

Green Finance and Renewable Energy Growth: A Case Study of Green *Sukuk* Implementation in Indonesia

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Abstract—Transition to sustainable development has increased the role of green finance as the key instrument to support the renewable energy production and usage. As the pioneer of Green *Sukuk*, Indonesia has mobilized at least USD 6 billion since the first year of issuance 2018 to fund the green and sustainable national scale projects. This study aims to analyze the gap between issuance of Green *Sukuk* toward renewable energy funding in Indonesia during 2018–2023. The method of descriptive gap analysis is applied, combined analysis trend of renewable energy growth and Green *Sukuk* proceeds issuance in Indonesia across the period of 2018–2023. The results showed that there is a gap in targeting RUEN's renewable energy goal is only increased from 10.3% in 2018 to 14.06% in the end of 2023, which still in below target 23% in the year of 2025. The study concludes that implementation of Green *Sukuk* in Indonesia as the innovation tools and financial credibility, but not too effective to escalate the growth of renewable energy. Recommendation of policies include: aligning regulations across institutions, strengthening renewable energy project pipelines, broadening market participation, and enhancing transparency on green fund allocation.

Keywords—green finance, green *Sukuk*, renewable energy, sustainable development

I. INTRODUCTION

Development transitioning towards sustainable development has become the focus of global attention as the SDGs 2030 are implemented worldwide and climate change is addressed. One important instrument for achieving this transition is incorporating green finance into national economies to enhance sustainable and responsible economic growth. Green finance has boomed and attracted significant attention as nations attempt to align their financial markets with the concept of sustainable development. Previous studies engaged the status of implementation of green finance as a specific development focus, for instance commercial banking corporation in giving green credits for sustainable matters investment (Ma & Li, 2025; Xiang & Ma, 2025), and accelerate wide-usage of renewable energy development (Chi *et al.*, 2025; Hanafy *et al.*, 2025; Tang *et al.*, 2025; Yeboah *et al.*, 2025).

As one of the largest rapidly developing economies with becoming the new industrialized nation in Asia (Boddin, 2016), Indonesia has also demonstrated its dedication to green finance as part of its national strategy to elevate the green economy and decarbonize. In accordance with the National Energy General Plan (RUEN), the Government of Indonesia has established an ambitious renewable energy target, a minimum of 23% of the national energy mix (IESR, 2022) is to be derived from renewable sources by the year 2025. Conversely, the Indonesian Financial Services

Authority/FSA (Otoritas Jasa Keuangan/OJK) has spearheaded the formulation of the Roadmap of Financial Sustainability Phase II: 2021–2025 (FSA, 2021), a comprehensive blueprint that underscores the imperative of environmentally sustainable investments within the financial sector which is currently running the Second Phase of Sustainable Financial Concept. Concurrently, the Indonesian Ministry of Finance has systematically issued Green Bonds and Green *Sukuk* (an Islamic conceptualization of bonds) to fund sustainable and green projects (UNDP, 2024), encompassing renewable energy development, transportation, and green building development.

Despite these strong policy commitments, the realization of renewable energy development in Indonesia remains below the target. IESR (2022) also reported that by 2022, renewable energy usage in Indonesia represented of 14% of national energy mix, definitely far from the RUEN target set by 23% in total (as Ministry of Energy and Mineral Resources (MEMR) set target at least USD 3.91 billion for renewable energy sector and still halted in USD 0.58 billion realization). This illustrated a policy-implementation gap, in which financial instruments and policies frameworks are available but the field impact on escalating renewable energy remains limited. So that, in pursuing green finance and energy transition, developing countries are confronted with several contradictions and institutional challenges (Han *et al.*, 2025), notably Indonesia as this study case of Green *Sukuk* proceeds implementation to renewable energy development. A number of obstacles persist, including the ambiguity of regulations, the limited engagement of the private sector, and the circumspect approach of financial institutions in regard to the concept of green finance.

This gap raises an important question regarding the effectiveness in implementing green finance, especially in Indonesia as this study case came in. While the previous studies from Chi *et al.* (2025), Tang *et al.* (2025), and Bai *et al.* (2025) were explored and observed the role of green bonds or sustainable bonds in general, little attention has been given to the specific case, such as Indonesia's Green *Sukuk* financial instrument and its impact on renewable energy development. Addressing this gap is definitely important, not only to assess Indonesia's progress toward SDGs 2030, particularly 7 (Affordable and Clean Energy) and SDG 13 (Climate Actions), but also to provide some insight into the broader discourse on green finance in emerging countries.

