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TIMOR-LESTE'S ECONOMIC TRANSITION: ENDING THE RESOURCE CURSE THROUGH NEW OIL AND GAS DEVELOPMENT, STRENGTHENING THE NON-OIL SECTOR, AND EXTENSIVE TAX REFORM

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Abstract:

With the official cessation of production at the Bayu-Undan oil and gas field on 31 July 2026, the Democratic Republic of Timor-Leste now stands at a historic economic crossroads and faces its most critical fiscal challenge since the restoration of independence. For more than two decades, the country's public financial management system has relied almost entirely on the Petroleum Fund (PF), which various international institutions project could decline rapidly and be fully depleted by 2034 if the current expansionary pattern of public spending is not strategically adjusted or rationalized. This article employs a Systematic Literature Review (SLR) to examine in depth the economic-transition strategies that the government must pursue to avoid the structural trap of the resource curse and the effects of Dutch Disease. Recognizing the fundamental fact that oil and natural gas are non-renewable resources, this study highlights the urgency of extensive tax reform - including the implementation of Value-Added Tax (VAT), expansion of excise taxation, and digitalization of tax administration - as a sustainable pillar of sovereign domestic revenue. It also critically evaluates medium-term bridge strategies involving the development of new hydrocarbon reserves (the Greater Sunrise megaproject, PSC 19-11 fields, and Chuditch), the conversion of legacy infrastructure into Carbon Capture and Storage (CCS) facilities, and long-term diversification into real-economy sectors, including commercial agriculture, sustainable tourism, and non-oil mineral mining. The analysis indicates that successful transition depends on policy synchronization among the optimization of remaining hydrocarbon assets as transitional capital, disciplined expansion of the domestic tax base, and substantial investment in human-capital quality.

Keywords: Economic Transition; Timor-Leste; Tax Reform; Non-Renewable Oil And Gas; Petroleum Fund; Economic Diversification; Resource Curse; Value-Added Tax; Carbon Capture and Storage

INTRODUCTION

Since the restoration of its independence in 2002, the Democratic Republic of Timor-Leste has pursued national development from an extremely limited post-conflict base. During this large-scale development process, the country established a macroeconomic framework that became heavily dependent on the extraction of natural resources in the Timor Gap, particularly oil and natural gas. The discovery and commercial exploitation of hydrocarbon reserves - especially the Bayu-Undan field operated by an international consortium - generated an exceptionally large inflow of liquidity into the state treasury.

To manage this resource wealth and avoid uncontrolled domestic inflation, the Government of Timor-Leste established the Petroleum Fund (PF) in 2005 through Law No. 9/2005. This sovereign



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wealth fund instrument was inspired by Norway's petroleum-management model and was intended to convert non-renewable offshore resource wealth into global financial assets capable of generating long-term returns. At its peak, the PF financed more than 80% to 90% of the annual state budget. These resources supported national electrification, road construction, telecommunications networks, basic health services, and cash-transfer programs for veterans and vulnerable communities.

However, this paradigm of abundance - the so-called paradox of plenty - has reached a critical limit. Consistent with the natural depletion cycle of fossil resources, Bayu-Undan experienced continuous reserve decline and officially ended production on 31 July 2026. The closure represents more than the cessation of gas production; it removes the principal source of state revenue and creates potentially severe consequences for fiscal sustainability.

Geological Reality: Oil and Gas as Non-Renewable Assets

A central challenge that has often been overlooked in Timor-Leste's expansionary budget planning is a fundamental geological and economic fact: hydrocarbons are non-renewable natural resources. Unlike agricultural production or tax revenue, which can be generated repeatedly over time, every barrel of condensate oil or cubic foot of natural gas extracted and sold represents a permanent reduction in the country's underlying resource wealth.

Dependence on a commodity that is intrinsically exhaustible becomes particularly damaging when combined with an aggressive withdrawal policy. The Petroleum Fund framework sets Estimated Sustainable Income (ESI) at 3% as a prudent withdrawal benchmark intended to preserve the real value of the fund's principal. In practice, however, financing large infrastructure projects and expanding public-sector expenditure has repeatedly required withdrawals above the 3% ESI benchmark, often in the range of 5% to 7%. The combination of the end of new Bayu-Undan revenue and persistent excess withdrawals underpins projections that the Petroleum Fund could be depleted by 2034.

