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Renewable Energy Certificate (REC) Market Demand Mapping in Indonesia

Veronica Ayu Pangestika, Gadiz Liberty Namira, Monika Merdekawati, Genta Harrison Hasiando Mardani



Highlights

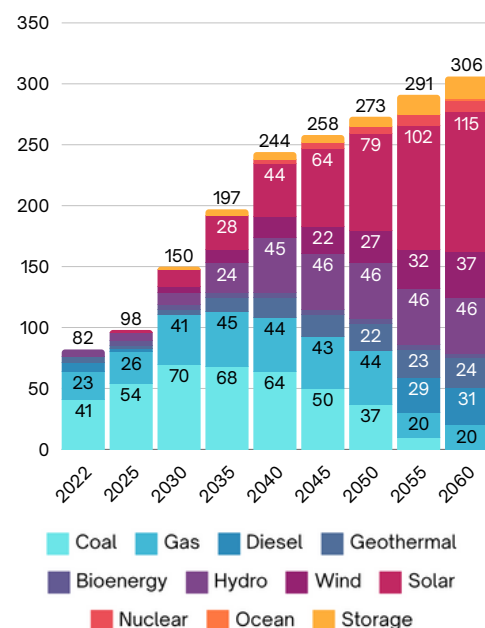
- **Strong Growth in Indonesia's REC Market:** Indonesia is experiencing a surge in REC demand, driven by multinational corporations and a growing number of local companies across various sectors. This growth is expected to accelerate as the country actively promotes wider REC adoption.
- **Key Sectors Driving REC Demand:** Manufacturing, smelting, non-manufacturing, and data processing are identified as sectors with significant REC demand potential.
- **Varying Levels of REC Adoption Across Sectors:** While REC adoption is strong in the manufacturing and data processing sectors, driven by commitments to initiatives like RE100 and SBTi, it remains relatively low in the non-manufacturing sector, particularly in oil and gas, mining, and agriculture.
- **PLN's Role in Expanding REC Access:** PLN's REC product is making RECs more accessible to smaller businesses, contributing to a more diversified and inclusive REC market.
- **Need for Policy Support to Further Stimulate REC Demand:** A clear legal framework for RECs is crucial to sustain market growth, attract investment, and encourage greater participation from companies in sectors with currently low REC adoption.

1. Introduction

Indonesia's pursuit of its 2060 net-zero emissions target is guided by a multi-pronged strategy emphasising energy efficiency, the development of both on-grid and off-grid renewable energy (RE) sources, sectoral electrification, and the gradual phase-out of coal-fired power plants. The nation's projected RE capacity is expected to reach approximately 184.5 GW from variable RE (VRE) by 2060 (Figure 1), aligning with the country's National Electricity Masterplan (Rencana Umum Ketenagalistrikan Nasional) [1].

Perusahaan Listrik Negara (PLN) is driving this transition through its 2021-2030 Power Development Plan (PDP), which prioritises the acceleration of new renewable energy (NRE) technologies, including bioenergy and hydropower, supported by incentivising policies [2].

Figure 1 Indonesia Net Zero Roadmap Draft as of September 2024.
The data is acquired from the Directorate General of New Renewable Energy & Energy Conservation. Figure is generated by ACE.



This policy brief analyses Indonesia's REC market to support regional cooperation and harmonise RE frameworks across Southeast Asia. It maps current and future REC demand across key sectors, evaluates the roles of stakeholders and sector-specific opportunities within the REC market ecosystem, and assesses relevant policies impacting market growth. Recognising Indonesia's unique archipelagic context, the brief considers both the challenges and opportunities, including diverse REC sources and nationwide expansion complexities, to strengthen Indonesia's commitment to advancing its RE, through the REC market.

2. Identifying Key Stakeholders

This brief first outlines the key stakeholders in Indonesia's REC market, differentiating between market actors and regulatory bodies. It then focuses on the market actors driving REC demand, specifically analysing four diverse sectors: manufacturing, smelting, non-manufacturing, and data processing. Finally, it highlights the significant role of PLN, the state-owned electricity company, in propelling REC market growth in Indonesia.

The later stakeholder comprises oversight and implementation bodies, which uphold market standards and compliance. Indonesia's Ministry of Energy and Mineral Resources (MEMR) is responsible for regulatory oversight. Moreover, for implementation bodies, international registries operating in Indonesia's REC market are APX TIGR and I-REC(E). The document will further examine the government support for REC demand through Indonesia's existing policy, regulatory, and framework landscape.

