, 2015, 2016a, 2016b, 2018a, 2020b, 2020c, 2021b, 2021d; Oxfam, 2019) usually understand societal and local issues better, but write for non-academic readers, as do bloggers (da Cruz Cardoso, 2019, 2020, 2021a, 2021b; Guterres, 2018; Neves, 2019, 2020) and other commentators. The many lively, well-informed debates among Timorese intellectuals on these issues, often over coffee or social media, are overlooked by most academic research.

This article attempts to fill some gaps in the published literature, especially in relation to Timor-Leste's public finances, petroleum dependency and prospects. It relies largely on primary and local sources, as well as international analyses when they provide useful perspectives. It also draws on the author's two decades of observations, engagement and interviews in Timor-Leste.

The article starts by providing a brief economic overview and summary of recent trends. It then discusses recent political developments and COVID-19. Its main focus is on public finances and petroleum, including the major Greater Sunrise and Tasi Mane projects.

ECONOMIC OVERVIEW AND RECENT ECONOMIC TRENDS

Timor-Leste entered nationhood in 2002 with a heavy burden. During 450 years of colonialism and occupation, little had been done to educate its people or develop a sustainable economy. A generation of Indonesian occupation and war had inflicted incalculable physical, cultural and societal damage. When Indonesia destroyed most of Timor-Leste's buildings and infrastructure in 1999, and Indonesian teachers, bureaucrats and business people moved back to their country, the victors in the struggle for independence created something few of them had ever lived in: a democratic state under rule of law, where the government listens to and provides services for its people. They also needed to build infrastructure, invent a legal system and develop the economy.

Timorese people's civil, political, cultural and social rights are infinitely better than they were before 1999; economic rights, not so much. More than 40% of the population live in poverty, unable to afford daily necessities (General Directorate of Statistics [DGE], 2016). Timorese children suffer more severe malnutrition than their neighbors in Southeast Asia and the Pacific (slightly worse than Papua New Guinea). More than half of children in Timor-Leste under the age of five are stunted, the third worst in the world (Food and Agriculture Organization [FAO] et al., 2021; von Grebmer et al., 2020).

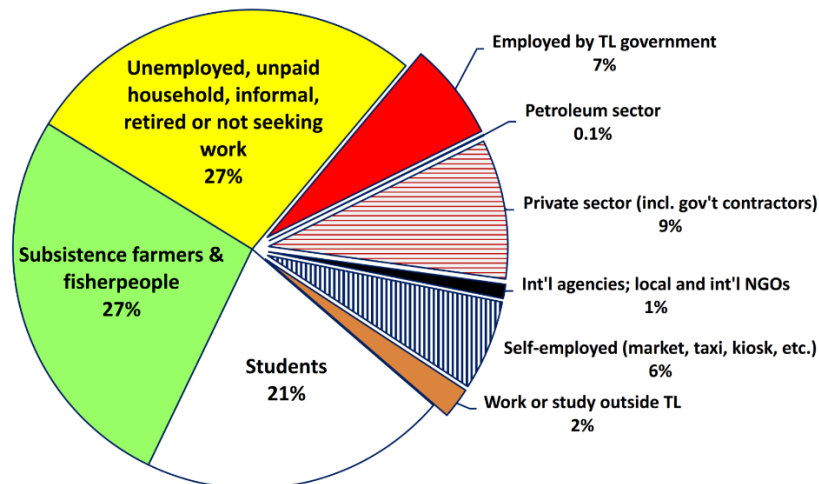
The young majority expects their elders to lay good foundations for their lives



The young country of Timor-Leste has a young population; more than half of its people were born after the Indonesian occupation ended 21 years ago. Most of the population live in rural areas and are growing up with inadequate food, poor education, substandard health care and few employment opportunities. Although some, especially the brightest kids from middle-class families, have access to much better education and jobs than their parents did, most do not.

Timor-Leste has 1.3 million people, and about two-thirds are of working-age, defined as those aged 15–64. La’o Hamutuk’s (2021e) analysis shows that only about a quarter of the 820,000 working-age people works in the formal economy (Figure 1). The rest are subsistence farmers or fisherpeople (although they may sell a small amount of surplus), not being paid for work, or students. Of those who earn mostly cash income, roughly equal numbers work for the government, the private sector, and very small family businesses.

Figure 1: Principal livelihoods of the Timorese working-age population



Sources: La’o Hamutuk (2021e), compiled from DGE (2017, 2019), Ministry of Finance (MoF, 2018), and La’o Hamutuk own research.

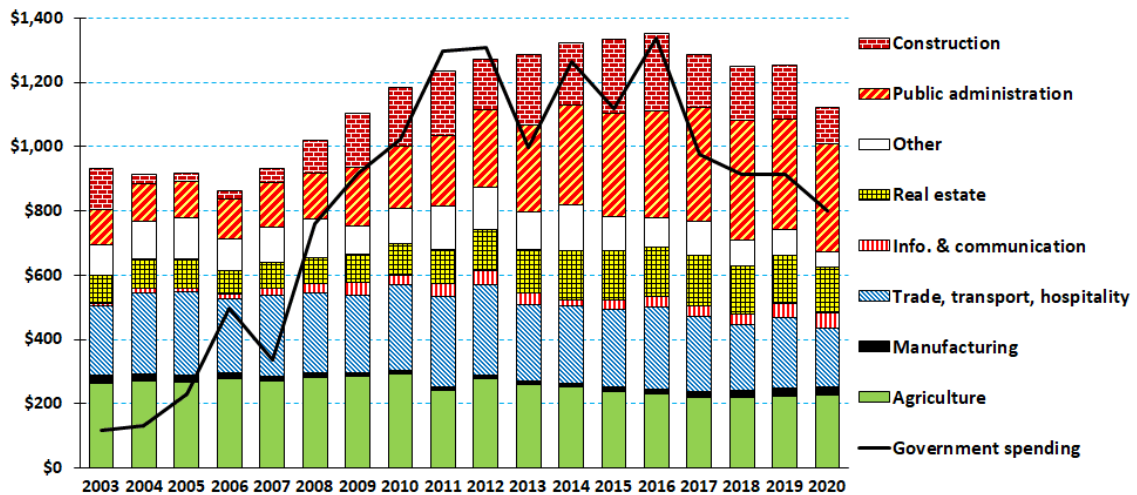
About two-thirds of households in Timor-Leste engage in farming, even if they also do other work. Their agricultural holdings average 1.5 hectares (DGE, 2020).

Private sector employment by businesses is falling, with about 15% fewer jobs in 2018 than in 2014 (DGE, 2019). In the same period, the working-age population increased by more than 10% (DGE, 2017).

Many people talk up the jobs that will be created by large projects supported by foreign investors, including the Heineken brewery in Hera, the Bolloré container port in Tibar, the Australian TL Cement mine and factory in Baucau, the Pelican Paradise Resort in Tasi Tolu and the Tasi Mane petroleum Project on the south coast. However, all together they will employ fewer people after construction is finished than the 4,000 who enter the working-age population every two months.² The Heineken brewery is the only one of these which has been built, and its closure may be imminent (Lusa, 2021).

Because economists and office-holders give attention to GDP growth, this article will discuss it. However, it's not the most appropriate indicator, because it counts dollars, not people, and undercounts the poor, especially informal producers.³ "Non-oil" GDP excludes activities related to oil and gas production, while including activities financed by petroleum-enabled government expenditure.⁴ Figure 2 shows the evolution of non-oil GDP per capita, adjusted for local inflation.

Figure 2: Sectoral contributions to non-oil GDP per capita
Constant (2015) prices, production approach



Sources: DGE (2021c).

Non-oil GDP per capita declined from 2003 until 2006, but it then grew fairly rapidly, increasing by 50% by 2016. Since then GDP per capita has again declined. After adjusting for inflation and population

² Heineken employed 125 people before layoffs started (Lusa, 2021). According to proponents' optimistic estimates, Tibar port will directly employ 200 workers during operation (Advisian, 2017, p. 314), TL Cement 700 (WorleyParsons, 2017, p. 4), Pelican Paradise 1,500 (Asia Pacific Environmental Consultants, 2018, pp. 4–18) and Tasi Mane 730 (ACIL Allen Consulting, 2016, pp. iii-v).

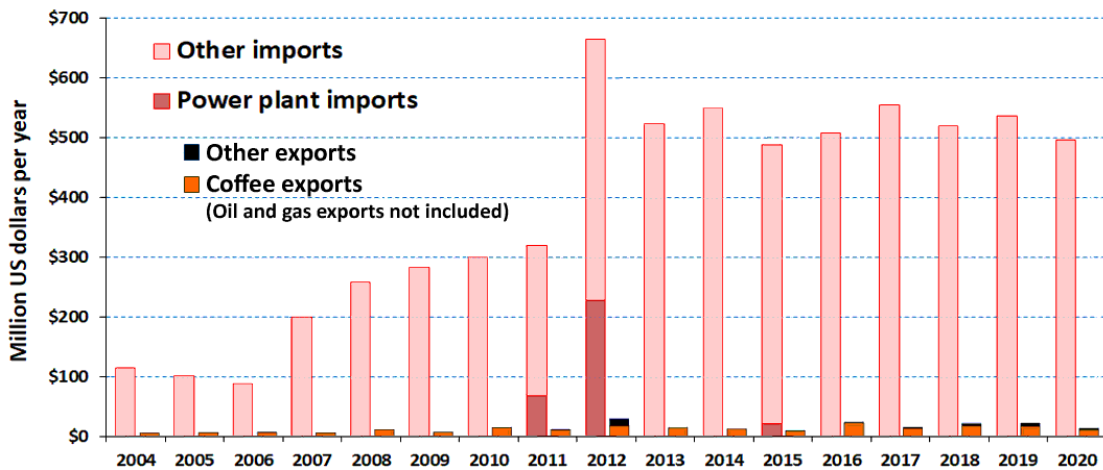
³ Although GDP methodology assigns monetary value to subsistence production and land ownership (imputed rent), but not to unpaid household work, it gives poor people's reality far less weight than that of affluent people. For example, if one of the richest families in Timor-Leste increased their 'production' by 10% (say, by \$100,000), that would add as much to the GDP as 200 low-income families doubling their productive output (from \$500 to \$1,000 each). Furthermore, using GDP (or GDP growth) to represent economic progress neglects poor people, inequality, barter and exchanges within extended families.

⁴ The contribution of the oil and gas sector to Timor-Leste's GDP has been difficult to assess, as its activities are conducted by overseas companies, in an offshore area where sovereignty was disputed until 2019. It's also unclear whether conversion of non-renewable resource assets into financial assets should be considered production. What is clear is that petroleum activities were much larger than non-oil GDP from 2004 to 2014 and have dropped since then.

growth, the sectors of agriculture and manufacturing produce less output than they did when independence was restored. The growth is in the top two segments, construction and public administration, which come almost entirely from petroleum-funded state spending. The black line shows how much the government spent each year, and its decline since 2016 is reflected in declining GDP.⁵

One consequence of the small local productive economy is that the country relies heavily on imports for the daily needs of its people and institutions. Timor-Leste’s trade balance has been broadly consistent for the past eight years. Every year, the country imports about \$500 million worth of goods, mostly from Indonesia and China (Figure 3). Non-oil exports are usually around \$20 million per year. During 2013–2020, 83% were coffee.

Figure 3: Balance of goods trade (excluding oil and gas exports)



Source: DGE (2021a).

The deficit in services trade has averaged about \$350 million per year, although it was \$80 million lower in 2020 due to reduced travel and construction. From 2017 to 2019, Timor-Leste’s balance of payments deficit (excluding oil and investment income) averaged about \$940 million per year, although it dropped to \$750 million in 2020, due to reduced and delayed state expenditures. As a rough estimate, at least half of the money leaving the country is government purchases of goods and services from foreign providers (Banco Central de Timor-Leste [BCTL], 2020).

Today, Timor-Leste covers its trade deficit with money from petroleum revenues and investment returns, which is not sustainable, as discussed below. When that money runs out, the country will not be able to pay for as many imports and the trade deficit will decline. The impact on families will be devastating if local food production has not markedly improved.

