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EXAMINING THE FISCAL PARADOX IN THE COST OF TAXATION AND ITS IMPACT ON RENEWABLE ENERGY TRANSITION IN INDONESIA

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ABSTRACT

Background: Despite committing to a 23 percent renewable energy mix by 2025, Indonesia has achieved only 14 percent of installed renewable capacity by 2024, while annual renewable energy investment remains stagnant at approximately USD 1.5 billion that a fraction of fossil fuel investment levels.
Purpose: The objectives of this study are to examine the fiscal paradox in Indonesia's energy transition, analyzing how tax instruments intended to support renewable energy development may generate structural barriers that constrain investment in the sector.
Design/methodology/approach: This study employs qualitative policy analysis and literature review to evaluate the effects of tax structure and fiscal allocation on renewable energy development.
Findings/Result: Misaligned tax structures generate disincentives through high VAT rates, import duties, complex administrative processesthat impose a cumulative taxation cost burden that directly elevates the Levelized Cost of Electricity (LCOE) for renewable energy projects to an average of USD 58 per MWh. Compounding this cost barrier, fiscal allocation disproportionately favors fossil fuels, with 57 percent of energy sector revenue directed to subsidies compared to only 4.5 percent allocated to renewable energy, creating a systemic fiscal paradox that simultaneously undermines investment competitiveness and policy coherence.
Conclusion: Planned fiscal reforms, including VAT exemption for renewable components, gradual reallocation of fossil fuel subsidies, carbon tax implementation with revenue recycling, and policy harmonization, are essential to resolve the fiscal paradox and accelerate a sustainable energy transition while maintaining fiscal stability.
Originality/value (State of the art): This study makes a distinctive academic contribution by introducing cost of taxation as a multidimensional analytical lens, encompassing compliance costs, administrative burdens, and economic distortion and to explain how fiscal policy design directly undermines renewable energy cost competitiveness and investment feasibility in Indonesia.

Keywords: fiscal paradox, cost of taxation, renewable energy, LCOE, fiscal reform

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INTRODUCTION

The global energy transition towards net-zero emissions is no longer merely an aspiration, but an urgent necessity requiring fiscal policy reorientation and investment across nations, including Indonesia, which ratified the Paris Agreement through Law No. 16 of 2016. The implementation mechanism requires each member state to formulate and update Nationally Determined Contributions (NDCs) in five-year cycles, containing emission reduction strategies based on each country's domestic capacity. The 2020–2024 period demonstrated increased NDC ambition from various countries in response to the urgency of the climate crisis and international community pressure, despite implementation still facing significant obstacles (UNFCCC Secretariat, 2015). Indonesia, as a signatory to the Paris Agreement, remains committed to green energy transition despite facing obstacles such as coal dependency and high renewable energy development costs. The Indonesian government has taken concrete steps, including early retirement of the Cirebon coal-fired power plant and development of low-carbon technology, in line with the net-zero emissions target by 2060, as stated in Indonesia's Enhanced Nationally Determined Contribution (Enhanced NDC) submitted in 2022. Based on Government Regulation No. 79 of 2014 on National Energy Policy, Indonesia set a renewable energy mix target of 23% by 2025 and 31% by 2050 (Government of the Republic of Indonesia, 2014). However, actual achievements show progress still far behind the target. Nevertheless, the realization of Indonesia's installed renewable energy capacity until 2024 reached only 14% of the total primary energy mix, still far from the 23% target set for 2025. This gap between policy targets and actual achievement indicates structural barriers in energy transition implementation (Wuryandani et al., 2025).