While green finance in Indonesia contains a variety of instruments like green bonds, sustainable loans, and ESG-based (Environment, Social, and Governance)

investment, the measurable form of implementation is the issuance of Green *Sukuk*. As the first nation to issue the Islamic concept of green bond globally, Indonesia has turned billions of dollars for sustainable projects, particularly in the renewable energy sector. Given its availability in its central role in Indonesia's sustainable finance framework, Green *Sukuk* also can serve as a practical proxy to examine how green finance can contribute to such renewable energy growth implementation and surpassing the RUEN's expected target of clean energy occupation in national energy mix usage in Indonesia.

Therefore, this study aims to analyze the gap of missed of RUEN's target on renewable energy in Indonesia during 2018–2023. This study's significance generally lies in two aspects. Academically, it enriches the empirical literature which is limited about green finance in developing countries, especially in Southeast Asia with focusing on the Indonesian Green *Sukuk* instrument as the case study. Practically, it gives the view for the Indonesian policymakers, financial institutions, and the investors about how to strengthen the role of green finance to escalate the nation's renewable energy transition and run the sustainable economy.

Although there is a growing body of literature on green finance globally and especially in emerging economies, specific empirical studies in Indonesia remain limited. Mostly of the existing researches has largely focused on regulatory framework and general discussion of implementing green finance consistently (e.g. FSA 2021; IESR 2022; Ministry of Finance 2024) and Green Bonds funding in general, with have a few attentions given to the measurable impact of Indonesia's Green *Sukuk* implication to fund renewable energy development. This study also contributes to answer the gap of missed RUEN's renewable energy target through the case of Green *Sukuk* funding in sustainable development projects in Indonesia. In addition, the findings will assist policymakers in identifying potential bottlenecks in the fund distribution process and formulating more targeted regulatory frameworks.

II. LITERATURE REVIEW

A. Theoretical Framework

This research utilizes the finance-energy connection framework to analyze the relationship between financial innovation and renewable energy expansion. The study integrates three core theoretical pillars: (a) Finance-energy nexus (supply-leading vs. demand-following hypothesis), (b) financial deepening, and (c) financial intermediation.

The supply-leading hypothesis (Patrick, 1966) posits that financial development acts as an exogenous catalyst for the real economy, where the creation of financial instruments (including Green *Sukuk*) provides the necessary capital to stimulate growth in the renewable energy sector before the demand fully materializes. Conversely, the demand-following hypothesis argues that the financial sector evolves as a reaction to the real sector's needs; here, the growing energy demand and national decarbonization commitments create a pull factor that necessitates the creation of sophisticated financial instruments.

Financial deepening is defined as the process of increasing the volume, diversity, and efficiency of financial institutions

and instruments within an economy (Shaw, 1973). In this research, the issuance of Green *Sukuk* serves as an indicator of financial deepening within the Islamic capital market, reflecting a transition from traditional financing to become more complex, specialized structure capable of supporting sustainable long-term projects.

The mechanism by which financial resources are converted into energy projects is explained through financial intermediation theory (Gurley & Shaw, 1960). Theoretically, financial intermediaries act as conduits, transforming the funds mobilized from surplus units (investors) into productive assets for deficit units (like the energy projects). In an idealized transmission mechanism, the capital raised via Green *Sukuk* should be efficiently allocated to finance renewable energy infrastructure (e.g., solar, wind, or hydro projects). This process is to achieving Green Growth, which occurs when this efficient capital allocation results in structural shift toward a low-carbon economy, ensuring that financial innovation directly enhances physical energy capacity.

B. Green Finance: Global Outlook

Green finance appears as the frontliner in spreading environmental awareness to always promote sustainable development projects in many countries. According to OECD (2021), global green bond issuance has increased since 2015, reflecting the growing interest of investors in funding existing sustainable projects and aligned with climate change mitigation and SDGs. Previous studies show the role of commercial banks and capital markets are spreading and channeling funds for sustainable infrastructure development and renewable energy. For instance, Ma and Li (2025) found that commercial bank existence actively provides green credits to support clean energy usage in China, while Xiang and Ma (2025) emphasized the integrating environmental risk assessments into lending policies. Similarly, Chi *et al.* (2025) and Hanafy *et al.* (2025) demonstrated that green finance is significantly accelerating the green energy adoption in emerging countries, though the challenges remain in terms of regulatory enforcement and investor awareness.