Because Timor-Leste uses the U.S. dollar as its official currency, it has no control over exchange rates. Between 2011 and 2014, annual inflation was around 10%, as rising government spending drove prices up (DGE, 2021b). About six years ago, government spending stabilized and became more efficient, and since mid-2014 inflation has averaged about 0.6% per year. Nevertheless, prices in Timor-Leste are about 25% higher than in Indonesia, the source of many goods sold in Timor-Leste (World Bank, 2021a, NY.GDP.MKTP.PP.CD and NY.GDP.MKTP.PP.KD).

People in the capital are much better off than those in the rest of the country, although only a handful are wealthy by international standards. A wealth index created using the 2016 Demographic and Health Survey showed that only 7% of Dili families are among the poorest 40% of households nationwide (DGE, 2018).

⁵ The decline in spending is due to a variety of factors: partisan disputes (resulting in late budget enactment), reduced inefficiency and waste, lower prices for imported fuel, and completed capital spending on large electricity, port and road infrastructure projects (with little spent on maintenance).

Thousands of young Timorese go overseas to work, mostly in the United Kingdom but also in government-organized programs in Australia and South Korea. They send home about \$100 million per year in remittances, a significant amount though a smaller fraction of GDP than in 57 other countries (World Bank, 2021a, BX.TRF.PWKR.CD.DT). Overseas workers acquire knowledge and work habits from their exposure to the larger world, while improving the living standards of their families. However, some people (including this author) believe that Timor-Leste would be better served if these workers came home after a few years and used their skills to develop Timor-Leste's own society and economy, rather than just sending part of the wages they get for supporting overseas businesses. This would require them to create or find jobs; as noted above, employment opportunities with private companies have been falling in recent years.

Timorese people born since 2002 are no longer automatically entitled to Portuguese passports, which facilitate working in Europe and, pre-Brexit, in the United Kingdom (McWilliam & Monteiro, 2019). This, combined with the travel impacts of COVID-19 and Brexit itself, may reduce remittances in the future.

POLITICAL SITUATION AND COVID-19

In early 2015, Prime Minister Xanana Gusmão resigned. He had created the CNRT (*Congresso Nacional de Reconstrução do Timor*) political party, served as Prime Minister for eight years and set the principal policy directions for the country (República Democrática de Timor-Leste [RDTL], 2011). He chose his successor, Dr Rui Maria Araujo, from the opposition party FRETILIN (*Frente Revolucionária de Timor-Leste Independente*) and established a unity government that included all political parties.

The unity dissolved in the 2017 parliamentary elections. FRETILIN got the most votes and formed a government under Prime Minister Mari Alkatiri, but its parliamentary coalition did not last, and an early election was called in 2018. Three opposition parties—CNRT, People's Liberation Party (*Partido Libertação Popular* or PLP) and KHUNTO (*Kmanek Haburas Unidade Nasional Timor Oan*)—formed a pre-election coalition dominated by CNRT. The coalition won 34 of the 65 seats in Parliament and chose PLP's Taur Matan Ruak as Prime Minister. FRETILIN, with 23 seats, went into opposition.

The new government's program (RDTL, 2018) devoted 30 pages to economic development, of which only five were about petroleum, the traditional focus for Timor-Leste's policymakers. However, the new government also quickly weakened financial and environmental protection in the petroleum sector, borrowed money from the sovereign wealth fund (Petroleum Fund) to buy participation in the Greater Sunrise project,⁶ greatly increased subsidies for TimorGAP (the state-owned oil company), and moved ahead with Tasi Mane and other petroleum exploration and processing projects.

Political instability hampered state functionality from mid-2017 until 2020, resulting in delayed state budgets and consequent economic downturn. In nearly three years between the 2017 elections and the government restructuring in early 2020, Parliament enacted a total of only 10 laws.

In late 2019, CNRT decided to enforce its will over the Prime Minister by opposing his proposed 2020 budget. Taur Matan Ruak resigned, but his resignation was not accepted by the President. In early 2020, many people felt that the threat of COVID-19 required a functioning administration and did not want another early election. In May 2020, FRETILIN joined PLP and KHUNTO to form a different governing coalition, retaining Taur Matan Ruak as Prime Minister. CNRT's 21 MPs became the opposition and the party told its Ministers to resign.

The restructured government is the most functional and stable in three years, although CNRT calls it "de facto" and often walks out of parliament. During 2020, parliament enacted 15 laws (two state budgets, two transfers from the Petroleum Fund, an anti-corruption law, a civil protection law and nine monthly

⁶ The Greater Sunrise project is a joint venture to develop the Greater Sunrise field, which includes the Sunrise and Troubadour oil and gas fields, located in the Timor Sea approximately 450 km northwest of Darwin, Australia, and 150 km south of Timor-Leste. More details below.

authorizations of the State of Emergency). The next presidential election will be in 2022, with the parliamentary election following in 2023. The current coalition is likely to last at least until then.

In April 2020, as COVID-19 began to spread around the world, Timor-Leste's President and parliament declared a State of Emergency, placing restrictions on international and domestic travel, requiring people to quarantine when entering the country, and limiting public gatherings. The State of Emergency has been renewed monthly at least through November 2021 (La'o Hamutuk, 2021c).

In August 2020, the government adopted an Economic Recovery Plan (RDTL, 2020) to deal with the economic impacts of pandemic prevention on the population. The plan was written by Rui Gomes, a non-partisan technocrat who served as Finance Minister in FRETILIN's 2017 government and was reappointed to that position in September 2020. It envisions diversifying the economy away from petroleum and offers an updated, more realistic, more appropriate and more equitable vision than the 2011 Strategic Development Plan (RDTL, 2011).⁷

Nobody in Timor-Leste died from COVID-19 until April 2021. Only 44 cases of the disease were identified during 2020, all in people who had just entered the country. Unfortunately, COVID-19 began to spread locally in February 2021. By 26 October, 121 people had died, and 19,605 people had tested positive. Of these, 52 cases were still active, and 69% of the cumulative total were in Dili. Many had no symptoms. Travel restrictions and lockdown directives to stay home had been implemented in Dili and several other municipalities, although some lockdowns were eased as the infection rate dropped in September (Lao Hamutuk, 2021c; RDTL, 2021a). By

Active COVID-19 cases rose to 2,600 in late May and, as preventive measures and vaccinations were implemented, declined to 839 at the end of June but resurged in July and August to more than 4,500, before falling to 52 by 26 October. Although 535,000 people (80% of the over-18 population) had received at least one dose of the AstraZeneca or Sinovac vaccine by 25 October, only 46% had gotten their second dose. Vaccination rates in Dili are higher than in other areas.

Adding to the country's challenges, Cyclone Seroja inflicted the worst flooding in decades on Easter Sunday 2021. The inundation killed 44 people and affected 34,000 households; six weeks later 1,700 people were still in emergency shelters (United Nations Resident Coordinator's Office Timor-Leste, 2021). Economic losses, including destroyed infrastructure, are estimated at \$300 million (Magalhães, 2021). The catastrophe has spurred interest in urban planning and climate change, and "building back better" could help diversify the country's economy (da Cruz Cardoso, 2021b; Gomes, 2021). Although the cyclone and the pandemic are separate emergencies, both impacted less affluent people most severely, and in April the government enacted increased spending to begin to address them (La'o Hamutuk, 2021a; RDTL, 2021b).

Although the rates of COVID-19 fatalities and serious illness are far lower than in most countries, the rapid rise and fall of the disease is worrisome and could escalate further with new variants and less compliance with preventive measures. The economic impacts on livelihoods, GDP and agricultural production will be severe but are not yet known, although non-oil GDP fell 8.6% in 2020 (DGE, 2021c). Three key institutions have estimated that 2021 GDP growth will be less than 2%, noting the high uncertainty around the outlook and that this will be the fifth consecutive year that per capita GDP has dropped (IMF, 2021; World Bank, 2021b, pp. 15-16; DGE 2021c, p. XIX).

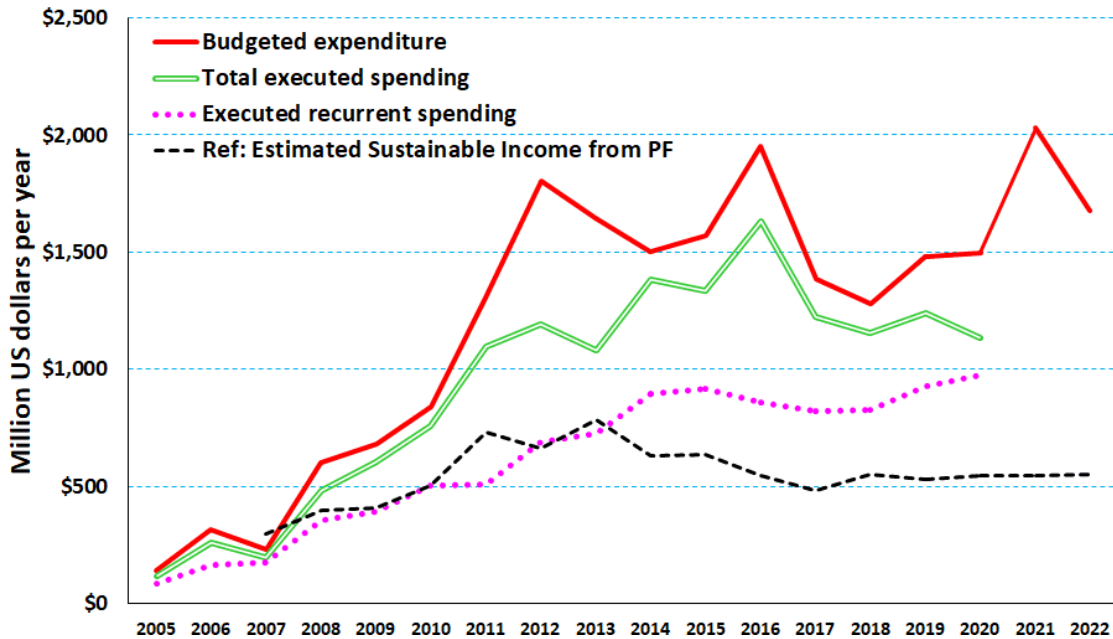
PUBLIC EXPENDITURE AND REVENUES

As shown in Figure 2, government spending is the principal driver of Timor-Leste's economy. As per Figure 4, spending grew very quickly from 2008 to 2012, and more slowly until 2016. Since then, spending has declined, partly due to political problems with enacting budgets on time, and partly because some

⁷ Although no official review has been published, very few targets in the 2011 Strategic Development Plan have been met.

major infrastructure projects, such as the national electricity system, are mostly completed. The 2021 budget authorizes a big increase in spending, but it remains to be seen how much will be executed.

Figure 4: Budgeted and executed state spending

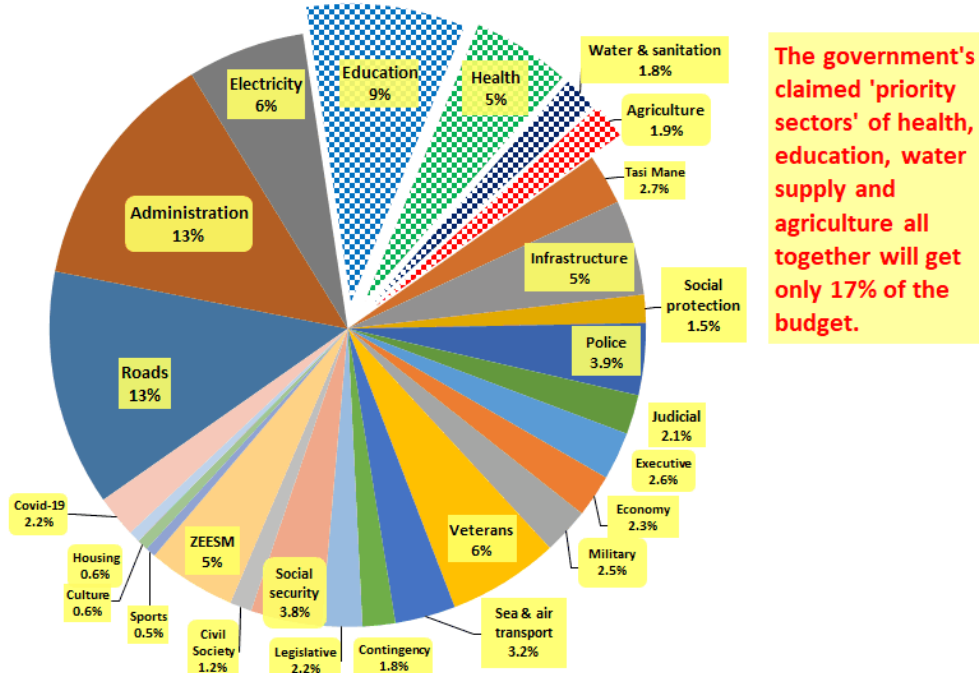


Sources: MoF (2018, 2020a, 2021b, 2021c) and earlier years, Budget Book 1; RDTL (2021b).