Paradoxically, one of the main obstacles stems from an instrument that should promote development: fiscal policy. Fiscal policy occupies a uniquely central role because it operates simultaneously on both the cost side and the incentive side of investment decisions. While technical barriers such as grid capacity or resource availability can be addressed through targeted infrastructure investment, fiscal misalignment creates a systemic deterrent that distorts the financial viability of renewable projects at their foundational stage, raising capital costs, increasing uncertainty, and reducing returns before a single turbine is installed or panel is deployed. This distinguishes fiscal policy from other contributing factors and positions it as the principal structural impediment to Indonesia's energy transition. Rather than accelerating energy transition, Indonesia's tax structure and budget allocation create a fiscal paradox that impedes investment in the renewable energy sector. This paradox manifests in tax regulation complexity, limited fiscal incentives applicable only to specific subsectors such as geothermal, and disproportionate budget allocation, where fossil fuel subsidies absorb 57% of energy sector revenue (IDR 161 trillion annually) while renewable energy spending accounts for only 4.5% of the Ministry of Energy and Mineral Resources budget (Rahmah, 2025). Consequently, Indonesia's renewable energy investment stagnates at USD 1.5 billion per year, one-tenth of the oil and gas sector investment (Elvia, 2025). Indonesia's tax burden structure on the renewable energy sector comprises three main components: Value Added Tax (VAT), Income Tax (PPh), and Import Duties on imported components. Solar power generation equipment (PLTS), for instance, is subject to an 11% VAT rate (effective April 2022, based on Law No. 7/2021 on Harmonization of Tax Provisions) which significantly increases the initial investment cost of renewable energy projects (Tiger, 2024). This policy contradiction becomes even more apparent when compared to fuel subsidy allocation totaling IDR 306.6 trillion in 2024, comprising IDR 113.3 trillion for fuel and liquefied petroleum gas subsidies and IDR 73.6 trillion for electricity subsidies, most of which still originate from fossil fuel-based power plants (Ministry of Energy and Mineral Resources of the Republic of Indonesia, 2024). This fiscal allocation disparity reflects government priority inconsistency between the green energy transition agenda and subsidy policies still favoring fossil fuels (Tambunan, 2018).

A direct manifestation of this fiscal paradox is the cost of taxation, which represents a substantial barrier to Indonesia's energy transition. Cost of taxation does not merely refer to nominal tax burden, but encompasses three significant hidden cost components. First, compliance cost: expenses incurred to meet tax obligations including tax consultant fees, audits, and documentation. Second, administrative burden: time and resources absorbed in the process of obtaining tax incentives, despite regulations establishing maximum tax allowance approval processes of 25-30 working days; in practice, document verification and inter-ministerial coordination often consume

months. Third, economic distortion: a condition where tax structure alters investment decisions from what should be economically optimal (Smith, 2006). In the Indonesian renewable energy context, these three components manifest concretely that solar PV developers face compliance costs from navigating VAT restitution procedures under PMK 18/2021; wind and microhydro project developers report administrative burdens from inter-ministerial coordination delays that can extend incentive approvals from the stipulated 25-30 working days to several months; and economic distortion is evident as investors redirect capital toward fossil-backed assets that benefit from more predictable subsidy regimes and established regulatory pathways.This complexity is compounded by overlapping fiscal incentive regulations between central and regional governments, creating legal uncertainty and adding administrative burden for project developers, as identified in microhydropower plant development (PLTMH) (Ministry of Finance, 2019). The accumulation of these three cost of taxation components creates structural disincentives that impede private investment inflow into the renewable energy sector (Tambunan, 2018).

Although regulations establish maximum tax allowance approval processes of 25-30 working days, in practice document verification and inter-ministerial coordination often consume months, creating uncertainty for investors. Regional comparisons demonstrate how Indonesia's cost of taxation impairs investment competitiveness. Vietnam successfully increased solar power capacity from 0.1 GW (2018) to 16.5 GW through feed-in tariff policies and procedure simplification, while Indonesia added only 200 MW. Fiscal complexity contributes to Indonesia's high solar levelized cost of electricity (LCOE), reaching USD 40.9-100.9/MWh, with an average of USD 58/MWh for 10 MW projects (Ariyadi & Purwanto, 2024), where tax compliance costs constitute one component raising capital costs. The high LCOE renders renewable energy less competitive compared to coal-fired plants still receiving subsidies, thereby slowing energy transition.