C. Green Finance in China

Major Asian countries emphasized on implementing the green finance concept to prioritize the sustainable development within using renewable energy in their countries as it follows. On July 31, 2024, the Central Committee of the Communist Party of China and the State Council has issued the Opinions on Accelerating the Comprehensive Green Transformation of Economic and Social Development in China (Yao *et al.*, 2025), which is the part of nation's movement in green finance implementation. Another study by Xiang and Ma (2025) highly spotted in Chinese commercial bank competition in promoting green finance in large societies, especially urban areas to preserve sustainable development within local enterprises and SMEs. As being the most promoted conventional bank product through technological innovation and optimized resource allocation in part of digital economy (Chen & Xie, 2025), green finance is becoming popular and it spreads at least in 276 Chinese cities. The concept of its product is focusing on being environmentally-friendly.

The external effect which is coming from the policymaker (Chinese Government) also contributed in escalating the performance of green finance in China as launched China's 2016 Green Finance Reform Pilot Program. Known as the largest economic influence, either Asia or the entire world, China is about to set a regulation prioritizing optimization of clean energy usage to finance both public and private institutions through green bond and the impact was immediately felt in entire country's neighborhood, such as degraded urban pollution (Yang & Liu, 2025) caused by human activities associated in transportation, industrial production, and much more. Output of this program could increase renewable energy usage and keep accelerating sustainable development. This followed by society's participation in lending a green bond to invest in eco-friendly economical outputs whereas this concept is called Short- Term Debt for Long-Term Investment (SDFLI).

D. Green Finance in Indonesia

Indonesia is also one of Asian countries which is trying to escalate clean energy by doing wide-promotion through both sovereign and commercial bank added product, and actuating a roadmap established by the Financial Services Authority. Realization of green finance was focused to increase the percentage of green finance contribution in national development. That means, the Government of Indonesia is centered and all of the investment's funds are used to financing sustainable development projects. Not limited to renewable energy usage, Indonesia has also highlighted fully funded expansion labelled "green finance" to fund all green oriented development. This expansion has been affected by various factors like general urbanization, engagement of Foreign Direct Investment (FDI), and labor market growth significantly (Han *et al.*, 2025) causing green finance to be labelled as a pioneer in expressing renewable energy usage in developing countries like Indonesia.

Unlike China and the rest of the world, Indonesia has Green *Sukuk* as part of the green finance instrument which is specifically an Islamic concept of loan. According to the Ministry of Finance (2024), Green *Sukuk* is one of the thematic finance instruments issued by the Indonesian Government that aims on national green energy procurement and sustainable projects. As its name implies, Green *Sukuk* is issued with Sharia principles as the Government through the Ministry of Finance launched it on March 1, 2018. Green *Sukuk* has already received at least 14 international awards, including from IFR Asia, Islamic Finance News, Finance Asia, Euromoney, The Assets Triple A, Climate Bond Initiative, and Cambridge IFA as the best sovereign fund and Islamic financing, also highlighted as the best green initiative. In addition to being issued through SNI (Indonesian Standard) instrument, Green *Sukuk* is also issued

in the domestic market in both retail and non-retail formats. As of now, *Sukuk* issued in Retail Green *Sukuk* format has reached 7 series, namely ST006, ST007, ST008, ST009, ST010T4, ST011T4, and ST012T4. On the other hand, non-retail issuance also issued the Project Based Green *Sukuk* instrument from the period 2022–2024 via series PBGS0001. This kind of series of *Sukuk* used to support the macroprudential inclusive financing ratio for the conventional and sharia banks, and other sharia business enterprises.

III. MATERIALS AND METHODS

A. Variables and Data Sources

To quantify the gap and execute the causal analysis, this study utilizes secondary data spanning the period of 2018–2023. The key variables and measurements are defined as follows:

- Input Indicator: The cumulative issuance of Sovereign Green *Sukuk*, measured in USD millions, representing the financial mobilization effort.
- Outcome Indicator: The realized share of renewable energy in the national energy mix, measured in percentage (%), reflecting physical implementation.
- Benchmark Target (The Ideal State): The National Energy General Plan (RUEN) target, establishing a minimum 23% renewable energy share by 2025.