Alongside market actors and regulatory bodies, voluntary initiatives like RE100 and the Science Based Targets initiative (SBTi) play a crucial role in driving REC adoption. RE100 focuses on companies committed to 100% renewable electricity, while SBTi mandates emission reductions, particularly Scope 2 emissions from electricity use. This brief will highlight companies within key sectors that are members of RE100 and SBTi, emphasising the importance of these voluntary standards in stimulating REC demand.

3. Case Studies in Key Sectors

3.1. Rationale for Selecting Key Sectors in Indonesia

The energy-intensive manufacturing sector, encompassing diverse industries like textiles, chemicals, electronics, and automotives, is poised to lead the transition to RE, especially given the presence of multinational manufacturers in the country. Simultaneously, the smelting sector, essential for processing Indonesia's abundant resources like nickel, copper, and tin, has substantial energy requirements. Meeting these needs sustainably is crucial, particularly with the MEMR aiming to achieve the energy demands of 52 smelters, with a planned capacity of 4,798 MW, by 2024 [3].

Beyond manufacturing and smelting, this section also examines the non-manufacturing sector, which includes diverse industries ranging from energy-intensive mining operations (coal, oil, and gas) to various service sectors. Additionally, it analyses the rapidly growing data processing sector, fuelled by Indonesia's expanding digital economy and the rise of hyperscale data centres in Jakarta. This sector presents a unique challenge, with its high energy consumption for cooling [4].

3.2. Case Studies in Key Sectors in Indonesia

Before analysing each sector, it is essential to clarify the approach taken towards companies without verified Renewable Energy Certificate (REC) purchases. For companies where no public record of REC acquisition could be identified, it is acknowledged that they may, in reality, purchase RECs but lack publicly accessible documentation. Only companies with tangible, verifiable evidence of REC purchases are included. Instances where REC procurement is mentioned as part of future strategies are categorised as having no recorded purchase. This policy brief prioritises information from company sustainability reports; if unavailable, other sources such as press releases and news articles are utilised. For Indonesia, the PLN REC buyer's registry is also referenced, listing entities that have procured its REC products.

3.2.1. Manufacturing Sector

Manufacturing industries are responsible for around 35% of Indonesia's energy consumption—the largest sector share—highlighting the crucial role of RE uptake in managing the nation's overall energy demand and emissions [5]. The below list comprises a strong mix of domestic and multinational firms, prioritising companies that bought RECs from PLN. The listed companies show a balanced REC demand both between the international and local companies.

Table 1 List of Manufacturing Companies in Indonesia

Company	REC	RE100	SBTi	Category	Activity
Fast Retailing	YES	NO	YES	Apparel & Textiles	Clothing and apparel
H&M Group	YES	YES	YES	Apparel & Textiles	Clothing and apparel
Nike	YES	YES	YES	Apparel & Textiles	Sportswear and footwear
Reckitt	YES	YES	YES	Chemicals & Materials	Consumer goods (cleaning products, hygiene)
ABB	YES	NO	YES	Electronics & Machinery	Electrical equipment, robotics, and automation
Clariant	YES	NO	YES	Chemicals & Materials	Specialty chemicals
CJ CheilJedang	YES	NO	YES	Food & Beverage	Food processing and bio-industry
Otsuka	YES	YES	YES	Food & Beverage	Pharmaceuticals and nutraceuticals
Voith	YES	NO	YES	Other	Paper manufacturing equipment and hydropower technology
Pigeon	YES	NO	NO	Other	Baby products
Georg Fischer Ltd	YES	NO	YES	Electronics & Machinery	Precision machinery and industrial automation
Cataler	YES	NO	NO	Other	Catalytic converters for automobiles
East Jakarta Industrial Park (EJIP)	YES	NO	NO	Other	Industrial estate development
Fuji Technica Indonesia	YES	NO	NO	Automotive	Automotive components
Indorama Corporation	YES	NO	YES	Chemicals & Materials	Petrochemicals, fibers, and yarns
Isuzu	YES	NO	YES	Automotive	Commercial vehicles and engines
NKW	YES	NO	NO	Electronics & Machinery	Electrical connectors and components
PT Polychem Indonesia Tbk	YES	NO	NO	Chemicals & Materials	Polyester resins and films
PT Toyota Motor Manufacturing Indonesia	YES	NO	NO	Automotive	Automobile manufacturing
PT Astra Honda Motor	YES	NO	NO	Automotive	Motorcycle manufacturing

Company	REC	RE100	SBTi	Category	Activity
PT Kahatex	YES	NO	NO	Apparel & Textiles	Textiles
Prym Intimates Indonesia	YES	NO	NO	Other	Intimate apparel accessories
Shinwon	YES	NO	YES	Apparel & Textiles	Clothing and apparel

**The information conveyed in the above figure is sourced from the companies' relevant publicly accessed documents, the RE100 members list [6] and/or the SBTi members list database [7] and PLN REC's website [8].*