Prior research on Indonesia's energy transition barriers tends to focus on technical and regulatory aspects without in-depth analysis of the fiscal dimension. While existing studies highlight regulatory readiness, technological feasibility, and financing constraints, limited attention has been given to the structural role of taxation costs embedded within fiscal policy. For instance, Halimatussadiah et al. (2023) analyze fiscal incentive effectiveness for solar and wind projects in Indonesia but focus primarily on incentive design rather than the cumulative taxation cost burden. Similarly, Sonjaya and Noch (2024) examine tax incentive effectiveness in the energy sector yet do not systematically address compliance costs or administrative burden as investment barriers. Tambunan (2018) provides a macroeconomic fiscal perspective on Indonesia's energy policy but does not employ cost of taxation as a structured analytical lens. By contrast, the present study treats cost of taxation as a multidimensional variable that bridges regulatory complexity, investment behavior, and LCOE outcomes. This study itself advances the literature by explicitly examining cost of taxation as a multidimensional barrier, encompassing compliance costs, administrative burdens, and economic distortion that shapes renewable energy investment decisions in Indonesia. The gaps described above indicate structural obstacles from fiscal policy that have not received adequate attention in academic literature. In addition, existing fiscal studies often treat taxation as a static revenue instrument, rather than as a dynamic factor influencing investment behavior and project feasibility. By positioning cost of taxation as an analytical lens, this research fills an important gap in understanding how fiscal policy design affects renewable energy deployment outcomes.

The research employs a qualitative approach through policy analysis and literature review of regulations, government reports, and academic studies, with regional comparison to identify best practices. This paper comprises five sections: introduction, literature review on fiscal paradox and cost of taxation, research methodology, findings on tax burden structure and investment impact, and conclusion with policy recommendations to address fiscal paradox and accelerate Indonesia's energy transition. By understanding how fiscal paradox can be resolved through policy reform, this research is expected to contribute to coherent policy formulation balancing state revenue targets with Indonesia's commitment to net-zero emissions by 2060. This approach allows the study to capture institutional complexity, regulatory interactions, and fiscal dynamics that are difficult to quantify. Through comparative analysis, the research identifies best practices and policy lessons relevant to Indonesia's context. As a result, the problem-solving approach is designed to generate policy-relevant insights rather than predictive generalizations. By applying

cost of taxation as a structured analytical framework, this research contributes to understanding how fiscal policy design that beyond nominal tax rates also shapes investment feasibility and LCOE dynamics in renewable energy transitions. This analytical contribution extends existing literature by demonstrating that misaligned fiscal instruments function as a structural variable that mediates between policy intent and actual investment outcomes in Indonesia's energy sector.

This research analyzes how cost of taxation affects Indonesia's renewable energy investment decisions. Main research questions: (1) How does tax structure create disincentives? (2) To what extent does cost of taxation contribute to high LCOE? (3) How can fiscal reform balance state revenue with energy transition?

METHODS

This research employs a qualitative approach with the objective of deeply exploring the mechanisms of cost of taxation and fiscal paradox that affect the renewable energy transition process in Indonesia. This study utilizes qualitative secondary data obtained from government regulations, official fiscal and energy sector reports, peer-reviewed academic journals, and publications from international institutions related to fiscal policy and renewable energy transition. This approach was selected because the research issue is complex, contextual, and relates to policy interactions, administrative procedures, and stakeholder perceptions, and therefore cannot be represented solely through quantitative measurement. The use of multiple data sources enhances the credibility and robustness of the analysis by enabling triangulation across regulatory, fiscal, and academic perspectives. Triangulation was conducted in three stages: first, regulatory sources (government regulations, ministerial decrees) were used to establish the formal fiscal framework; second, official fiscal and energy reports were cross-checked against this framework to identify implementation gaps and allocation patterns; third, peer-reviewed academic studies and international institution publications were used to evaluate the consistency of findings and validate the analytical interpretation. Convergence across these three source types strengthened the internal validity of the analysis, while divergences were noted and discussed as areas of regulatory ambiguity or data limitation.

The research design uses case study methodology, which enables researchers to examine in detail how tax structure, administrative processes for fiscal incentives, and energy subsidy allocation directly impact renewable energy project investment decisions. Data were collected through document analysis and systematic literature review of fiscal regulations, taxation policies, renewable energy incentives, and investment reports relevant to Indonesia's energy transition. Data collection was conducted through policy analysis and literature review of regulations, government reports, and academic studies.

The collected data were analyzed using qualitative thematic analysis and comparative policy analysis. This approach was employed to identify patterns of fiscal disincentives, taxation cost structures, and their implications for renewable energy investment and electricity cost competitiveness.