B. Analytical Framework

The "financial-energy bottleneck" diagnostic is conducted through three analytical steps:

- Trend Mapping: Graphing the trajectory of Green *Sukuk* funds mobilized versus the actual percentage increase in the renewable energy mix (2018–2023).
- Gap Quantification: Calculating the discrepancy between the 2023 realization (14.06%) and the linear trajectory required to reach the 2025 RUEN target (23%).
- Policy and Allocation Evaluation: Analyzing the internal allocation of Green *Sukuk* proceeds (e.g., identifying the proportion actually channeled to renewable energy versus other green sectors) to trace the root cause of the implementation gap.

IV. RESULT AND DISCUSSION

A. The Widening Gap

Since 2018, Indonesia has established the issuance of sovereign Green *Sukuk*, making it the first country in the world to launch the instrument of Islamic green bonds at the national level scale. At Table 1, it summarizes the Green *Sukuk* issuance alongside the renewable energy share in Indonesia energy mix in the period 2018 to 2023.

Table 1. Green *Sukuk* issuance and renewable energy growth (2018–2023)

Year	Green <i>Sukuk</i> Issuance (Million USD)	Renewable Energy Share (%)	Policy Highlights
2018	1250	10.30	Green <i>Sukuk</i> issuance in Indonesia
2019	750	10.64	Continuation of Green <i>Sukuk</i> issuance
2020	750	12.23	Economic slowdown due to COVID-19 constrained investment capacity
2021	750	13.02	Established Sustainable Finance Roadmap by FSA
2022	1500	12.75	Renewable energy share decreased
2023	1000	14.06	Energy mix still far below RUEN target 23%

Despite Indonesia's consistent issuance of Green *Sukuk* since 2018, reaching the cumulative value USD 6 billion, the renewable energy share has shown no significant improvements at all. Green *Sukuk* issuance has been stuck since 2019 due to the COVID-19 pandemic that is distracting global economics, as well as Indonesia. In addition to facing economic recovery after having such a national economic recession, Indonesia still does not have much improvement on the renewable energy share in energy mix in total, and still far below targeted renewable energy production 23% in total.

While Green *Sukuk* has been issued, FSA is also arranging the roadmap for sustainability finance implementation in Indonesia after, and it was launched in 2021 (FSA, 2021). To accelerate the RUEN's 23% target of renewable energy in Indonesia, Financial Services Authority established the five-year roadmap of sustainable finance implementation nationally in the period of 2021-2025, followed by issuing carbon-tax for the massive carbon emission industries (IESR, 2022).

Based on the data of carbon-tax roadmap in IESR (2022) Reports, in 2021, there is the issuance of Presidential Decree 98/2021 on carbon Economic Value and Law No.7/2021 on tax harmonization regulating carbon tax, followed by development of carbon trading mechanism and carbon trading piloting in electricity subsectors by MEMR. Next in 2022, The Presidential Regulation on Carbon Tax Roadmap. There is also the development of measurement, reporting, and verification supporting carbon trading followed by implementation of carbon tax (cap and tax) only towards coal-fired power plants. In the year 2023–2025, the infrastructure of the carbon market evolved, evaluating the implementation of carbon trading and tax. Finally, full implementation of carbon trading through the carbon market and carbon tax implementation for other sectors based on the Presidential Regulation on Carbon Tax Roadmap which was issued in 2022. This is the evidence that Indonesia is currently accelerating its RUEN target in getting 23% in renewable energy usage in energy mix by establishing a carbon tax by the period of 2025.

In the period of 2018–2023, renewable energy growth in Indonesia has only grown 3.76 points, where this quantity is still far below RUEN's 2025 renewable energy share goal represent 23% in total of national energy production. This makes Indonesia needs at least only two years left in order to fulfil the RUEN's 2025 target of 9% left in the renewable energy share. However, in the year of 2024, the Indonesian government has changed the RUEN's renewable energy target to 17–19%. This policy shift is clearly captured in Fig. 1, where the target trajectory suddenly shifts downward from 2024 onward, reflecting the government's pragmatic adjustment to missed national economic and energy targets. This is because the previous target was too high to implement followed by national economic growth missed the target that has been set. The decline in renewable energy target has caused investors to hesitate to invest in Green *Sukuk* for sustainable development on renewable energy (Pristiandaru, 2024).