Indonesia, a major industrial hub in Southeast Asia, is witnessing a surge in REC demand, driven by both multinational corporations and a growing number of local manufacturers, although the multinationals are still in dominance. This upward trend is expected to accelerate as Indonesia actively encourages wider REC adoption across its industries. While large corporations currently dominate REC purchases, significant potential exists to engage suppliers throughout the value chain. The PLN REC product offers an appealing entry point for smaller retailers, with a minimum purchase requirement of just ten RECs, providing an accessible option for those testing the waters in the REC market. This flexibility enables smaller players to participate at a manageable scale, supporting Indonesia's broader ambitions for RE adoption and diversifying demand across sectors.

3.2.2. Smelting Sector

As of 2023, Indonesia has recorded 116 smelting industries focused solely on nickel, not to mention the numerous facilities dedicated to processing other commodities such as copper, aluminum, and tin. Table 2 highlights the major players in the smelting sector, providing a closer approximation of the REC demand within the industry. However, it is essential to note that this selection is limited to large smelting enterprises, which may not fully represent the nation's broader landscape of smelting operations.

Table 2 List of Smelting Companies in Indonesia

Company	Commodity	Location
PT Vale Indonesia	Nickel	Sulawesi
PT Smelting (Freeport)	Copper	East Java, Papua
PT Indonesia Asahan Aluminium (Inalum)	Alumunium	North Sumatra, Central Sulawesi
PT Timah Tbk	Tin	Bangka Belitung
PT Antam Tbk	Nickel	Southeast Sulawesi, West Java

Smelting companies face a broad challenge within the industry, which relies heavily on stable power supplies to ensure uninterrupted operations, often depending on dedicated power plants fuelled by fossil fuels [9].

Indonesia, endowed with abundant nickel reserves, aspires to become a global leader in electric vehicle (EV) battery production, where nickel plays a pivotal role. However, the nation faces mounting international scrutiny over carbon emissions from its coal-powered smelting industry, a key component in refined nickel exports [10].

Due to their substantial energy consumption and higher carbon intensity than other industries, smelters are classified as Energy-Intensive and Trade-Exposed (EITE) industries under the European Union's cap-and-trade policy, the Carbon Border Adjustment Mechanism (CBAM).

As a result, smelting products are subject to CBAM and similar regulatory frameworks aimed at curbing carbon emissions. Recognising this challenge and the critical need for a RE transition, RECs can serve as credible proof of avoided emissions. By verifying the use of clean electricity, RECs may provide smelting companies with exemptions or compliance benefits under policies analogous to CBAM.

3.2.3. Non-Manufacturing Sector

The following companies represent the diversity of Indonesia's non-manufacturing sector, highlighting both traditional and emerging players shaping the nation's REC demand landscape.

Table 3 List of Non-Manufacturing Companies in Indonesia

Company	REC	RE100	SBTi	Category	Activity
ANZ	YES	YES	NO	Financial Services	Banking and financial services
DBS Bank	YES	YES	NO	Financial Services	Banking and financial services
HSBC	YES	YES	NO	Financial Services	Banking and financial services
KPMG	YES	YES	YES	Consultancy Services	Accounting and consulting services
Macquarie Group Limited	YES	YES	NO	Financial Services	Investment banking and financial services
McKinsey & Company	YES	YES	YES	Consultancy Services	Management consulting
PwC	YES	YES	YES	Consultancy Services	Accounting and consulting services
Zoetis	YES	YES	NO	Other	Animal health (pharmaceuticals and vaccines)
Chevron Pacific Indonesia	YES	NO	NO	Oil & Gas	Oil and gas exploration and production
ExxonMobil Indonesia	YES	NO	NO	Oil & Gas	Oil and gas exploration and production
PT Adaro Energy	YES	NO	NO	Mining	Coal
PT Bumitama Agri Ltd	NO	NO	NO	Food & Agriculture	Palm oil plantation
PT Sinar Mas Agribusiness and Resources Technology (SMART)	NO	NO	NO	Food & Agriculture	Palm oil plantation and processing
PT Sinar Mas Land	YES	NO	YES	Property Development & Real Estate	