The framework (Figure 1) demonstrates how misaligned tax structures and fiscal allocation generate high cost of taxation in the form of compliance costs, administrative burdens, and economic distortion. These costs increase the levelized cost of electricity (LCOE) for renewable energy projects, reduce investment attractiveness, and ultimately slow Indonesia's renewable energy transition. The framework also reflects the interaction between fiscal policy design and investor decision-making processes. By emphasizing cost of taxation as an intermediate variable, the model highlights how fiscal instruments indirectly influence energy transition outcomes. This framework serves as an analytical guide for interpreting empirical findings presented in the results section.

RESULTS

How Does Tax Structure Create Disincentives?

Based on the synthesis of reviewed evidence, this study finds that Indonesia's tax structure generates disincentives for renewable energy investment through three interconnected mechanisms: elevated tax rate burdens, administrative compliance costs, and economic distortion arising from asymmetric treatment between renewable and fossil energy. These mechanisms do not operate in isolation; rather, they interact to compound the overall fiscal burden on clean energy projects, as elaborated below with supporting evidence from the

reviewed literature. Tax structure misaligned with energy transition can constitute a tangible disincentive to renewable energy investment. First, relatively high tax rates or VAT/income tax burdens uncompensated with specific incentives render clean energy projects with weaker financial prospects compared to conventional assets, leading investors to postpone or cancel investments. Administrative consequences of taxation such as complex documentation requirements, prolonged verification processes, and inter-institutional fiscal/regional coordination can add compliance cost and administrative burden components, which in the tax structure function as hidden impediments. For example, a study discussing "Tax Policy and Taxation of Renewables" demonstrates that business surveys confirm that tax policies deemed unfavorable directly become disincentives to new investment in the renewable energy sector.

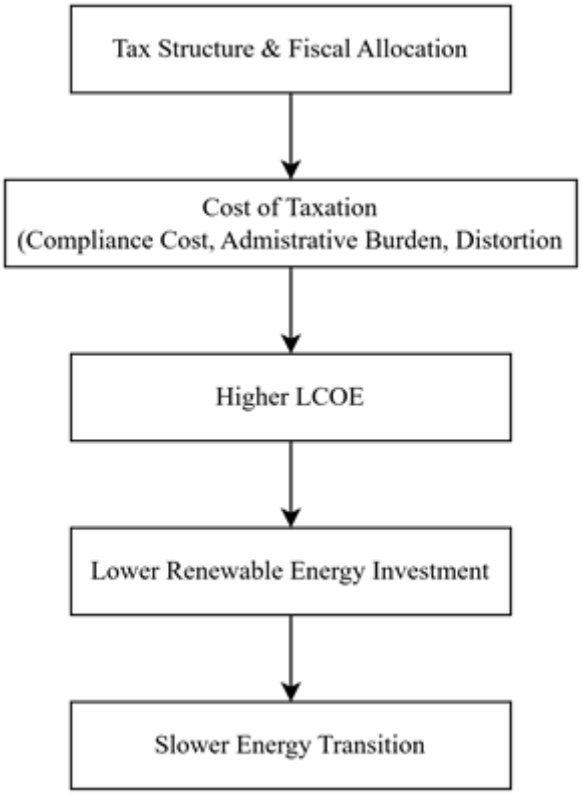

Figure 1. Research framework

Furthermore, Indonesia's national analysis in the report "Renewable Energy Tariffs and Incentives in Indonesia" affirms that although fiscal incentives are available, the tax structure and heavy subsidy schemes for fossil energy continue to create a fiscal burden dynamic that impedes renewable project competitiveness. Tax structure that is universal without considering renewable project characteristics (with high initial capital and high risk) tends to increase economic distortion, because investors' optimal choice shifts to safer projects or those heavily supported otherwise. Comparative study "Applying Energy Taxes to Promote a Clean, Sustainable" proves that the type and structure of energy taxation (including rates and tax objects) differ in their influence on renewable energy development depending on the national energy system structure. Thus, literature indicates that tax structure, from both tariff, administrative, and incentive-compensation design perspectives, plays a crucial role as an investment impediment factor in the clean energy sector. Table of reviewed article on on tax structure as investment disincentives for renewable energy in Table 1.

Across the reviewed studies, a consistent cross-study pattern emerges: tax structure complexity, regulatory uncertainty, and insufficient incentive compensation are recurrent barriers to renewable energy investment regardless of national context. For Indonesia, the implication is that the challenge is not merely one of tax rate levels, but of fiscal architecture where the combination of VAT burdens, import duties, and fragmented incentive systems creates an investment environment structurally less favorable to renewable projects than to fossil-based assets.