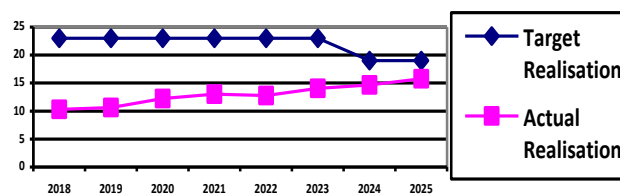


Fig. 1. Trajectory gap between renewable energy share and RUEN 2025 Target (%).

B. Diagnosing Financial-Energy Bottleneck

In order to diagnose the bottleneck between financial mobilization and actual energy capacity growth, it is important to evaluate the internal allocation of Green *Sukuk*. Although Indonesia successfully mobilized around 6 billion in 2018–2023, this fund distribution shows the significant deviation in energy sector. According to Ministry of Finance (2024), most of Green *Sukuk* funds allocated to sustainable water and waste management projects (82.77%). In contrast, the renewable energy sector received only approximately 16.5% of total Green *Sukuk*.

The deviate allocation clearly explains the modest 3.76% increase in renewable energy growth over the five-year period. Viewed through the lens of financial intermediation theory established in theoretical framework, a structural bottleneck is occurring. While the supply-leading mechanism successfully created financial instrument to attract investors, the intermediation process failed to channel the majority of these funds into energy assets. Consequently, the absence of a robust, bankable pipeline for renewable energy projects combined with a highly diversified green funding market has accidentally diluted the financial impact on clean energy growth, making the RUEN's target of 23% increasingly difficult to achieve.

C. Comparative Analysis

The findings from Indonesia showed the stark contrast where although the issued amount of USD 6 billion Green *Sukuk* proceeds in 2018–2023, the proportion of renewable energy in the energy mix is only 14.06% at the latest data (2023). To understand this significant gap, it is important to compare Indonesia's achievements with other countries.

Meanwhile, China has become the example of green finance implementation which has an effective correlation between green finance and renewable energy growth. According to the Climate Bonds Initiative (2023), China has transformed into the second biggest green obligation market in the world, with the green debt issuance reaching approximately USD 83.5 billion in 2023. Use of proceeds for green energy is the most significant, both from the sources of development bank and non-financial corporate issuers which accounting for 54 and 65% of the use of proceeds (Climate Bonds Initiative, 2023). The green finance investment in China also proved in giving effectiveness within declined only 8% than traditional investment in 23% as the pandemic happened, so that means the green finance mechanics provided more diversifications and risk management benefits (Sun *et al.*, 2025). Although China faces the growing conflict between economic growth and environmental protection, especially in rural area, the policymaker tried to balance the significant economic development through green finance in order to keep the sustainable development, such as

supporting ecological development level of rural cultural tourism industries by applying renewable energy development (Zheng *et al.*, 2025), and applying the advanced technologies for green industries (Yuan *et al.*, 2025).

Recently, India (as a BRICS member) entered the green obligation market with its issuance cumulatively reaching USD 9.41 billion in period of 2021–2022 (Nenavath & Mishra, 2023), and it mostly used to fund renewable energy with occupied at INR 1,768 billion (approximately USD 20.2 billion) (CPI, 2024). In fact, India's economy is bank-dominated, with significant contributions to green finance from public sources of funding (Bhatnagar *et al.*, 2025). Despite India going to accelerate its renewable energy share in mix energy, it faces the similar problem like Indonesia. Bhatnagar *et al.* (2025) also highlighted that financial, legal, and regulatory barriers are the major obstacles in escalating green finance implementation, particularly in low rate of returns followed by high investment risk are the most prominent financial barriers.

Looking to the other Islamic financing pioneers, countries like Malaysia, United Arab Emirates, and Qatar also have issued Green *Sukuk*, though primarily at the corporate level, not sovereign level like in Indonesia. For instance, Malaysia has issued at least USD 13 billion in Green *Sukuk* across the period of 2017 to Q3 2024 (LSEG, 2024). Malaysia has named their own *Sukuk* as “SRI (Sustainable and Responsible Investment) *Sukuk*”. SRI *Sukuk* amount of claim up to 90% with maximum funding of MYR 300,000 (approximately USD 70,000). An enterprise applying SRI *Sukuk* for their development can get the tax deduction until the year of assessment of 2023 (Securities Commission Malaysia, 2019). Therefore, less obligation issuance from the government (sovereign Green *Sukuk*) makes this comparison becoming limited. This highlights the unique role of Indonesia as the first global nation in implementing Green *Sukuk* issuance.