The solid red line shows how much was budgeted for each year, and the double green line shows how much was actually spent. The dotted purple line is recurrent spending, including on personnel, supplies and day-to-day government operations. It has stayed relatively flat in recent years while capital spending has risen and fallen.

In December 2020, Timor-Leste enacted its \$1.90 billion state budget for 2021, the second-largest in the country’s history and the first one in four years to be enacted on time (see political discussion above). Five months later, unforeseen costs of the flooding and pandemic emergencies required it to be increased to \$2.03 billion. In October 2021, Government proposed a \$1.67 billion budget for 2022, and Figure 5 is a sectoral analysis of its appropriations.

Figure 5: Appropriations in the proposed 2022 state budget



The government's claimed 'priority sectors' of health, education, water supply and agriculture all together will get only 17% of the budget.

Sources: MoF (2021d, Budget Books 2, 3a, 3c and 4).

Note: This is a preliminary analysis, before complete information is available. It represents what the money is allocated for, not which ministry it goes to. For example, education includes two ministries, educational institutions, scholarships, education-related infrastructure, and money allocated to municipality and Oecusse administrations for education.

Abbreviation: ZEESM, Special Economic Zone for Social Market Economy.

For at least five years, governments led by various parties and coalitions have claimed that their priorities are health, education, water supply and agriculture (MoF, 2020b, slide 9), but budgetary allocations have not matched this promise. In 2022, 17% of appropriations will go to these four sectors, which is far below international good practice for developing countries, which is that at least 28% of state spending should go to education and health (United Nations Development Program [UNDP], 2011, p. 122).

Timor-Leste is a young country, and 38% of its people are of school age (5-19). According to World Bank data, Timor-Leste allocated 8% of its state budget to education in recent years, compared with 20% in Indonesia, 13% in Australia and 16% among all Least Developed Countries (World Bank, 2021a, SE.XPD.TOTL.GB.ZS). Timor-Leste's spending for health, water and education infrastructure in 2011–2018 was so low that the World Bank rounded them off to zero (World Bank, 2020b, p. 34).

Agriculture, which is the principal livelihood of about two-thirds of Timorese families and produces essential food which could reduce both malnutrition and the trade deficit, gets less than 2% of public spending, more than before 2020, but still far below what is needed. Farming is hard work, and many Timorese people have internalized Portuguese colonial values that farming is “low-class”. For these reasons, and in search of a better life, large numbers of people have moved from the country to cities seeking jobs, although many maintain connections with their rural roots. It is difficult for Timorese agriculture to compete in international markets (except for niche products such as high-quality coffee, spices or organic produce), but it could replace imported food within the country.⁸

Spending more money on neglected sectors will not solve everything. The negative impacts from inadequate funding in many “priority” sectors are compounded by lack of effective planning and

⁸ In recent years, Timor-Leste has imported about \$150 million worth of food products each year, about 10 times as much as the value of the coffee it exports (DGE, 2021a).

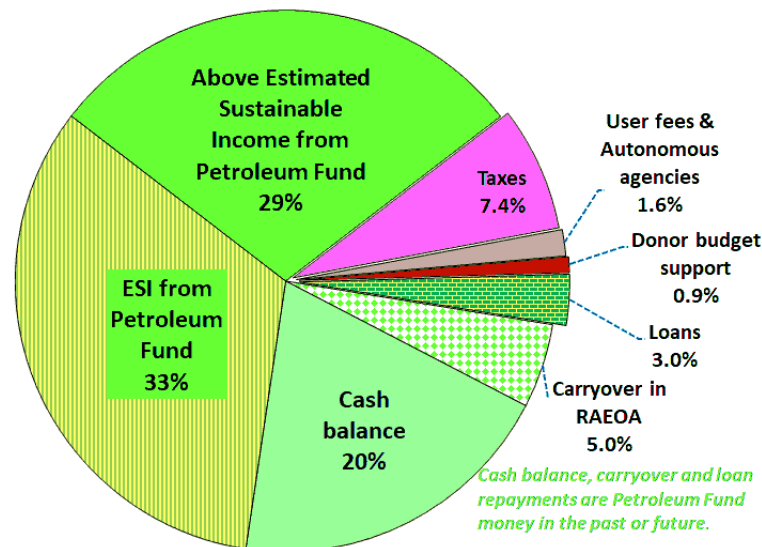
execution, and shortages of well-educated and experienced personnel, which persist despite two decades of international advisors and “capacity-building”. In addition, the government sometimes reduces its involvement because it believes that development partners are covering a particular need.

PETROLEUM: REVENUES, DEPENDENCY AND THE PETROLEUM FUND

In 2005, Timor-Leste enacted far-seeing legislation to establish its Petroleum Fund (PF), which it expected to benefit “current and future generations” (La’o Hamutuk, 2021b; Scheiner, 2019). The Petroleum Fund was established to receive all oil and gas income and invest it in secure overseas financial instruments, with the returns to be reinvested in the PF. The annually Estimated Sustainable Income (ESI) was to guide how much could be withdrawn without depleting the PF’s long-term balance. The ESI is legislated at 3% of total petroleum wealth—that is, the current balance plus a prudent, inflation-adjusted (net present value or NPV) estimate of future oil and gas revenues from projects with approved development plans.⁹ Withdrawals, which finance the state budget, require parliamentary authorization and can only exceed ESI with an explicit justification (La’o Hamutuk, 2021a).

Non-Petroleum Fund sources of income—domestic revenues (taxes and user fees),¹⁰ direct budget support from donors, and money borrowed from international financial institutions—cover less than 15% of budgeted expenditure. The remaining “non-oil fiscal deficit” is covered by transferring money from the PF. Since the first withdrawal was made in 2007, the PF has paid for 86.2% of all state spending, and actual domestic revenues have never covered more than one-sixth. Figure 6 shows the revenue sources of the proposed 2022 budget.

Figure 6: Revenues in the proposed 2022 budget, totaling \$1.675 billion



Sources: MoF (2021d Budget Book 1). Note: The RAEOA carryover is money previously transferred to the autonomous Oecusse regional authority, but not used at the time and applied to the 2022 budget. Abbreviation: RAEOA, *Região Administrativa Especial de Oecusse-Ambeno*.

Five of the slices in Figure 6 (the green ones) represent money withdrawn from the Petroleum Fund at some point in time. The two largest ones, the Estimated Sustainable Income (ESI) and the excess above ESI, will be withdrawn in 2022 (see below). The cash balance and carryover mostly came from the PF in

⁹ The only approved plans are for Bayu-Undan and Kitan. Other fields are not yet included in the ESI.

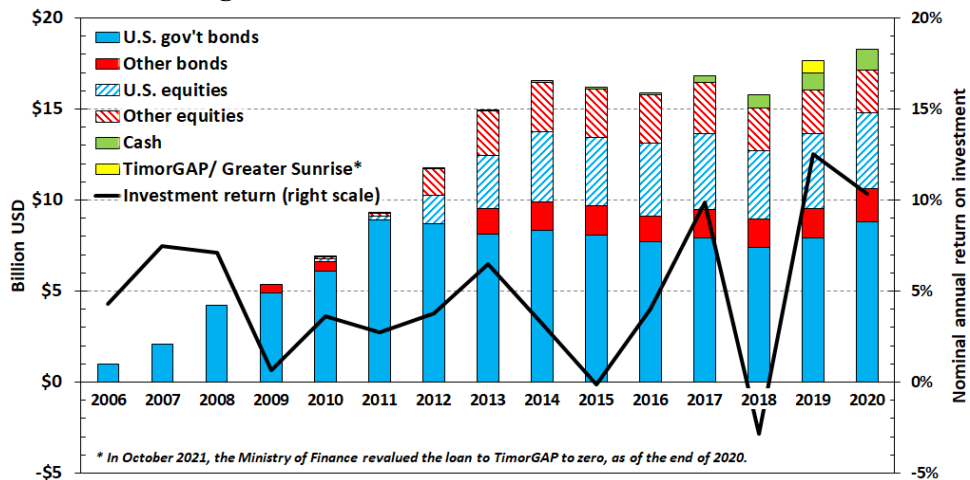
¹⁰ Some domestic revenues are misleading. For example, about 14% of domestic revenues come from electricity sales by the Ministry of Public Works, which runs at a loss. Between 2010 and 2020, Timor-Leste spent \$2 billion to build and operate its electricity system. During the same period, total electricity revenues were \$254 million, about one-third of the fuel costs alone.

previous years but were not spent; about 85% of the loans will be repaid with Petroleum Fund money. All together, the PF is expected to pay for 86% of 2022 budget appropriations.

Since its establishment, the Petroleum Fund has received \$23.4 billion in oil income and \$8.4 billion in returns on its investments. \$13.3 billion has been withdrawn to pay for state expenditures, leaving \$18.5 billion in the Fund at the end of September 2021.

Figure 7 shows that, over the last decade, the PF gradually diversified its investment portfolio from U.S. government bonds to other countries' bonds, then to stocks, and, since 2019, into petroleum projects in Timor-Leste. Although its all-bonds portfolio in 2009 made it the only sovereign wealth fund in the world which didn't lose money during the global financial crisis, the PF now goes up and down with the global stock market. A change in management strategy in July 2021 will slightly reduce the portion in equities.

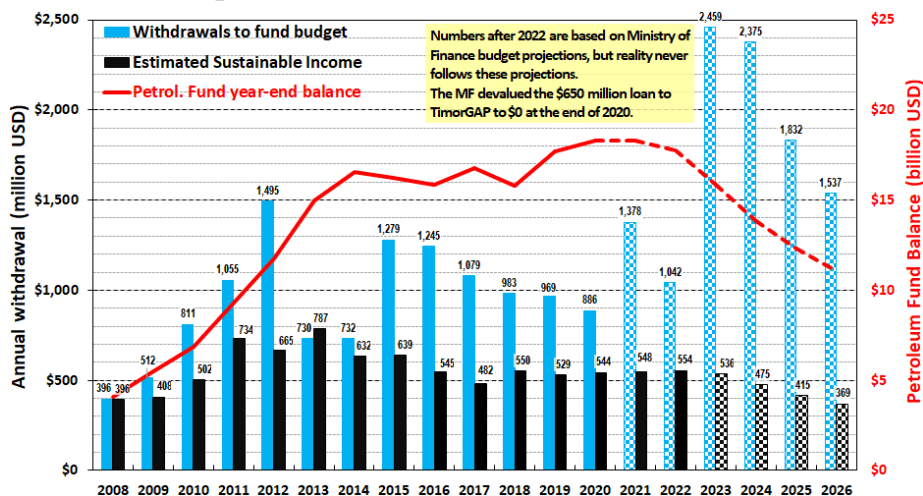
Figure 7: How the Petroleum Fund is invested



Source: BCTL (2021), MoF (2021d).

As shown in Figure 8, Petroleum Fund withdrawals have exceeded ESI every year since 2009 except 2013, when much of the huge withdrawal in 2012 was not spent and was carried over. In aggregate, withdrawals total 63% more than ESI to date. Although changes in some laws have relaxed rules on governance and investment of the PF, the basic mechanisms are largely intact, even if, as discussed below, visions of long-term sustainability will not be realized (see also Scheiner, 2020).

Figure 8: Historical and planned withdrawals from the Petroleum Fund, and PF balance



Sources: BCTL (2021); MoF (2021d, Budget Book 1 and proposed Budget law).