Unless Timor-Leste rapidly establishes renewable sources of public revenue - particularly a robust domestic tax system linked to the real economy - the country may face a severe fiscal crisis, heightened inflationary pressure, and a potential failed-state scenario.

Research Questions and Objectives

Against this background, the article addresses three principal questions: (1) What medium-term mitigation strategies can extend the country's fiscal capacity through the remaining hydrocarbon reserves? (2) Which non-oil real-economy sectors possess comparative advantages that can be developed structurally? and (3) Why is far-reaching tax reform essential as a replacement for oil and gas revenue?

The purpose of this study is to provide an academic and policy-oriented blueprint for policymakers, scholars, and international institutions in formulating a roadmap for Timor-Leste's transition toward genuine economic self-reliance in the post-Bayu-Undan era.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Resource Curse Theory

The paradox of plenty, or resource curse, a concept popularized by Richard Auty (1993), refers to the empirical phenomenon in which countries rich in non-renewable natural resources, such as minerals and fossil fuels, often experience slower economic growth, weaker democratic outcomes, and poorer development performance than resource-poor countries. In Timor-Leste, this pattern can



be observed in the limited transformation of offshore resource wealth into resilient domestic manufacturing or agricultural industries.

Dutch Disease Model

A major macroeconomic explanation for the resource curse is Dutch Disease, formalized by Corden and Neary (1982). The phenomenon occurs when a surge in export revenue from a booming sector - in this case, oil and gas - produces a real exchange-rate appreciation. Although Timor-Leste uses the United States dollar (USD), so there is no domestic nominal exchange-rate appreciation, large inflows of dollars from the PF into the domestic economy can generate substantial local inflation, particularly in non-tradable sectors such as construction, real estate, and local services.

As a consequence, domestic production costs and wages become comparatively high. This weakens the competitiveness of lagging tradable sectors such as coffee, vanilla, and tourism because Timor-Leste's goods and services become more expensive in international markets relative to neighboring economies such as Indonesia or Vietnam. Economic transition must therefore reduce dependence on centralized resource-financed spending while raising productivity in the real economy.

Domestic Revenue Mobilization (DRM) in Development Economics

In the public-finance literature on developing economies, Domestic Revenue Mobilization (DRM) refers to government revenue collected from domestic citizens and businesses, principally through taxation. DRM is often regarded as more sustainable than official development assistance (ODA) or natural-resource royalties because it can strengthen the social contract between the state and citizens. When citizens pay direct and indirect taxes, they may demand greater accountability, transparency, and political representation, which can in turn strengthen institutional governance.

METHODS

This study applies a Systematic Literature Review (SLR) approach. This secondary-research method is structured to identify, evaluate, and synthesize empirical evidence, fiscal data, and theoretical analyses from reputable publications in a transparent manner.

The sources reviewed include peer-reviewed journal articles, government technical reports from the Ministry of Finance of Timor-Leste and the Autoridade Nacional do Petróleo (ANP), and monitoring documents issued by international financial institutions, including the Asian Development Bank (ADB), International Monetary Fund (IMF), and World Bank.

The literature search was organized around five thematic domains: (1) the fiscal crisis of the Petroleum Fund and actuarial projections of depletion; (2) transitional hydrocarbon exploration, including Greater Sunrise and PSC 19-11; (3) sectoral economic diversification; (4) structural tax reform as a substitute for oil and gas revenue; and (5) infrastructure innovation, including CCS, and human-capital development.

RESULT AND DISCUSSION

The End of the Bayu-Undan Era and Its Implications

The cessation of production at Bayu-Undan marks a major turning point. Technically, the offshore platform and subsea wells have stopped extracting condensate and natural gas because reservoir pressure is no longer economically viable for continued production. Macroeconomically, the end of Bayu-Undan marks the beginning of a net-depletion phase for the Petroleum Fund.