To What Extent Does Cost of Taxation Contribute to High LCOE?

Various studies demonstrate that taxation costs contribute significantly to the high Levelized Cost of Electricity (LCOE) value of renewable energy projects. A report by the Institute for Essential Services Reform (IESR) reveals that import duties and Value Added Tax (VAT) on solar modules can increase module prices by approximately 20 percent, or equivalent to 0.12–0.36 USD/Wp, thereby driving up solar power plant investment costs by approximately 10 percent and ultimately increasing LCOE. Castillo-ramírez (2021) also proves that tax credit mechanisms can significantly reduce photovoltaic project LCOE, which

implicitly demonstrates that higher tax burdens or absence of fiscal incentives will cause LCOE increases. Additionally, Halimatussadiah et al. (2023) through policy simulation in Indonesia found that tax allowance scenarios, VAT reduction, and tax holiday can lower the economic price of renewable energy electricity, meaning that high cost of taxation directly increases production costs and long-term electricity prices. Thus, the accumulation of tax burdens in the form of tax rates, import duties, VAT, and administrative compliance costs plays a role in increasing capital costs, adding investment risk, and reducing return on capital rates, thereby contributing to high renewable energy LCOE.It is important to distinguish between the direct empirical findings of reviewed studies and the analytical inference drawn in this research. While Castillo-Ramírez (2021) directly demonstrates that tax credits reduce LCOE, and Halimatussadiah et al. (2023) show that favorable tax instruments lower electricity prices through simulation, the broader claim that higher tax burdens necessarily increase LCOE represents an analytical inference derived from the convergence of these findings within the Indonesian fiscal context. This inference is supported by the IESR's quantified estimate that import duties and VAT on solar modules increase investment costs by approximately 10 percent, but should be understood as a policy-relevant analytical conclusion rather than a directly tested empirical result. Table of reviewed article on the impact of taxation costs on renewable energy LCOE in Table 2.

Table 1. Table of reviewed article on on tax structure as investment disincentives for renewable energy

Author(s), Year	Country/ Region	Policy Instrument	Study Type	Key Findings
Tambunan (2018)	Europe (multiple countries)	Various forms of energy taxes	Quantitative comparative study	The complexity of tax structures and lack of adjustment to national energy system conditions reduces the effectiveness of taxes as regulatory instruments for renewable energy; taxation often serves fiscal rather than regulatory purposes, creating disincentives.
Sonjaya (2024)	Indonesia	Tax incentives for energy sector	Literature review and empirical synthesis	Although tax incentives exist, policy coherence and long-term stability largely determine effectiveness. Inconsistencies and regulatory uncertainty discourage investors.
Wang & Mayburov (2025)	China	Green R&D tax incentives and tax rate policies	Quantitative model simulation	Ineffective tax incentive design and high levels of policy uncertainty hinder the diffusion of green technology and reduce investor willingness, creating barriers for renewable energy projects.

Table 2. Table of Reviewed Article on the Impact of Taxation Costs on Renewable Energy LCOE

Author(s), Year	Country/ Region	Policy Instrument	Study Type	Key Findings
Castillo-ramírez (2021)	Global/Various (case studies)	Tax credits for solar PV projects	Empirical quantitative study	Found that tax credit mechanisms significantly reduce LCOE for solar-PV projects; cost of taxation (or lack of favourable tax treatment) therefore contributes to higher LCOE.
Halimatussadiah et al. (2023)	Indonesia	Tax holiday, tax allowance, VAT reduction for renewables	Simulation model study	Simulated results show that favourable tax instruments lower the economic price of renewable power plants; conversely, weaker tax treatment leads to higher cost of energy.
Stanytsina et al. (2021)	Europe	Higher environmental tax rates (coal/petroleum)	Quantitative model simulation	Showed that tax burdens on fossil fuels shift cost structures and influence relative competitiveness of renewables, indirectly affecting LCOE dynamics.

The reviewed studies collectively indicate that taxation cost reduction whether through tax credits, VAT waivers, or tax allowances will consistently translates into measurable LCOE reductions. For Indonesia, this cross-study pattern implies that the current tax burden on renewable energy components functions as an embedded cost premium that diminishes the sector's competitiveness relative to coal-based generation, which continues to benefit from subsidized fuel inputs and established capital recovery pathways.