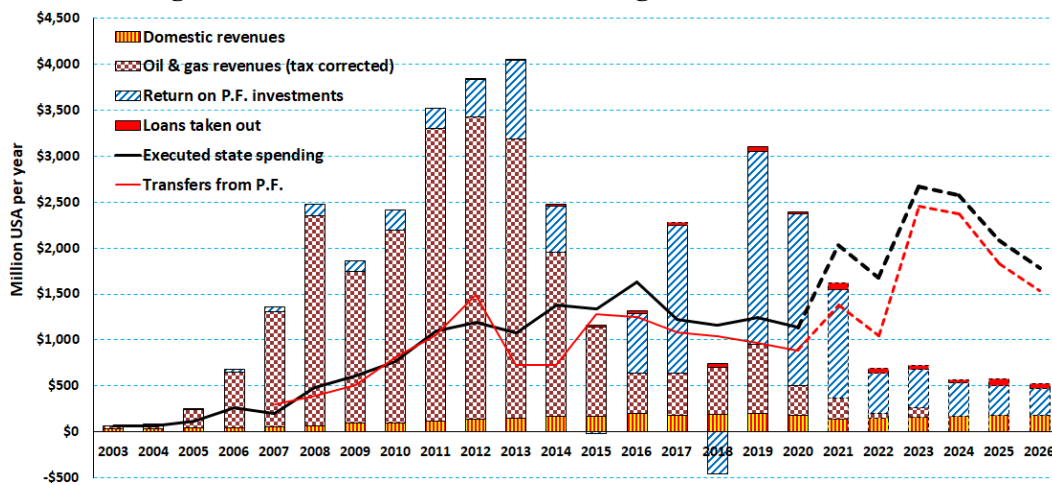
Note: The \$650 million loan from the Petroleum Fund to TimorGAP for Greater Sunrise discussed below is considered

an investment, not a withdrawal. Therefore, its principal and accrued interest were part of the PF balance, although it was revalued to zero at the end of 2020 due to uncertainties in the Greater Sunrise project.

The red line in Figure 8 (right scale) is the end-of-year balance in the Petroleum Fund, with Ministry of Finance projections from 2021 on. The bars are the withdrawals during each year, with the left (blue) bars representing the amount withdrawn, while the right-hand (black) bars show what portion of this was the ESI. Although withdrawals have significantly exceeded ESI for the past 15 years, the Petroleum Fund balance rose until 2014 due to higher than expected oil prices, and in 2019–2020 due to high returns on its investments. The government plans to withdraw four times the ESI during the next four years, and the PF balance is projected to fall sharply.¹¹

Figure 9 consolidates government and the Petroleum Fund to look at total income flows to the state.

Figure 9: Income to the state (including the Petroleum Fund)



Sources: MoF (2021d, Budget Book 1, and previous years).

Note: In a few cases, collected revenues were returned to oil companies in subsequent years to repay over-assessed or over-estimated taxes. Figure 9 overcomes that anomaly by subtracting refunded taxes from the year they were collected, rather than the year in which they were returned, to create “tax corrected” revenues.

The red-and-white checked segments show the oil and gas revenues Timor-Leste has received each year, which include royalties, profit oil taxes and corporate taxes. About 93% of this has come from the still-active Bayu-Undan offshore oil and gas field,¹² with most of the rest from the Kitan oil field which produced from 2011 to 2015. Projections from 2021 on are from state budget documents, based in turn on information provided by oil companies.

Figure 9 shows that, although petroleum revenues rose rapidly until 2012, by 2020 they had dropped to one-tenth of their peak, and they will continue to fall. Timor-Leste has already received 99% of the revenue it is expected to receive from nearly depleted Bayu-Undan, and the slight increase in 2023 is taxes on decommissioning that field. As discussed below, the additional wells Santos is drilling in Bayu-Undan in 2021 are unlikely to generate significant revenue for Timor-Leste.

The diagonal blue-striped segments are the returns from investing the Petroleum Fund. Some of this is dividends and interest that actually add money to the PF, but most of it is fluctuations in stock and bond

¹¹Government spending forecasts use a simplistic methodology, assuming that every recurrent budget line will go up 4% per year and that every infrastructure project will be built on time, as costed. Consequently, they are often very different from what actually occurs. Some anticipated projects (see Table 3) are not included in the budget, while others which are budgeted may never be built. The officially projected Petroleum Fund withdrawals shown in Figure 8 are nevertheless based on these forecasts.

¹²Bayu-Undan is a large field under the Timor Sea between Timor-Leste and Australia, but closer to Timor-Leste. It began oil production in 2004 and gas production in 2006.

prices and foreign exchange rates, which are only realized when the investment is sold. Although this goes up and down with the market (and was negative in 2015 and 2018), Timor-Leste has been very lucky so far.

The red-and-yellow striped segments in Figure 9 are “domestic revenues”—taxes and user fees collected within Timor-Leste—and the small red segments are loans that must be repaid with interest in the future.

The solid black line is government spending. When it is higher than the combined bars, as in 2015, 2016 and 2018, the state spent more than it took in. The Ministry of Finance expects the gap between spending and revenue to increase rapidly from 2021.

Figure 9 only looks five years ahead. According to my estimates (Scheiner, 2015), which were recently confirmed by government scenarios (MoF, 2021d, Budget Book 1, Figure 18) and the World Bank (World Bank, 2020b, p. 36), the Petroleum Fund could be entirely empty within 10–15 years, and the diagonal blue-striped segments will disappear, just as the red-and-white checked ones are doing.

PETROLEUM PRODUCTION AND REVENUE: PAST, PRESENT AND FUTURE

Because Timor-Leste has been so dependent on oil and gas income, and because the other sectors of its economy are so small, many people think it is an oil-rich country. As Table 1 shows, this is not correct, even if the Greater Sunrise project goes ahead which, as argued later, is unlikely.

Table 1: Timor-Leste’s neighbors have much more petroleum than it does.

	Timor-Leste (70% Sunrise) ^a	Timor-Leste (without Sunrise) ^b	Australia (30% Sunrise)	Australia (without Sunrise)	Indonesia	Brunei
Proved oil and gas reserves at end of 2020 (million barrels equivalent = mmBOE)	774	18	16,450	16,130	9,800	2,400
Proved oil and gas reserves per person (BOE)	587	14	645	632	36	5,530

Sources: BP (2021); Santos (2021a) for Timor-Leste; Woodside (2020) for Sunrise.

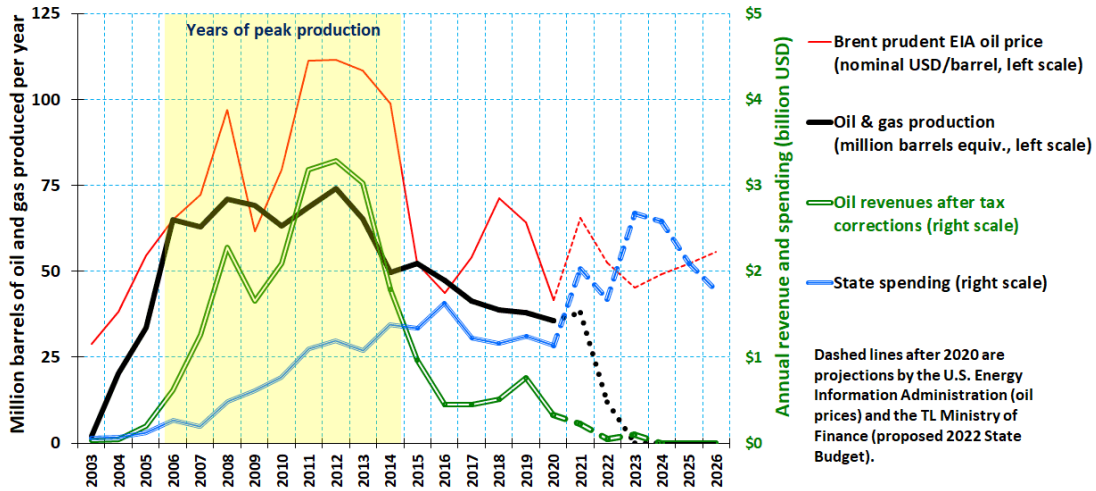
Note: Quantities of oil and gas are combined as “barrels of oil equivalent” (BOE), by calculating the amount of gas with the same energy content as one barrel of oil. A million BOE is written “mmBOE”.

^a Under the 2019 Maritime Boundary Treaty, Timor-Leste will get 70% of Sunrise upstream revenues (Australia gets the other 30%) if the gas is liquefied in Timor-Leste. If the LNG plant is in Australia, the split will be 80/20.

^b Includes only Bayu-Undan, as no other fields have approved development plans.

Timor-Leste hit the jackpot with Bayu-Undan, its largest oil and gas field. As shown in Figure 10, it was built in 2004–2005 when oil prices (thin red line) were low (as were construction costs), and it produced when they were very high. For a while, it was the most profitable project in the history of ConocoPhillips.

Figure 10: Petroleum prices, production and revenues



Sources: ANPM (2021); U.S. Energy Information Administration (EIA, 2021a, 2021b); MoF (2021d).

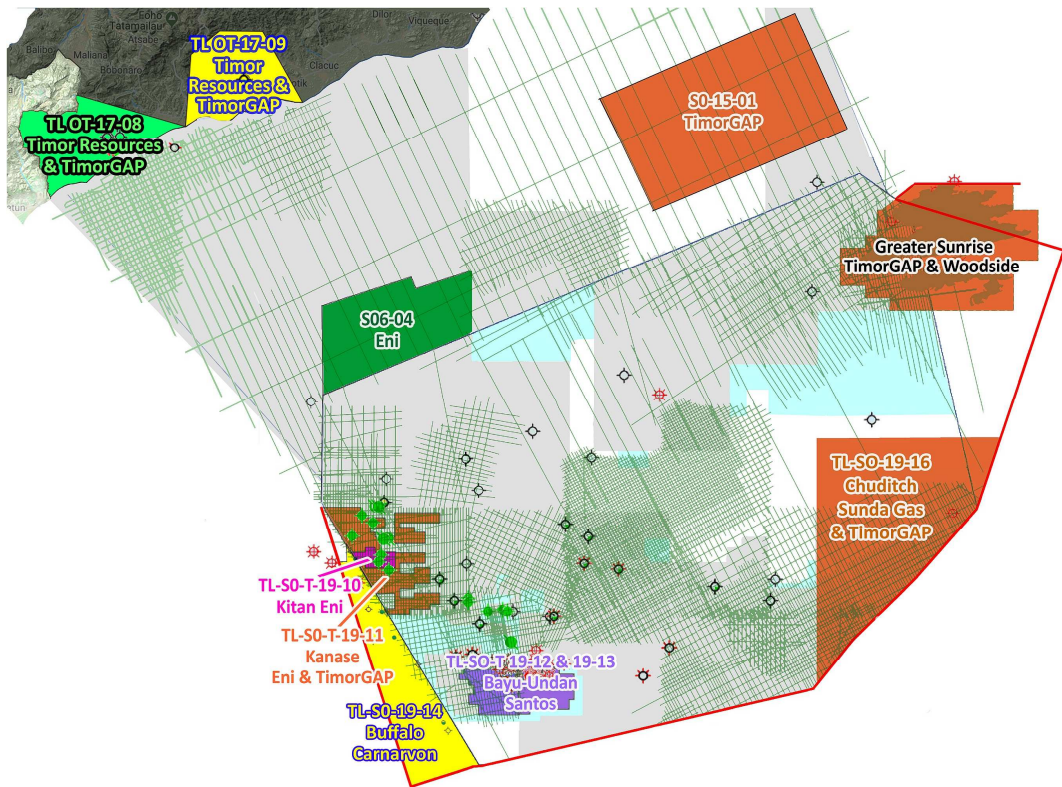
The dashed and dotted lines in Figures 8-10 after 2020 are projections, but production will end soon as the Bayu-Undan reserve is almost empty. Most of the remaining resource is natural gas, which is extracted at a constant rate to match the capacity of the pipeline and Darwin LNG plant, where the gas is processed. When the field's gas pressure can no longer sustain this rate, production will abruptly cease.