In this phase, the fund no longer receives substantial new inflows from contractor taxes and production royalties. Its balance increasingly depends on returns from the global investment



portfolio, including international bonds and equities. The central concern is that average investment returns, estimated in the article at approximately 4% to 6% per year, may not keep pace with the government's rising budget withdrawals. This imbalance between expenditure and revenue accelerates Timor-Leste's movement toward a fiscal cliff.

The 2034 Depletion Scenario

Econometric projections attributed to the IMF (2023) and supported by ADB analysis (2024) warn that, without substantial intervention, rationalization of social transfers, or significant reductions in ministerial expenditure, the Petroleum Fund could reach a zero balance by 2034. Such a collapse in financing would undermine the state's ability to pay civil-service salaries, finance hospital and school operations, and maintain basic infrastructure. Avoiding a sovereign fiscal crisis therefore requires coordinated intervention across several policy fronts.

The development of new oil and gas resources in contemporary Timor-Leste should no longer be regarded as a permanent economic foundation, but rather as a transitional bridge or fiscal lifeline. Its purpose is to provide temporary foreign-exchange inflows while the government reforms the tax system and builds productive infrastructure for agriculture and tourism. Three projects are identified as particularly important.

Greater Sunrise Megaproject

The Greater Sunrise block contains a large accumulation of gas and condensate, estimated in the article at 5.1 TCF of gas, with the potential to generate tens of billions of dollars. National strategic policy favors construction of a subsea pipeline to Timor-Leste's southern coast, with Timor LNG/TLNG facilities in Beço as part of the Tasi Mane megaproject, rather than routing production to existing facilities in Darwin, Australia.

The principal challenge is capital expenditure (CAPEX), estimated at USD 15-20 billion. The government, through the state-owned enterprise Timor Gap, continues negotiations with Woodside Energy and Osaka Gas regarding a commercially viable development concept. The article argues that a Final Investment Decision (FID) is urgent if first gas is to be achieved between 2028 and 2030, before the Petroleum Fund reaches a critical stage of depletion.

PSC 19-11 Fields (Kuda Tasi, Jahal, Krill, and Squilla)

To address the very short-term cash-flow gap, the development of the PSC 19-11 satellite fields is presented as important. These oil fields are significantly smaller but may be developed more rapidly using a Floating Production, Storage and Offloading (FPSO) facility. First oil is expected in the article's scenario in 2027, providing a temporary additional fiscal inflow to the state budget.

Further Exploration: Chuditch Block

Ongoing exploration in the Chuditch block, operated by an independent contractor, is described as having promising gas prospects. The planned Chuditch-2 appraisal well is positioned as a strategic fallback option if the Greater Sunrise development schedule is delayed by technical or political factors.

INFRASTRUCTURE INNOVATION AND ENERGY TRANSITION: CARBON CAPTURE AND STORAGE (CCS)

The closure of Bayu-Undan does not necessarily eliminate the economic value of its infrastructure. In the context of the global transition toward net-zero emissions by 2050, depleted petroleum facilities may create an opportunity for circular infrastructure use. Repurposing the Bayu-Undan platform and reservoir as a commercial Carbon Capture and Storage (CCS) hub is presented as a potentially important regional option (Borges & Smith, 2022).



The Bayu-Undan reservoir is described as geologically stable and capable of storing millions of tonnes of CO₂ annually. Emissions could be transported by pipeline from LNG projects and heavy industry in northern Australia. For Timor-Leste, the article identifies three potential benefits: (1) reducing or avoiding part of the decommissioning burden associated with the offshore platform; (2) creating a new foreign-exchange revenue stream through carbon-storage service fees; and (3) retaining high-skilled technical employment for Timorese workers.

STRUCTURAL ECONOMIC DIVERSIFICATION THROUGH NON-OIL SECTORS

To move beyond the resource curse, Timor-Leste must diversify aggressively toward labor-intensive and sustainable real-economy sectors. Drawing on the comparative-advantage literature (Lundahl & Sjöholm, 2020), the article identifies three sectors as potential long-term growth engines.