How Can Fiscal Reform Balance State Revenue with Energy Transition?

Fiscal reform plays a strategic role in balancing the need for state revenue with accelerating energy transition towards clean energy. The World Bank's Green Fiscal Reforms report emphasizes that effective fiscal reform requires a combination of policies including carbon tax implementation, gradual elimination of fossil energy subsidies, and increased public financing for renewable energy, thereby capable of maintaining fiscal stability amid changes in energy sector economic structure. A study by the Economic Research Institute for ASEAN and East Asia (ERIA) found that developing countries such as Indonesia face challenges in designing innovative fiscal instruments to support energy transition due to high budget dependency on the fossil sector. Therefore, restructuring taxation instruments and reallocating state spending are necessary to create new fiscal space without reducing state revenue. The International Institute for Sustainable Development (IISD) affirms that fossil subsidy reform must be accompanied by tax base expansion and new revenue instruments such as environmental taxes and energy levies to avoid creating fiscal gaps that slow energy transition. Overall, the reviewed literature indicates that fiscal reform strategies capable of balancing state revenue with energy transition objectives share three common characteristics: they employ revenue-neutral mechanisms such as carbon taxes with recycling provisions; they involve phased reallocation of fossil fuel subsidies rather than abrupt elimination; and they include complementary public financing instruments to de-risk renewable energy investment. These evidence-based characteristics provide the analytical foundation for the policy recommendations presented in the following section.

The reviewed (Table 3) evidence on fiscal reform strategies reveals a shared finding across contexts: integrated reforms combining revenue-neutral instruments (carbon taxes, subsidy reallocation) with targeted incentives are more effective than piecemeal regulatory adjustments. For Indonesia, this implies that resolving the fiscal paradox requires a coordinated reform package rather than isolated policy changes, and that fiscal sustainability and energy transition goals are complementary rather than competing objectives when reform is sequenced appropriately.

Table 3. Table of reviewed article on fiscal reform strategies for balancing state revenue and energy transition

Author(s), Year	Country/ Region	Policy Instrument	Study Type	Key Findings
Yan (2023)	Cambodia / Developing Asia	Environmental tax and fiscal policy for clean energy	Long-run & short-run quantitative study	Found that green investment, environmental tax, and fiscal policy are significantly and positively linked to clean energy inclusion in the long run; fiscal policy reforms that incorporate environmental taxation create conditions favorable to clean energy adoption and sustainable development.
Zahro et al. (2025)	Indonesia	Green fiscal policy: green taxes and clean technology promotion	Systematic review	Finds that when designed properly green taxes can simultaneously generate revenue, reduce emissions and promote clean technology but design and implementation gaps remain large in Indonesia.

Policy and Public Administration Implications

The findings of this study carry significant implications for policymakers, fiscal authorities, and public administrators responsible for designing and implementing Indonesia's energy transition framework. These implications extend beyond managerial practice to address institutional design, inter-agency coordination, and fiscal governance, domains that are critical to resolving the structural barriers identified in this research. First, fiscal managers within the Ministry of Finance and related agencies must recognize that taxation instruments do not function solely as revenue-generating tools but also as strategic signals that shape investment behavior. Misaligned tax structures particularly Value Added Tax (VAT), import duties, and income tax treatment for renewable energy projects, create hidden managerial costs in the form of compliance burden, administrative delays, and regulatory uncertainty. These costs should be explicitly incorporated into fiscal policy evaluation and performance indicators, rather than being treated as external or incidental effects. From a managerial standpoint, recognizing taxation costs as part of policy performance assessment enables more informed decision-making and reduces unintended fiscal distortions that weaken renewable energy investment signals.

Second, public managers responsible for designing and implementing fiscal incentives need to shift from a fragmented, regulation-based approach toward an integrated incentive management system. The complexity of approval procedures and overlapping authority between central and regional governments indicates weak policy coordination. From a managerial perspective, this necessitates the establishment of a single-window fiscal service for renewable energy investments, with standardized documentation, clear timelines, and measurable service-level agreements (SLAs). Such managerial reforms would reduce compliance costs, improve investor confidence, and enhance the effectiveness of existing tax incentives without necessarily reducing overall tax revenue. This implies that managerial efficiency and institutional coordination are as critical as fiscal incentives themselves in determining the success of renewable energy policies.