The thick black line shows the amount of oil and gas produced each year, and the double green line shows the money it generated for Timor-Leste. Revenue lagged production while Bayu-Undan capital costs were being repaid in 2004–2007. Since 2015, prices and production have been dropping, and revenues have fallen even faster as barrels have become more expensive to extract. By 2019, when the Maritime Boundary Treaty with Australia came into effect and Australia stopped siphoning off 10% of the revenues, there wasn't much oil and gas left.

Figure 10 doesn't anticipate the three new wells that Santos is drilling at Bayu-Undan in mid-2021 to sip up the last puddles of oil and gas. The \$235 million it will cost to drill them will be subtracted from revenues, so the 20 million barrels of additional production will not produce much income for Timor-Leste (Santos, 2021b). They will, however, be good for Santos, providing gas to operate the Darwin liquefaction plant until the Australian Barossa field comes on line (Evans, 2021a; Morrison, 2021). It also doesn't include Santos' recently floated idea to store carbon dioxide from nearby Australian high-carbon gas fields in Bayu-Undan after its own gas is exhausted, although this is also unlikely to yield much revenue for Timor-Leste (Milne 2021; Santos 2021d).

Timor-Leste is currently conducting a bidding round to attract companies to explore in its onshore and offshore territory. Although the round has been promised for more than a decade, lack of interest caused its opening to be delayed until 2019, and bids will be accepted until March 2022 (Ferreira, 2021; La'ó Hamutuk, 2021d; Scheiner, 2017, 2019). As Figure 11 shows, the most geologically promising areas within Timor-Leste's land and sea territory have long been explored by other companies, both seismically (green lines) and under previous contracts (light grey and blue areas). After unpromising results, the companies relinquished the areas. In the last bidding rounds in 2006, no company that had already explored in this area submitted a bid, and they know the geology better than anyone else.

Figure 11: Past and present oil and gas exploration



Sources: *Autoridade Nacional do Petróleo e Minerais (ANPM, 2018); La'o Hamutuk (2020b)*. Most contracts available at *La'o Hamutuk 2021d*.

Grey areas were under contract in 2003 or 2006, and blue areas were contracted before 2000; all these were relinquished after unsuccessful prospecting and are now vacant. Crossed circles show where test wells have been drilled during the last 50 years. Fine green lines show where seismic exploration has been done. The red line at lower right is the 2019 Maritime Boundary Treaty with Australia. Hyphenated numbers are the contracts between the government and the companies, followed by the project name and the principal companies involved.

The darker-colored shapes are current oil and gas contracts. Most of the areas other than Bayu-Undan are speculative, and the national oil company TimorGAP is a partner in nearly all of them. As shown in Table 2, even if they meet the most optimistic projections, none of these fields (with the possible exception of Sunrise, discussed separately in the next section) is likely to generate more than a few hundred million dollars for Timor-Leste.

Table 2: Current and potential oil and gas projects at the start of 2021

Project	Operator (partners)	Oil reserve (mmBOE)	Gas reserve (mmBOE)	Possible future revenues (million USD)	Status
Bayu-Undan current wells	Santos 46% (SK E&S 25%, Inpex 11%, Eni 11%, JERA/Tokyo Gas 9%)	16	4	\$200	Produced 800 mmBOE since 2004, will end in 2022 or 2023.
Bayu-Undan infill wells	Santos 46% (SK E&S 25%, Inpex 11%, Eni 11%, JERA/Tokyo Gas 9%)	16	4	\$0	Three infill production wells drilled in mid-2021 may extend production for 1-2 years. They are unlikely to increase revenues, as discussed above.
Greater Sunrise	Woodside 33% (TimorGAP 57%, Osaka Gas 10%)	226	854	unknown	Discovered in 1974. Seeking financing to proceed with development. High capital costs. TL will get 70% of state revenues. Woodside and TimorGAP revalued it to \$0 in 2020.
Buffalo	Carnarvon 50% (Advance Energy 50%)	31	0	\$465	Produced 20 mmBOE in 1999-2005 for BHP and Australia. First new well planned for late 2021.
Onshore (Covalima & Manufahi)	Timor Resources 50% (TimorGAP 50%)	40	0	\$600	First test wells in October 2021.
Chuditch	SundaGas 50% (TimorGAP 25%, Baron Oil 25%)	0	588 ^a	unknown	Shell drilled a test well in 1998 but did not continue. New owners will decide by the end of 2022 whether to drill another.
Three other contract areas	TimorGAP and Eni	?	?	unlikely	Although these contracts were signed several years ago, not enough work has been done to estimate possible reserves. No wells are planned yet.

Sources: ANPM (2021), MoF (2021d) and Santos (2021a) for Bayu-Undan current; Santos (2021b) for Bayu-Undan infill; Woodside (2020) and MoF (2021d) for Sunrise; Carnarvon Petroleum (2020) for Buffalo; Lusa (2020) for Onshore; Baron Oil (2021) for Chuditch.

Notes: Reserve estimates are in millions of barrels of oil equivalent (mmBOE), with 50% (2C or 2P) likelihood. Revenue estimates for Buffalo and onshore assume the government take will be \$15/barrel, which is what Timor-Leste received from Bayu-Undan in 2019–2020.

^a The Chuditch estimate is very speculative, based on a single test well 23 years ago and seismic data. The partners acknowledge that it is not consistent with standard industry methodology, and were recently granted a one-year extension, until the end of 2022, to analyze existing data and decide whether to drill another test well.

The companies involved in the projects other than Sunrise and Bayu-Undan are very small with limited commercial experience. TimorGAP, SundaGas (a Singapore-based exploration and production company) and Timor Resources (a privately owned Australian oil and gas company) have never managed an oil or gas project or drilled a well anywhere. Australia-based Carnarvon Petroleum has operated only one producing project, onshore in Thailand. These companies' reserve estimates are intended to attract investors, but companies such as TimorGAP and Timor Resources, which are not traded on stock exchanges, risk nothing by exaggerating.

In recent years, most exploration wells drilled the world over do not find reserves worth developing (Westwood Global Energy, 2019), and offshore wells are even less likely to discover commercially viable fields. Timor-Leste has a worse record: 90 exploration wells drilled since 1970 have found only eight commercially viable fields. One well that was considered non-viable was Chuditch, which has already been relinquished by at least two companies.

As Table 2 shows, the projects which are far enough along to estimate could, if all goes well, generate a total of about \$1.3 billion for Timor-Leste—as much as the country received in petroleum revenues during the last three months of 2012. They might finance the state budget for a year, but are not a long-term solution to the nation’s finances or economy.

GREATER SUNRISE AND THE TASI MANE PROJECT

Woodside discovered the Greater Sunrise reserve in 1974, but its development was delayed by Indonesia’s illegal occupation of Timor-Leste, and then by Australia’s continuing occupation of the new country’s maritime territory. After independence, Timor-Leste and the contract holders (Woodside, Shell, ConocoPhillips and Osaka Gas) couldn’t agree on a development model. The companies calculated that a floating LNG plant or a pipeline to Darwin (using the soon-to-be-idle LNG plant currently serving Bayu-Undan), would be most profitable. But Timor-Leste insisted on a pipeline to an LNG plant in Beaçu on its south coast, so nothing happened (La’o Hamutuk, 2008, 2018a).

After the Maritime Boundary Treaty was agreed in 2018, the companies were still reluctant to pipe the gas to Timor-Leste, so TimorGAP borrowed \$650 million from the Petroleum Fund and used the money to buy 57% participation in the Greater Sunrise joint venture. ConocoPhillips and Shell sold their shares, relieved to be paid for a non-productive asset. The loan is accruing interest at 4.5% per year and repayments will start in 2027, although it is unclear how TimorGAP will get the money. Based on the advice of an auditor, the Ministry of Finance recently reduced the assumed value of this investment to zero (MoF, 2021d, Book 1, p. 39).

In 2019, ConocoPhillips sold its majority stake in the Bayu-Undan joint venture and the Darwin LNG plant to the Australian gas company Santos, completely getting out of Timor-Leste. After Bayu-Undan production ends in a few years, Santos intends to use the existing Darwin LNG plant to process gas from Barossa, in Australian waters (Evans, 2021b; Santos, 2021c). Darwin LNG is no longer available for Sunrise, even if Timor-Leste or hypothetical investors wanted to explore options other than Beaçu LNG.

Due to changes in the energy economy from COVID-19 and other factors, Woodside, operator and 33% owner of the Sunrise project, revalued it at zero in July 2020 (Evans, 2020). TimorGAP followed suit at the end of 2020 (MoF, 2021d, Book 1, p. 38).

The development of the Greater Sunrise field itself as well as an undersea gas pipeline from Greater Sunrise to an LNG plant and export terminal in Beaçu are components of the proposed Tasi Mane¹³ project along Timor-Leste’s south coast, which also includes:

- a port and petroleum logistics supply base in Suai
- an oil refinery in Betano, with two onshore oil pipelines between Suai and Betano
- a 150-km highway between Suai and Beaçu
- airports in Suai and Viqueque
- new towns, water supply, ports and other facilities.

Tasi Mane is presented as a package, but each component should be evaluated on its own, and Sunrise could be developed without the airports, Suai and Betano facilities, highway or oil pipelines (though not without the gas pipeline, LNG plant and export terminal).

Unfortunately, most of the discussion, media coverage, and decisions about Sunrise and Tasi Mane have been personalized, politicized and nationalistic (Scambary, 2015). Policymakers have not yet seen comprehensive, unbiased, independent cost/benefit/risk analyses of each component’s economic, fiscal, social and environmental impacts. The decisions to proceed with Tasi Mane have been driven by independence hero Xanana Gusmão. Although non-Timorese academic researchers have explored the anthropological roots (Bovensiepen, 2020, 2021), political economy (Bovensiepen & Nygaard-Christensen, 2018; Rahmani, 2019; Scambary, 2015) and local impacts (Cryan, 2015a) of the Tasi Mane

¹³*Tasi Mane* (“Male sea” in Tetum) is the Timorese name for the waters off the country’s south coast, which others call the Timor Sea.

project, the risks of putting all of the country’s eggs in one unsound basket have so far been overlooked by many of Timor-Leste’s leaders.

Table 3 shows that the capital investment needed to build Tasi Mane will be around \$19 billion dollars—equal to the entire Petroleum Fund. This does not include operational costs or consider financial returns, which require further study. However, government documents reveal that only about 12% of the required investment has been budgeted for. Nearly half of that is the money borrowed from the Petroleum Fund to buy into the Sunrise joint venture. International media have reported that China will loan Timor-Leste money to build Tasi Mane, but TimorGAP and other officials deny this. At the time of writing, no known investors have expressed interest in this project.

Table 3: Funds spent, budgeted and needed to build the Tasi Mane project (million USD)

Component	Location	Status	Spent through 2020	Budgeted 2021	Budgeted 2022–2025	Est. total cost	Per cent budgeted
Airport	Suai	Constructed	77	3	9	100	90%
Highway	Suai-Fatukai	Mostly built	306	3	4	340	92%
Highway	Fatukai-Beaçu	Not started	3	1	22	1,320	2%
Supply base	Suai	Awaiting procurement	51	5	745	900	89%
Airport	Viqueque	Not started	–	–	–	75	0%
Oil refinery & pipelines	Betano	Pending design	5	–	6	1,500	1%
Gas pipeline, LNG plant & port	Sunrise-Beaçu	Pending design, seeking financing	25	–	21	6,000	1%
57% share of Sunrise Joint Venture	Offshore	Borrowed from Petrol. Fund	650			650	100%
57% of Sunrise upstream capital expenditure	Offshore	Pending design and financing	–		–	6,840	0%
Administrative and other costs during construction	Dili	Ongoing	58	63	–	500	25%
TOTAL			1,175	75	807	18,225	11%

Sources: MoF (2021a, 2021c); TimorGAP (2020); author’s estimates.

Note: the \$650 million loan from the Petroleum Fund to purchase a controlling share of the Sunrise Joint Venture will cost an additional \$512 million in interest.