Table 1. Structural Diversification Priorities

Real-Economy Sector	Challenges and Strategic Transformation Measures
A. Commercial Agriculture and Agribusiness	Approximately 70% of the labor force is described as engaged in low-productivity subsistence farming. Reducing rural poverty therefore requires modernization through rehabilitation of reservoirs and irrigation channels affected by climate change, adoption of improved seed varieties, and expansion of export-oriented commodities. In addition to internationally recognized organic coffee such as Ermera coffee, high-value crops including vanilla, cloves, candlenut, and cocoa should be promoted. Post-harvest processing is needed so that value-added products, rather than raw commodities, can be exported.
B. Sustainable Tourism (Eco-Tourism)	Timor-Leste is unlikely to compete effectively with low-cost mass-tourism destinations such as Bali or Phuket because living and transport costs are comparatively high. The proposed alternative is high-value niche eco-tourism, including colonial and independence heritage tourism, mountain trekking at Mount Ramelau, and especially marine tourism and diving. Atauro Island is highlighted for its exceptional coral-reef biodiversity. Eco-friendly accommodation, improved sanitation, and better direct international air connectivity are identified as supporting conditions.
C. Non-Oil Mineral Mining	Timor Island is described as having significant mineral potential, including premium marble, limestone for cement production, manganese, copper, and gold. To avoid severe terrestrial ecological damage, mineral extraction should be scientifically regulated and institutionally coordinated through the Autoridade Nacional dos Minerais (ANM) as regulator and Murak Rai Timor (MRT) as a state-owned operator working with foreign direct investment partners under Environmental, Social, and Governance (ESG) standards.

EXTENSIVE TAX REFORM: A FUNDAMENTAL SUBSTITUTE FOR OIL AND GAS REVENUE

This is the core of the proposed transition. Because oil and gas are finite non-renewable resources, Timor-Leste's long-term fiscal sustainability depends on its capacity to collect revenue from renewable and continuously expanding economic activity. The country's tax-to-GDP ratio has historically remained low, at below 10% according to the article. Fiscal-governance reform therefore requires a comprehensive, extensive, and binding approach. Four principal pillars are proposed.



Full Implementation of Value-Added Tax (VAT)

The existing import-duty and final sales-tax system is described as insufficient to capture value added across the domestic economy, while also being regressive and potentially distorting market prices. The introduction of a VAT regime, or IVA (Imposto de Valor Acrescentado), is presented as a central reform recommended by the World Bank (2023). VAT is comparatively stable, broad based, and supported by an input-output tax-credit mechanism. This mechanism creates incentives for firms to document transactions and encourages informal businesses to enter the formal system and obtain taxpayer identification so that input taxes can be credited, thereby expanding the domestic tax base.

Tax Base Expansion: Excise Taxes (Sin Taxes) and Property Tax

The government is encouraged to mobilize currently underused revenue sources. First, high-rate excise or 'sin' taxes - using specific and ad valorem rates - may be applied to products associated with negative externalities, including imported tobacco and cigarettes, alcohol, packaged sugar-sweetened beverages, and high-emission motor vehicles. In addition to raising public revenue, such excises can help reduce the prevalence of non-communicable diseases (NCDs), potentially lowering long-term pressure on the public health budget. Second, the article proposes a commercial land and building or property tax. Rapidly rising real-estate values in Dili could be brought into the tax base through updated cadastral registration and property valuation, including taxation of capital owners and expatriates.

Digitalization of Tax Administration (SIGITAS-V3 and P24)

Tax-rate reform will be ineffective without strong taxpayer compliance. The article therefore recommends accelerating e-government transformation in revenue administration by upgrading the integrated SIGITAS tax-management system (Sistema Integrado de Gestão de Impostos Timor-Leste) to version 3 and integrating it with the P24 digital-payment portal and the BCTL/BNCTL banking network. The principal objective is to reduce direct physical interaction between tax collectors and taxpayers. Anti-corruption literature suggests that limiting face-to-face transactions can reduce opportunities for informal negotiation, illicit charges, and revenue leakage while supporting real-time transfer of payments to the state treasury.

Public Financial Management (PFM) Discipline

Higher tax revenue should be accompanied by stronger expenditure discipline. Consistent with the Public Financial Management Reform Strategy 2022-2027 (Ministry of Finance of Timor-Leste, 2022), the government is expected to reduce excessive withdrawals from the PF, reform public procurement through e-procurement, and conduct systematic spending reviews. Budget allocations should prioritize capital expenditure that supports the productive real economy rather than non-essential ceremonial spending or excessive purchases of official vehicles.