D. Policy Implications

Based on the research findings showed that NOT fully Green *Sukuk* is directed to fund the sustainable energy projects in Indonesia (occupied only 16.5%), there is several key recommendations to maintain the renewable energy transition in Indonesia by using Green *Sukuk* as the national funding regulation are purposed:

1) Enhance policy and regulatory alignment

The government must ensure stronger coordination among the Ministry of Finance, Ministry of Energy and Mineral Resources, and Financial Services Authority to align financing mechanisms with renewable energy deployment targets. As the policymaker, the government should simplify regulatory frameworks and remove some bottlenecks of development, for instance the permit delays that could hinder renewable energy project implementation by both official government and private investment. On the other hand, green finance must be inclusive and integrated between green concept and inclusive finance. This implementation is focused on the limitation industries which resulted in high carbon emissions. Studies showed that green inclusive finance (Yao *et al.*, 2025), giving the financial incentives for enterprises who applied green credits (Zhang *et al.*, 2025), and expanding green finance concept (Hanafy *et al.*, 2025; Xu & Liu, 2025) which stimulate corporations to pursue

green innovation by imposing constraints on both debt and equity financing (Xu & Liu, 2025) can improve carbon emission efficiency, increase harmony between economy and the environment aspect, and drive the development of a sustainable economic implementation to accelerating the transition to post-carbon age. Yao *et al.* (2025) also found that green inclusive finance positively increases the financing cost for high-carbon industries, which is compressing their development space and forcing them to adopt technological transformation and upgrading industries to reduce carbon emissions.

2) Strengthen renewable energy project pipelines

Indonesia should develop such a comprehensive pipeline of bankable renewable energy projects that can directly ingest Green *Sukuk* proceeds. This matter can also encourage partnerships among state-owned enterprises, private sector developers, and international investors to escalate this renewable deployment. Perhaps, the project pipelines must be on control and the policymaker establish the pilot zone concept like in China, which the innovation pilot zone policy and green finance reform positively can reduce the intension of carbon emission through the regulation of “policy incentive and market constraint” dual environmental regulation system (Yang & Liu, 2025). This also followed by the implementation of green management system, particularly the energy sector by optimizing resource allocation followed by accelerating environmentally friendly technologies transfer to enhance the corporate green innovation performance and sustainability (Hunjra, 2025), which is the project pipelines is clear and has more benefits for the both private and state-owned corporate sectors. These verify the direct driving effect of management practices on innovation outcomes (Cui, 2025) and increased the rate of green growth in industrial intelligence development by applying renewable energy (Luo *et al.*, 2025).

3) Increase transparency and monitoring

Establishing robust reporting mechanisms could track how *Sukuk* proceeds are allocated and measure the impact directly on renewable energy growth. Next, the government has to publish the reports linking financing flows particularly in renewable capacity additions which is done by the Ministry of Finance and the Ministry of Energy and Mineral Resources in order to foster local and foreign investor trust regarding their participation in financing renewable energy projects via Green *Sukuk* schemes.

V. CONCLUSION

This study analyzed the actual gap of failure in reaching RUEN's target on renewable energy in Indonesia during 2018–2023. The result reveals a paradox, while Indonesia has successfully mobilized USD 6 billion in Green *Sukuk* issuance, the existence of renewable energy growth has been relatively modest. The proportion of share in renewable energy increased only from 10.3% in 2018 to 14.06% in 2023, falling short of the trajectory needed to surpass the RUEN target of 23% by 2025, followed by a small proportion of Green *Sukuk* is used to fund the renewable energy projects there. So that the findings indicate financial innovation itself alone is insufficient to generate energy transition. By accelerating RUEN's target in 2025, Indonesia currently is

running the Carbon-Tax Roadmap since 2022. This implementation is forcing industries to use renewable energy in order to decrease the carbon emissions in Indonesia which is similar to the implementation concept of carbon tax in China by increasing the price of operational in high-carbon industries and automatically, it gets the implementation of SDGs, particularly SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Actions).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Muhammad Ilham Firmansyah conducted the research, wrote the paper and analyzed related secondary data; Tiara established the theoretical framework and advised on the research method; all authors had approved the final version.

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