Tasi Mane’s future economic benefits to Timor-Leste are greatly exaggerated (ACIL Allen Consulting, 2016; TimorGAP, 2020, p. 48).¹⁴ Nearly all of the billions of dollars for construction will go to foreign companies. After operation begins, these facilities will provide hardly any local jobs or subcontracts. According to Australian economist Brett Inder, investing in improved coffee production would employ six

¹⁴TimorGAP’s 2019 Annual Report says “The Tasi Mane Project ... will increase national gross domestic product (GDP) and export earnings, while creating employment opportunities during construction and operation, as well as providing a catalyst for further development in the south coast region. It is projected that up to 10000 direct jobs will be created from Tasi Mane projects, and more than 50000 indirect jobs can be generated with the transformation of petroleum sector development from extractive to industrialization. In addition, the Tasi Mane Project will generate indirect benefits, influencing broader economic performance as a result of spillover effect to other industry sectors” (TimorGAP, 2020).

times as many workers and stimulate six times as much GDP growth as the same amount invested in Tasi Mane (Inder, 2019; Inder & Qu, 2019). In fact, studies elsewhere show that the petroleum industry creates fewer jobs per dollar than virtually any other potential investment (Bacon & Kojima, 2011; Communities for a Better Environment, 2011). Although exporting oil and gas from Greater Sunrise might generate revenue for the state of Timor-Leste, other Tasi Mane components—highway, airports, refinery, supply base—are unlikely to recover their investment costs.

The only parts of Tasi Mane that have been built (or even contracted) so far are Suai airport and the first fifth of the highway (Gomes & Ahrens, 2020). The airport is unused and overgrown with weeds, and part of the highway, which separates people from their families and farms, slid down the hill with the first heavy rainfall (Fundasaun Mahein, 2021b). Many people have already been displaced from their homes and farms in anticipation of other Tasi Mane components (Cryan, 2015a, 2015b). In addition, each part of the Tasi Mane project heightens social conflict, uses valuable land and shoreline, worsens public health, and will degrade and endanger the environment (Fundasaun Mahein, 2021a; La’o Hamutuk, 2008, 2016a, 2016b).

In May 2020, the restructured government replaced the Minister for Petroleum and Mineral Resources, the head of the National Petroleum and Minerals Authority (Autoridade Nacional do Petróleo e Minerais or ANPM) and the head of the TimorGAP national oil company. The new holders of these positions have said that previous studies were biased and that a thorough review of Tasi Mane’s costs, benefits and risks will be done before proceeding further. In March 2021, new ANPM President Florentino Ferreira told an oil industry conference that Tasi Mane “is currently subject to reassessment of its viabilities” (Ferreira, 2021, slide 12). Nevertheless, the project has a lot of momentum, and the 2021 state budget envisions building the Suai Supply Base starting in 2022 (MoF, 2021c, Budget Book 3a, p. 36).

To summarize, although Greater Sunrise is Timor-Leste’s only undeveloped, proven oil and gas reserve and is much larger than other possibilities, its future is uncertain for technical, financial, ecological and political reasons. Even if it goes ahead and generates returns, it will not be nearly as lucrative as Bayu-Undan has been. The logistics are more complex, and the global petroleum economy has changed. Oil companies and other investors have been unwilling to take it on, realizing that projects of borderline viability will become unprofitable as renewable energy replaces fossil fuel to avert further calamities from climate change. Although a few components of the Tasi Mane project have been built, they and the remaining components may never provide net benefits for Timor-Leste. Further construction has been delayed and is being re-evaluated.

CONCLUSION

In many areas, Timor-Leste has made great strides since independence. Civil and political rights are respected, democracy flourishes and most state actions follow the rule of law. Infant and maternal mortality are greatly reduced, malaria and leprosy have been virtually eliminated, and many more people have access to electricity, education and health care.

However, there is still a long way to go. Multidimensional poverty still afflicted 47% of people in Timor-Leste in 2016—a significant improvement on 70% in 2009. Although this is the fourth-largest improvement in the world, Timor-Leste’s Multidimensional Poverty Index (MPI) is still more than double the average for developing countries, and is worse than every non-African country except Papua New Guinea (UNDP, 2020).

Timor-Leste is now at a crossroads, with risks intensified by COVID-19 and political competition. As producing oil and gas reserves near depletion, future petroleum projects will not be able to continue to finance the government’s budget and the nation’s economy. Although the urgency of economic diversification is well-understood by many Timorese analysts outside the political system (da Cruz Cardoso, 2020, 2021a; da Costa Junior, 2018; Gomes & Ahrens, 2020; Guterres, 2018; Neves, 2019, 2020; Fundasaun Mahein 2021c), political leaders are hesitant to acknowledge that the country needs to change direction. Economic diversification is difficult to envision and to implement.

Withdrawals from the Petroleum Fund are decided by Timorese officials, but its income is not within their control. Although the Timorese people have won struggles that international “experts” said were impossible, including national independence and the maritime boundary, no amount of determination or strategizing can create new petroleum reserves or influence global oil prices and investment markets.

It is hard for many people to accept that Timor-Leste will never again receive \$3 billion a year, as it did when it was converting non-renewable oil and gas assets to financial assets a few years ago, and that the savings in the Petroleum Fund will not be able to finance the state for generations. Existing fields are depleted or near depletion. New prospects are minor, apart from Sunrise which may not be commercially viable, and there are real risks of massive waste of public funds and land on the dubious Tasi Mane project. The only way forward—it is not a choice—is to diversify the economy.

All the non-governmental Timorese authors cited in this paper came of age after independence, and their minds may be more open than those conditioned by the struggle to survive and overcome a brutal foreign occupation. Although the senior “1975” generation of leaders excelled at resistance and clandestine struggle, the skill set of national heroes may not be best suited for democracy in peacetime. Their successors, including the current President, Prime Minister and most other ministers, grew up in wartime, largely isolated from the world. However, nearly three-quarters of Timor-Leste’s people are under 35, and have enjoyed more peaceful and diverse opportunities than their forebears. As this younger generation moves into decision-making roles, they are bringing fresh energy and ideas to the nation’s development and transcending old patterns.

In August 2020, Timor-Leste’s government adopted a plan for Economic Recovery from COVID-19 prevention measures, which says:

“For Timor-Leste to grow continuously in an inclusive and sustainable way, more and better ways must be found to strengthen its production capacity and diversify its economy outside the oil sector ... [T]he message is simple: we must rely less on our natural resources and rely more on what we can produce with our own sweat, creativity and imagination, which would imply more resources devoted to tourism, agriculture and manufacturing.” (RDTL, 2020)

In January 2021, Timor-Leste was assessed to determine it should continue to be categorized as a “Least-Developed Country”, even though some statistical indicators would allow it to “graduate.” As it had three years earlier, the government persuaded the international experts to defer Timor-Leste’s graduation, based on the fragility of its economy. Their statements in New York recognized many of the economic challenges described in this paper (Ministry of Foreign Affairs and Cooperation, 2021).

This is a different message than most Timorese politicians have been hearing and promoting at home. Although technocrats in Timor-Leste are reconsidering the dominant role of oil and gas in its economy, the inertia of prior thinking will be difficult to overcome, and nobody wants to be the bearer of bad news. Many political leaders continue to declare “*Hakarak ka lakohi, Projetu Greater Sunrise ita tenke kontinua*” (“Like it or not, we must continue the Greater Sunrise project”).

If decision-makers can overcome the fantasies and obsessions that have followed oil and gas into the public policy arena, the remainder of the Petroleum Fund could be used to kick-start more sustainable, equitable economic development.

An essential first step is strengthening the country's most precious resource—its people. Investing in nutrition, education and health care will lay the foundation for whatever paths are followed in the future. Although more than half of Timor-Leste's petroleum-fueled period has passed, a few years remain to prepare for the next phase of the country's history.



REFERENCES

Many documents are referenced on both La'o Hamutuk and official websites, as the latter don't always work or endure. All were accessed in March 2021 or later.

- ACIL Allen Consulting. (2016). Tasi Mane Project: Potential implications for the economy of Timor-Leste. Report to TimorGAP. [http://www.laohamutuk.org/Oil/Sunrise/2018/ACIL Tasi Mane Study Final Report 20160830.pdf](http://www.laohamutuk.org/Oil/Sunrise/2018/ACIL_Tasi_Mane_Study_Final_Report_20160830.pdf)
- Advisian. (2017). *Timor Port: Tibar Bay. Environmental impact statement*. Report submitted by Timor Port SA. http://www.laohamutuk.org/Env/TibarPort/EIS_301320-13728-EN-REP-1200_Rev2DOct2017.pdf
- Autoridade Nacional do Petróleo e Minerais, RDTL. (2018). Interactive map of Timor Sea contract areas. <http://web.anpm.tl/webs/anptlweb.nsf/pgLafaekMap>
- Autoridade Nacional do Petróleo e Minerais. (2020). *Annual Report 2019*. National Petroleum and Minerals Authority (ANPM). [http://web01.anpm.tl/webs/anptlweb.nsf/vwAll/Resource-ANNUAL-REPORT-2019-FINAL/\\$File/ANNUAL-REPORT-2019-FINAL.pdf?openelement](http://web01.anpm.tl/webs/anptlweb.nsf/vwAll/Resource-ANNUAL-REPORT-2019-FINAL/$File/ANNUAL-REPORT-2019-FINAL.pdf?openelement) or <http://www.laohamutuk.org/Oil/PetRegime/ANP2014/ANPMAR2019en.pdf>
- Autoridade Nacional do Petróleo e Minerais. (2021). JPDA production and revenue data. <http://web01.anpm.tl/webs/anptlweb.nsf/pgLafaekDataGasListHTML> and www.anpm.tl/publish-what-you-pay/
- Asia Pacific Environmental Consultants. (2018). *Environmental Impact Statement for Proposed Pelican Paradise Development*. ASPEC. [http://www.laohamutuk.org/Env/Pelican/TL%20EIS_Final%20Report%20\(Scanned\)_18%20Apr%202018_Optimized.pdf](http://www.laohamutuk.org/Env/Pelican/TL%20EIS_Final%20Report%20(Scanned)_18%20Apr%202018_Optimized.pdf)
- Asian Development Bank. (2020a). *Asian development outlook 2020: What drives innovation in Asia?* ADB. <http://dx.doi.org/10.22617/FLS200119-3>
- Asian Development Bank. (2020b). *Asian development outlook 2020 update: Wellness in worrying times*. ADB. <http://dx.doi.org/10.22617/FLS200256-3>
- Bacon, R. & Kojima, M. (2011). *Issues in estimating the employment generated by energy sector activities*. World Bank. <http://hdl.handle.net/10986/16969>
- Banco Central de Timor-Leste. (2020). Balance of payments 2006–2020. Central Bank of Timor-Leste. <https://www.bancocentral.tl/en/go/balance-of-payments>
- Banco Central de Timor-Leste. (2021). Petroleum Fund annual, quarterly and monthly reports. Central Bank of Timor-Leste. <https://www.bancocentral.tl/en/go/publications-key-report-petroleum-fund-report>
- Baron Oil. (2021). Update on TL-SO-19-16 production sharing contract. 8 January. <http://www.laohamutuk.org/Oil/Project/SO-19-16/BaronChuditch8Jan2021.pdf>
- Bovensiepen, J. (2020). On the banality of wilful blindness: Ignorance and affect in extractive encounters. *Critique of Anthropology*, 40(4), 490–507. <https://journals.sagepub.com/doi/full/10.1177/0308275X20959426>
- Bovensiepen, J. (2021). Can oil speak? On the production of ontological difference and ambivalence in extractive encounters. *Anthropological Quarterly*, 94(1). (In press). <https://kar.kent.ac.uk/80581> or <https://aq.gwu.edu/index.html>
- Bovensiepen, J. & Nygaard-Christensen, M. (2018). Petroleum planning as state building in Timor-Leste. *The Asia Pacific Journal of Anthropology*, 19(5), 412–431. <https://doi.org/10.1080/14442213.2018.1513060>
- BP. (2021). *Statistical Review of World Energy 2021*. <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report.pdf>
- Carnarvon Petroleum. (2020, December 17). Buffalo farmout and redevelopment. Press Release. <https://www.carnarvon.com.au/wp-content/uploads/2020/12/2157542.pdf>
- Communities for a Better Environment. (2011). Big oil, little jobs: Green energy, more jobs. CBE. <http://www.cbecal.org/wp-content/uploads/2015/04/Big-Oil-little-jobs-Green-Energy-more-jobs1.pdf>
- Cryan, M. (2015a). *Dispossession and impoverishment in Timor-Leste: Potential impacts of the Suai supply base*. SSGM Discussion Paper 2015/15. Australian National University. http://dpa.bellschool.anu.edu.au/sites/default/files/publications/attachments/2016-07/dp_2015_15-cryan.pdf
- Cryan, M. (2015b). 'Empty land'? The politics of land in Timor-Leste. In S. Ingram, L. Kent, & A. McWilliam (Eds.), *A new era? Timor-Leste after the UN* (pp. 141–154). ANU Press. <http://doi.org/10.22459/NE.09.2015>