Third, the study highlights the importance of fiscal reallocation management in achieving policy coherence. Energy subsidy managers must reassess subsidy allocation mechanisms that disproportionately favor fossil fuels, as these distort investment signals and undermine renewable energy competitiveness. Gradual subsidy reallocation toward renewable energy financing should be managed through clear transition roadmaps, risk mitigation strategies, and transparent monitoring frameworks. This managerial approach enables governments to maintain fiscal stability while progressively supporting clean energy investment. Effective subsidy management therefore requires not only budgetary adjustment but also strategic planning to ensure policy consistency across energy and fiscal domains.

Finally, the results imply that managers in energy-related public institutions must integrate cost-of-taxation considerations into electricity pricing and project feasibility assessments. High Levelized Cost of Electricity (LCOE) is not solely a technical or market issue but also a consequence of fiscal design and administrative practices. Incorporating taxation costs into project appraisal frameworks allows decision-makers to better evaluate policy trade-offs and design targeted fiscal reforms that lower investment risk, improve cost efficiency, and accelerate renewable energy deployment. Overall, effective managerial coordination between fiscal authorities and energy sector institutions is essential to resolving the fiscal paradox and ensuring a sustainable and investment-friendly energy transition in Indonesia. Without such coordination, fiscal policies risk undermining broader energy transition objectives despite strong political commitment to sustainability targets.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The findings of this research demonstrate that taxation instruments play a significant role in accelerating or impeding energy transition in Indonesia. First, tax structure not yet aligned with renewable energy investment characteristics has proven to create disincentives for investors. Tax rate burdens such as VAT and income tax, accompanied by complex administrative procedures and uncertainty regarding incentive approval timelines, add compliance costs and administrative burdens that directly reduce the attractiveness of clean energy investment compared to

fossil-based assets. This condition is worsened by fiscal policy structure that still favors fossil energy through substantial subsidies and minimal effective incentives for renewable technology, thereby creating economic distortion in investment decision-making.

Second, cost of taxation has proven to contribute significantly to high Levelized Cost of Electricity (LCOE) in renewable energy projects. Various empirical studies demonstrate that tax components such as import duties, VAT on solar modules, and administrative compliance costs increase cost of capital and investment risk, thereby directly raising LCOE. Research shows that tax reduction and fiscal incentive schemes are capable of substantially lowering LCOE, thus high tax burdens can be understood as a factor that slows renewable energy penetration.

Third, fiscal reform becomes key to balancing state revenue requirements with long-term energy transition objectives. Literature shows that repositioning fiscal instruments through carbon tax implementation, subsidy reallocation from fossil to clean energy, tax base expansion, and strengthened public financing can create stable fiscal space without disrupting state revenue. Fiscal reform designed in integrated manner not only enhances renewable energy competitiveness but also drives economic decarbonization, strengthens investment climate, and ensures fiscal sustainability.

These findings are broadly consistent with prior studies on fiscal barriers in developing economies, confirming that administrative complexity and incentive misalignment are recurring impediments to renewable energy investment. However, this study extends the existing literature by explicitly demonstrating how cost of taxation as a multidimensional variable encompassing compliance costs, administrative burdens, and economic distortion and mediates the relationship between fiscal policy design and renewable energy LCOE outcomes in the Indonesian context, a linkage that prior studies have not systematically analyzed.

Recommendations

Fiscal policy reform is necessary to reduce tax distortions that currently create disincentives for renewable energy investment and cause high clean electricity production costs. The government must provide VAT exemption and import duty waiver for major renewable energy generation components, while simultaneously simplifying administrative processes for incentives through integrated single-window service to reduce business compliance costs. The next step is to gradually redirect fossil energy subsidies towards energy transition financing, as well as implement carbon tax instruments with revenue recycling mechanisms to support renewable energy project financing and social protection. Additionally, regulatory stability and harmonization of central-regional policy must be strengthened to enhance investment certainty, reduce financing risk, and encourage achieving lower cost of capital. In the long term, diversification of state revenue sources through tax base expansion and improved tax administration efficiency are necessary so that energy transition can proceed without disrupting fiscal stability.

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