HUMAN CAPITAL INVESTMENT AND THE DEMOGRAPHIC DIVIDEND

Timor-Leste has a youthful population structure, with a large share of its population under the age of 30. This demographic dividend can become an important source of development, but it may also create significant unemployment and social pressure if sufficient employment opportunities are not generated.

Policy transformation should therefore rebalance investment from physical infrastructure toward human capital. The article argues for a strong education allocation in the state budget, with particular emphasis on Technical and Vocational Education and Training (TVET), in addition to basic education. Secondary-school graduates should be connected to polytechnic institutions with direct industry linkages. Priority skills include mechanics, petroleum engineering for Tasi Mane,



English-speaking hospitality professionals for Atauro tourism, and agronomy for rural areas. A more skilled labor force would support productive growth and expand the future base of compliant taxpayers.

IMPLEMENTATION ROADMAP AND RISK ANALYSIS

Transition Roadmap (2026-2040)

Phase 1 (2026-2028): Fiscal Stabilization and Tax Foundations. In the immediate post-Bayu-Undan period, the priority is to rationalize public subsidies, formally launch Value-Added Tax, reform the national tax framework under Law No. 8/2008 and Regulation No. 18/2000, and secure a Final Investment Decision (FID) for the Greater Sunrise megaproject.

Phase 2 (2029-2034): Structural Transformation. Under this scenario, PSC 19-11 reaches full production and the first LNG exports from Greater Sunrise begin. Royalties are transferred to the Petroleum Fund, the Bayu-Undan CCS project becomes commercially operational and stores CO₂ from Australia, and investment in commercial agricultural irrigation is completed.

Phase 3 (Post-2034): Sovereign Self-Reliance. Even if the Petroleum Fund accumulated during the Bayu-Undan era declines substantially, the country would have two new pillars: a new 'Sunrise Fund' and a DRM-based tax ratio above 15% of GDP. Commercial agriculture, tourism services, and self-sustaining light industry would become major contributors to GDP.

Risk Analysis and Mitigation

Table 2. Risk Analysis and Policy Mitigation

Risk Factor	Policy Mitigation Strategy
Market and Geopolitical Dynamics	The global green transition may weaken long-term LNG prices. Mitigation: finance Greater Sunrise through an international private consortium without a sovereign guarantee that could expose the state to excessive debt risk, and secure long-term LNG offtake agreements.
Political Gridlock	A future government could reverse VAT reform for short-term political popularity. Mitigation: establish a cross-party Fiscal Stability Pact in the National Parliament that provides durable commitments to tax reform and limits PF withdrawals in line with the ESI framework.
Absorptive Capacity and Corruption	Infrastructure programs may be undermined by cost inflation, weak execution, or bureaucratic inefficiency. Mitigation: implement real-time electronic auditing (SIGAP), strengthen the independence of the Anti-Corruption Commission (CAC), and involve independent international auditors in major infrastructure projects.

CONCLUSION

The Democratic Republic of Timor-Leste has reached the end of its extractive golden era. The closure of Bayu-Undan on 31 July is presented as a final warning that hydrocarbons are finite non-renewable commodities and that the Petroleum Fund will erode if withdrawals persist beyond sustainable investment returns. Remaining projects such as Greater Sunrise, PSC 19-11, and Bayu-



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Undan CCS should therefore be treated as transitional sources of capital rather than permanent pillars of long-term state dependence.

The principal policy recommendation is that the Government, National Parliament, and civil society build sustained political commitment to comprehensive tax reform. The adoption of VAT, commercial property taxation, excise or sin taxes, and digitalized fiscal administration is presented as urgent. Without a robust, equitable, and transparent DRM system capable of capturing value added from the real economy - including commercial agriculture, high-value tourism, and mining - Timor-Leste's fiscal independence would remain highly vulnerable.

Oil and natural gas reserves beneath the Timor Sea are finite and temporary. By contrast, a resilient tax system supported by a productive real economy and managed by a capable, educated, and healthy Timorese workforce is presented as the most durable form of sovereign wealth for future generations.

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