- da Costa Junior, A. (2018). Productive economic sectors are essential for sustainable development in Timor-Leste. Paper presented to Timor-Leste Studies Association–Brazil conference, Brasilia, July. <http://www.laohamutuk.org/misc/TLSA2018/TLSABRProdEconJul2018Paper.pdf>
- da Cruz Cardoso, J. (2019, March 6). Can Timor-Leste move away from an oil-based economy? *The Diplomat*. <https://thediplomat.com/2019/03/can-timor-lestes-move-away-from-an-oil-based-economy/>
- da Cruz Cardoso, J. (2020, January 8). Can Timor-Leste achieve a balanced development? *The Diplomat*. <https://thediplomat.com/2020/01/can-timor-lestes-achieve-a-balanced-development/>
- da Cruz Cardoso, J. (2021a, March 1). Why is Timor-Leste still unable to diversify its economy? *The Diplomat*. <https://thediplomat.com/2021/03/why-is-timor-lestes-still-unable-to-diversify-its-economy/>
- da Cruz Cardoso, J. (2021b, April 13). Dili floods a costly consequence of poor urban planning? *The Interpreter*. <https://www.lowyinstitute.org/the-interpreter/dili-floods-costly-consequence-poor-urban-planning>
- Evans, D. (2020, July 22). Sunset at East Timor’s Greater Sunrise LNG after Woodside write-down. *Energy Voice*. <https://www.energyvoice.com/oilandgas/asia/254153/sunset-at-east-timors-greater-sunrise-lng-after-woodside-write-down/>
- Evans, D. (2021a, January 15). Santos breathes new life into East Timor’s Bayu-Undan. *Energy Voice*. <https://www.energyvoice.com/oilandgas/asia/lng/291733/santos-east-timor-bayu-undan>
- Evans, D. (2021b, 30 March). Santos approves \$3.6bn Barossa LNG project. *Energy Voice*. <https://www.energyvoice.com/oilandgas/asia/310936/santos-approves-3-6bn-barossa-lng-project/>
- Ferreira, F. (2021). Leading Timor-Leste’s Hydrocarbon Industry to Growth – Roles and Responsibilities. Presentation to third Timor-Leste oil, gas & energy summit, 25 March.
- Food and Agriculture Organization, UNICEF, World Food Programme, & World Health Organization. (2021). Asia and the Pacific regional overview of food security and nutrition 2020: Maternal and child diets at the heart of improving nutrition. FAO. <https://doi.org/10.4060/cb2895en>
- Fundasaun Mahein. (2021a). Projeitu Tasi Mane Nia Impaktu ba Feto sira [Tasi Mane Project’s impact on women]. (In Tetun). www.fundasaunmahein.org/wp-content/uploads/2021/01/MNH-17-Tasi-Mane-PDF.pdf
- Fundasaun Mahein. (2021b, January 29). Security risks and impacts from the Tasi Mane Project and South Coast Highway. www.fundasaunmahein.org/2021/01/29/security-risks-and-impacts-from-the-tasi-mane-project-and-south-coast-highway/
- Fundasaun Mahein. (2021c, October 20). Timor-Leste’s Strategic Development: A Question Of National Security. <https://www.fundasaunmahein.org/2021/10/20/timor-lestes-strategic-development-a-question-of-national-security/>
- General Directorate of Statistics (DGE), RDTL. (2016). *Poverty in Timor-Leste 2014*. RDTL, Ministry of Finance, DGE & World Bank Group. https://www.mof.gov.tl/wp-content/uploads/2016/09/012_TL_REPORT_R01.pdf or <http://www.laohamutuk.org/DVD/DGS/SLS2014/PovertyReport2014-Sep2016en.pdf>
- General Directorate of Statistics. (2017). *Timor-Leste 2015 census*. DGE. <https://www.statistics.gov.tl/category/publications/census-publications/2015-census-publications/> or <http://www.laohamutuk.org/DVD/DVDIndexEn.htm# census15>
- General Directorate of Statistics. (2018). *Demographic and health survey 2016*. DGE, Ministry of Planning and Finance, & Ministry of Health. www.dhsprogram.com/publications/publication-FR329-DHS-Final-Reports.cfm or <http://www.laohamutuk.org/DVD/2018/DHS2016.pdf>
- General Directorate of Statistics. (2019). *Business activity survey of Timor-Leste 2018*. DGE & Ministry of Finance. https://www.statistics.gov.tl/wp-content/uploads/2019/12/FINAL_Publication-BAS2018-English.pdf or <http://www.laohamutuk.org/DVD/DGS/BAS2018en.pdf>
- General Directorate of Statistics. (2020). *Timor-Leste agricultural census 2019: National report on final census results*. DGE, Ministry of Finance, & Ministry of Agriculture and Fisheries. <https://www.statistics.gov.tl/wp-content/uploads/2020/11/FINAL-MAIN-REPORT-TLAC2019.pdf>
- General Directorate of Statistics. (2021a). External trade statistics, monthly and annual reports. DGE. <https://www.statistics.gov.tl/category/survey-indicators/external-trade-statistics/?lang=en> or <http://www.laohamutuk.org/DVD/DVDIndexEn.htm# gov>
- General Directorate of Statistics. (2021b). Consumer price index reports. DGE. <https://www.statistics.gov.tl/category/survey-indicators/consumer-price-index/?lang=en>

- General Directorate of Statistics. (2021c). *Timor-Leste National Accounts 2000–2020*. DGE & Ministry of Finance. <https://www.statistics.gov.tl/wp-content/uploads/2021/09/Timor-Leste-National-Accounts-2001-2020.pdf> or <http://www.laohamutuk.org/DVD/DGS/NatlAccts2020en.pdf>
- Gomes, E. & Ahrens, B. (2020). Implikasaun Husi Projētu Greater Sunrise no Projētu Tasi Mane ba Sustentabilidade Finansa Estadu. In S. Farram, D. M. da Silva, L. F. Soares, N. Canas Mendes, C. Fernandes, M. B. Soares, U. Pinto, H. Loney, R. L. Williams, C. Ninas Nabais, & M. Leach (Eds.). *Understanding Hatene kona ba Compreender Timor-Leste 2019* (pp. 18–24). Swinburne University of Technology. https://researchbank.swinburne.edu.au/file/27b705e3-fda5-481d-927d-4bec1b7245d5/1/2020-farram-proceedings_volume_1.pdf or <http://www.laohamutuk.org/misc/TLSA2019/ImplikTMPTLSAMay2020te.pdf>
- Gomes, E. (2021). Dili and Timor-Leste’s Territory: Urban and Territorial planning: Need to Promote Integrated and Inclusive Plans. <http://www.laohamutuk.org/Env/2021/280921Planu%20Urbanu%20no%20TerritorialEn.pdf>
- Guterres, J. (2018, May 22). Timor-Leste’s corruption challenge. *The Diplomat*. <https://thediplomat.com/2018/05/timor-lestes-corruption-challenge/>
- Inder, B. (2019). Where lies the future for the Timor-Leste economy? Presentation at the Timor-Leste Studies Association, Dili.
- Inder, B. & Qu, N. (2019). *Coffee in Timor-Leste: What do we know? What can we do?* Monash University Research Briefs on Timor-Leste (RB-TL1). <https://drive.google.com/file/d/1oMufKgFvLVGPjvFPOPSiFK1pOzWthKlj>
- International Monetary Fund. (2019). Democratic Republic of Timor-Leste: 2019 Article IV Consultation-Press Release; Staff Report. <https://www.imf.org/en/Publications/CR/Issues/2019/05/07/Democratic-Republic-of-Timor-Leste-2019-Article-IV-Consultation-Press-Release-Staff-Report-46874>
- International Monetary Fund. (2021, May 17). IMF Staff Completes 2021 Article IV Mission to Timor-Leste. Press release No. 21134. <https://www.imf.org/en/News/Articles/2021/05/18/pr21134-timor-leste-imf-staff-completes-2021-article-iv-mission>
- John, S., Papyrakis, E. & Tasciotti, L. (2020). Is there a resource curse in Timor-Leste? A critical review of recent evidence. *Development Studies Research*, 7(1), 141–152. <https://doi.org/10.1080/21665095.2020.1816189>
- La’o Hamutuk. (2008). *Sunrise LNG in Timor-Leste: Dreams, realities and challenges*. Timor-Leste Institute for Reconstruction Monitoring and Analysis. <http://www.laohamutuk.org/Oil/LNG/LNGReport.pdf>
- La’o Hamutuk. (2015). How long will the Petroleum Fund carry Timor-Leste? <http://www.laohamutuk.org/econ/model/13PFSustainability.htm>
- La’o Hamutuk. (2016a). Environmental assessment for Betano refinery. <http://www.laohamutuk.org/Oil/TasiMane/Betano/EIA/16RefineryEIA.htm>
- La’o Hamutuk. (2016b). South coast Petroleum infrastructure project. <http://www.laohamutuk.org/Oil/TasiMane/11TasiMane.htm>
- La’o Hamutuk. (2018a). Buying part of Greater Sunrise from ConocoPhillips: What does it mean for Timor-Leste and the Pipeline? <http://laohamutuk.blogspot.com/2018/10/buying-part-of-greater-sunrise-from.html>
- La’o Hamutuk. (2018b). 2017 and 2018 General State Budgets. <http://www.laohamutuk.org/econ/OGE17/16OGE17.htm>
- La’o Hamutuk. (2020a). 2020 General State Budget. <http://www.laohamutuk.org/econ/OGE20/19OGE20.htm>
- La’o Hamutuk. (2020b). 2016–2020: Compulsory conciliation leads to a Maritime Boundary Treaty between Australia and Timor-Leste. <http://www.laohamutuk.org/Oil/Boundary/18ConcilTreaty.htm>
- La’o Hamutuk. (2020c). Timor-Leste buys into the Sunrise oil and gas project. <http://www.laohamutuk.org/Oil/Sunrise/18SunriseBuyout.htm>
- La’o Hamutuk. (2021a). 2021 General State Budget. <http://www.laohamutuk.org/econ/OGE21/20OGE21.htm>
- La’o Hamutuk. (2021b). [Operation of] Timor-Leste Petroleum Fund. <http://www.laohamutuk.org/Oil/PetFund/05PFIndex.htm>
- La’o Hamutuk. (2021c). Covid-19 State of Emergency: 2020–2021. <http://www.laohamutuk.org/Justice/2020/20Emergency.htm>
- La’o Hamutuk. (2021d). Petroleum production sharing contracts. <http://www.laohamutuk.org/Oil/PSCs/10PSCs.htm>

- La'o Hamutuk. (2021e). Rights and sustainability in Timor-Leste's development. <http://www.laohamutuk.org/econ/briefing/RightSustainCurrentEn.pdf>
- Lundahl, M. & Sjöholm, F. (2019). *The creation of the East Timorese Economy – Volume 2: Birth of a Nation*. Palgrave Macmillan. <https://doi.org/10.1007/978-3-030-22052-5>
- Lundahl, M. & Sjöholm, F. (2020). *Economic challenges for East Timor*. Sweden. Lund University Department of Economics Working Paper 2020:14. https://project.nek.lu.se/publications/workpap/papers/wp20_14.pdf
- Lusa. (2020, July 17). *Timor Resources espera iniciar exploração em poços no sul de Timor-Leste no final do ano* [Timor Resources expects to start exploration in wells in southern Timor-Leste later this year]. Plataforma. <https://www.plataformamedia.com/2020/07/17/timor-resources-espera-iniciar-exploracao-de-petroleo-no-final-do-ano/>; English translation at <http://www.laohamutuk.org/Oil/onshore/LusaTimorResourcesExpects17Jul2020EnTePt.pdf>
- Lusa. (2021, February 25). *Heineken em Timor-Leste em risco de fechar após anos de perdas* [Heineken in Timor-Leste at risk of closing after years of losses]. Notícias ao Minuto. <https://www.noticiasao minuto.com/economia/1697097/heineken-em-timor-leste-em-risco-de-fechar-apos-anos-de-perdas>
- Magalhães, F. (2021, May 19). Lessons from the recent cyclone in Timor-Leste. *The Interpreter*. <https://www.lowyinstitute.org/the-interpreter/lessons-recent-cyclone-timor-leste>
- McWilliam, A. & Monteiro, C. (2019). On Brexit worries: Migration and remittance landscapes in Timor-Leste. In A. McWilliam & M. Leach (Eds.), *Routledge handbook of contemporary Timor-Leste* (pp. 136–146). Routledge. <https://doi.org/10.4324/9781315623177>
- Milne, P. (2021, May 11). Santos and ENI team up to tackle dirty gas and decommissioning. *Boiling Cold*. <https://www.boilingcold.com.au/santos-and-eni-team-up-to-tackle-dirty-gas-and-decommissioning/>
- Ministry of Finance, RDTL. (2018). 2017 and 2018 General State Budgets. Available at <http://www.laohamutuk.org/econ/OGE17/16OGE17.htm#docs>
- Ministry of Finance. (2020a). 2020 General State Budget. Available at <http://www.laohamutuk.org/econ/OGE20/19OGE20.htm#docs>
- Ministry of Finance. (2020b). Jornada Orçamental 2021 [Budget workshop 2021]. 4 August 2020, Dili. <http://www.laohamutuk.org/econ/OGE21/jornada/AprezJornadaOrsamental4Aug2020te.pdf>
- Ministry of Finance. (2021a). Budget Transparency portal. www.budgettransparency.gov.tl/public/index?&lang=en
- Ministry of Finance. (2021b). Orçamento Geral do Estado para 2021, Panorama Orçamental, Livro 1, Aditamento Março 2021 [General State Budget for 2021, Overview, Book 1, Supplement March 2021]. <http://www.laohamutuk.org/econ/OGE21/OR/SupplementBB1Mar2021pt.pdf>; English translation at <http://www.laohamutuk.org/econ/OGE21/OR/SupplementBB1Mar2021en.pdf>
- Ministry of Finance. (2021c). State Budget documents for 2021, including enacted and rectified State Budgets for 2021. Available at <http://www.laohamutuk.org/econ/OGE21/20OGE21.htm#docs>
- Ministry of Finance. (2021d). Proposed State Budget documents for 2022. Available at <http://www.laohamutuk.org/econ/OGE22/21OGE22.htm#docs>
- Ministry of Foreign Affairs and Cooperation, RDTL. (2021). Statement on the Consideration of Timor-Leste's Graduation from the Least Developed Country Status. <https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/TL-2021-CDP-EGM.pdf>
- Morrison, K. (2021, May 14). East Timor faces energy transition challenge early. Argus Media. <https://www.argusmedia.com/news/2215303-east-timor-faces-energy-transition-challenge-early>
- Neves, G. (2016). The political economy of petroleum dependency, SSGM In Brief 2016/6, Canberra: State, Society & Governance in Melanesia, Australian National University. <http://bellschool.anu.edu.au/experts-publications/publications/3630/political-economy-petroleum-dependency>
- Neves, G. (2018). Political and economic challenges of petroleum dependency in Timor-Leste. In J. Bovensiepen (Ed.), *The promise of prosperity: Visions of the future in Timor-Leste* (pp. 63–83). ANU Press. <http://doi.org/10.22459/PP.2018>
- Neves, G. (2019, January 16). Timor-Leste needs new strategies to create jobs. *The Diplomat*. <https://thediplomat.com/2019/01/timor-leste-needs-new-strategies-to-create-jobs/>

- Neves, G. (2020, August 21). Aproximasaun de zenvolvimentu umanu: konseitu no implikasaun [Approaches to human development: concepts and implications]. Tatoli.
<http://www.tatoli.tl/2020/08/21/aproximasaun-dezenvolvimentu-umanu-konseitu-no-implikasaun/>
- Oxfam. (2019). Towards economic diversification in Timor-Leste.
<https://asia.oxfam.org/latest/policy-paper/economic-diversification-timor-leste>
- Rahmani, B. (2019, June 1). The looting of Timor-Leste's oil wealth. *The Diplomat*.
<https://thediplomat.com/2019/05/the-looting-of-timor-lestes-oil-wealth/>
- República Democrática de Timor-Leste. (2011). *Timor-Leste Strategic Development Plan 2011–2030*. Democratic Republic of Timor-Leste. timor-leste.gov.tl/wp-content/uploads/2012/02/Strategic-Development-Plan_EN.pdf or <http://www.laohamutuk.org/econ/SDP/2011/Timor-Leste-Strategic-Plan-2011-20301.pdf>
- República Democrática de Timor-Leste. (2018). *Program of the Eighth Constitutional Government*. Democratic Republic of Timor-Leste. timor-leste.gov.tl/wp-content/uploads/2018/10/VIII-GOVERNO-CONSTITUCIONAL-FINAL_Programa_ENG.pdf or <http://www.laohamutuk.org/misc/gov8/VIIIGovtProgramEn.pdf>
- República Democrática de Timor-Leste. (2020). *Economic Recovery Plan*.
http://timor-leste.gov.tl/wp-content/uploads/2020/10/EN-PRE_screen.pdf or
<http://www.laohamutuk.org/Justice/2020/PlanoRecuperacaoEconomicaAug2020en.pdf>
- República Democrática de Timor-Leste. (2021a). Covid-19 Timor-Leste Dashboard.
<https://covid19.gov.tl/en/dashboard/>
- República Democrática de Timor-Leste. (2021b). Lei N.º 8/2021 de 3 de Maio. Primeira alteração à Lei n.º 14/2020, de 29 de dezembro, Orçamento Geral do Estado para 2021 e aprovação de medidas de apoio socioeconómico [Law No. 8/2021 – first amendment to General State Budget for 2021 and approval of socio-economic support measures]. *Jornal da República*, Series I, No. 18E.
www.mj.gov.tl/jornal/public/docs/2021/serie_1/SERIE_I_NO_18_E.pdf
- Santos. (2021a). Quarterly, annual and reserve reports for 2003–2020.
<https://www.santos.com/investors/company-reporting/>
- Santos. (2021b, January 5). Bayu-Undan infill development FID. Press release.
<https://www.santos.com/news/bayu-undan-infill-development-fid/>
- Santos. (2021c, March 30). Santos announces FID on the Barossa gas project for Darwin LNG. Press release.
<https://www.santos.com/news/santos-announces-fid-on-the-barossa-gas-project-for-darwin-lng/>
- Santos. (2021d, May 3). Santos and Eni sign MOU to collaborate in northern Australia and Timor-Leste. Press release.
<https://www.santos.com/news/santos-and-eni-sign-mou-to-collaborate-in-northern-australia-and-timor-leste/>
- Scambary, J. (2015). In search of white elephants: The political economy of resource income expenditure in East Timor. *Critical Asian Studies*, 47(2), 283–308, <http://dx.doi.org/10.1080/14672715.2015.1041281>
- Scheiner, C. (2015). Can the Petroleum Fund exorcise the resource curse from Timor-Leste? In S. Ingram, L. Kent, & A. McWilliam (Eds.), *A new era? Timor-Leste after the UN* (pp. 73–101). ANU Press.
<http://doi.org/10.22459/NE.09.2015>
- Scheiner, C. (2017). As Bayu-Undan dries up: Challenges and opportunities. Paper presented at the 2017 Timor-Leste Studies Association conference, *New research on Timor-Leste 2017*, 5–7 July, Swinburne University of Technology. <http://www.laohamutuk.org/misc/TLSA2017/ScheinerTLsABayuDriesEn.pdf>
- Scheiner, C. (2019). After the oil runs dry: Economics and government finances. In A. McWilliam & M. Leach (Eds.), *Routledge handbook of contemporary Timor-Leste* (pp. 85–109). Routledge.
<https://doi.org/10.4324/9781315623177>
Updated version at <http://www.laohamutuk.org/econ/briefing/AfterOilRunsDryCurrentEn.pdf>
- Scheiner, C. (2020). Implications of recent changes to Timor-Leste's Petroleum Fund. In S. Farram, D. M. da Silva, L. F. Soares, N. Canas Mendes, C. Fernandes, M. B. Soares, U. Pinto, H. Loney, R. L. Williams, C. Ninas Nabais, & M. Leach (Eds.), *Understanding Hatene kona ba Compreender Timor-Leste 2019* (pp. 318–330). Swinburne University of Technology. https://researchbank.swinburne.edu.au/file/27b705e3-fda5-481d-927d-4bec1b7245d5/1/2020-farram-proceedings_volume_1.pdf. Updated version at <http://www.laohamutuk.org/Oil/PetFund/2020/ImplicationsPetroleumFundMay2020en.pdf>
- TimorGAP, E.P. (2020). *2019 Report and Accounts*. Available at
<http://www.laohamutuk.org/Oil/TimorGAP/TGAR2019en.pdf>

- United Nations Development Programme. (2011). *Timor-Leste human development report 2011: Managing natural resources for human development*. Available at <https://www.laohamutuk.org/econ/HDI10/TLHDR2011En.pdf>
- United Nations Development Programme. (2020). Human development report 2020. hdr.undp.org/en/2020-report
- United Nations Resident Coordinator Office Timor-Leste. (2021). Timor-Leste floods – Situation report No. 9, as of 21 May 2021. reliefweb.int/report/timor-leste/timor-leste-floods-situation-report-no-9-21-may-2021
- U.S. Energy Information Administration. (2021a). *Annual energy outlook 2021: With projections to 2050*. US EIA. <https://www.eia.gov/forecasts/aeo/>
- U.S. Energy Information Administration. (2021b). Short-term energy outlook. May. US EIA. <https://www.eia.gov/outlooks/steo/archives/May21.pdf>
- von Grebmer, K., Bernstein, J., Alders, R., Dar, O., Kock, R., Rampa, F., Wiemers, M., Acheampong, K., Hanano, A., Higgins, B., Ní Chéilleachair, R., Foley, C., Gitter, S., Ekstrom, K., & Fritschel, H. (2020). *2020 Global Hunger Index: One decade to zero hunger – Linking health and sustainable food systems*. Welthungerhilfe and Concern Worldwide. <https://www.globalhungerindex.org/pdf/en/2020.pdf>
- Westwood Global Energy. (2019). The state of exploration 2019. <https://www.westwoodenergy.com/news/the-state-of-exploration-2019>
- Woodside. (2020). *2019 Annual Report*. [https://files.woodside/docs/default-source/investor-documents/major-reports-\(static-pdfs\)/full-year-2019-results/annual-report-2019.pdf](https://files.woodside/docs/default-source/investor-documents/major-reports-(static-pdfs)/full-year-2019-results/annual-report-2019.pdf)
- World Bank. (2020a). *Timor-Leste economic report April 2020: A nation under pressure*. World Bank. <http://hdl.handle.net/10986/33749>
- World Bank. (2020b). *Timor-Leste economic report October 2020: Towards a sustained recovery*. <http://hdl.handle.net/10986/34748>
- World Bank. (2021a). DataBank. <http://databank.worldbank.org/data/home.aspx>
- World Bank (2021b). *Timor-Leste economic report May 2021: Charting a new path*. <http://hdl.handle.net/10986/35720>
- WorleyParsons. (2017). *Baucau cement project: Limestone mine environmental impact statement* (Vol. II). TL Cement. http://www.laohamutuk.org/Env/TLCEment/301012-02135-REP-0001_EIS%20Limestone%20Mine_Final%20Rev1_Volume%20II.p.pdf