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Company	REC	RE100	SBTi	Category	Activity
PT Wilmar International Ltd	YES	NO	YES	Food & Agriculture	Palm oil, sugar, and consumer products
ConocoPhillips Indonesia	NO	NO	NO	Oil & Gas	Oil and gas exploration and production
China National Offshore Oil Corporation (CNOOC)	NO	NO	NO	Oil & Gas	Oil and gas exploration and production
Medco Energi	NO	NO	NO	Oil & Gas	Oil and gas exploration and production
Pertamina	YES	NO	NO	Oil & Gas	State-owned oil and natural gas (exploration, production, refining, and marketing)
PT Aneka Tambang (ANTAM)	YES	NO	NO	Mining	
PT Astra Agro Lestari Tbk	NO	NO	NO	Food & Agriculture	Palm oil plantation
PT Bayan Resources	NO	NO	NO	Mining	Coal
PT Bukit Asam (PTBA)	NO	NO	NO	Mining	Nickel, gold, bauxite
PT Charoen Pokphand Indonesia	NO	NO	YES	Food & Agriculture	Poultry and animal feed
PT Freeport Indonesia	YES	NO	NO	Mining	Coal
PT Indofood Sukses Makmur Tbk	NO	NO	NO	Food & Agriculture	Food processing (noodles, dairy, snacks)
PT Indonesia Asahan Aluminium (Persero) (INALUM)	NO	NO	NO	Other	Gold and copper
PT Merdeka Copper Gold (MDKA)	NO	NO	NO	Mining	Gold and copper
PT PGN (Perusahaan Gas Negara)	NO	NO	NO	Oil & Gas	Natural gas infrastructure and distribution
PT Timah Tbk (TINS)	NO	NO	NO	Mining	Tin
PT Vale Indonesia (INCO)	NO	NO	NO	Mining	Nickel
Deltamas	YES	NO	NO	Real Estate & Property	Development of industrial and commercial properties.
Concentrix	YES	NO	YES	Business Services	Customer experience and business process outsourcing services.
Super Indo	YES	NO	NO	Retail	Grocery and supermarket chain

Company	REC	RE100	SBTi	Category	Activity
Allianz	YES	YES	YES	Insurance	Providing financial services, including insurance and asset management
Intertek	YES	NO	YES	Testing & Inspection	Quality assurance, testing, and certification services
Bank Indonesia	YES	NO	NO	Financial Services	Central banking operations, including monetary policy and financial regulation

**The information conveyed in the above list is sourced from the companies' relevant publicly accessed documents, the RE100 members list and/or the SBTi members list database, PLN REC's website, and the respective companies' sustainability report.*

Indonesia's non-manufacturing sector represents an ample scope of industries, from financial services, food & agriculture, mining, also oil & gas industries. With total of 35 listed companies, 15 companies (43%) are listed to purchase RECs and 20 companies (57%) with no recorded REC purchase. The services industry dominates REC market demand within this sector, with major companies such as KPMG, ANZ, and Allianz leading the way. These firms, as members of both RE100 and SBTi, actively utilise RECs as part of their sustainability commitments.

In contrast, REC adoption remains limited in resource-intensive industries like oil and gas and mining. However, a positive trend is emerging within these high-emission sectors. Excluded from RE100 and SBTi memberships due to significant carbon footprints and transition risks, some companies—such as Pertamina, PT Freeport Indonesia, PT ANTAM, and PT Adaro Energy—have still made notable strides in REC procurement. The majority of these resource-intensive industries are recorded as buyers under the PLN REC registry, showing PLN's critical role in enabling the nation's RECs purchase.

Unlike the manufacturing sector, this sector reflects a more balanced demand, driven equally by local and multinational companies, showcasing a promising shift towards greener practices even in traditionally challenging industries.

The future demand for REC in Indonesia's non-manufacturing sector appears promising. Indonesia's commitment to sustainable industry practices, particularly in oil and gas and mining, is expected to contribute to adoption. Additionally, emerging agri-businesses and food services are increasingly aligning with global sustainability frameworks to meet export market standards, such as CBAM. While the diverse nature of this sector presents a wide range of potential REC demand, a key challenge lies in raising awareness and promoting RECs as a valuable tool for achieving sustainability targets across all industries.

3.2.4. Data Processing Sector

Indonesia ranks as the second largest ASEAN country with data centre capacity, 222 MW operational, 147 MW under construction, and a projected 482 MW. Its large population and rapidly expanding digital economy make it an attractive destination for data centres.

Increasing internet penetration and e-commerce growth drive demand for data centre services, which heavily rely on cooling systems, leading to substantial energy needs. Integrating RECs can help companies meet these RE demands while creating a revenue stream for sustainable energy generation, enhancing both operational efficiency and environmental responsibility.

Table 4 List of Data Processing Entities in Indonesia

Company	REC	RE100	SBTi	Category	Activity
Cummins	YES	NO	YES	Power Generation	Providing backup power solutions for data centre
Fuji Electric	YES	NO	YES	Technology Providers	Power electronics, automation systems, and industrial equipment
Google	YES	YES	NO	Cloud Computing & Internet Services	Internet search, advertising, cloud computing, software, and hardware

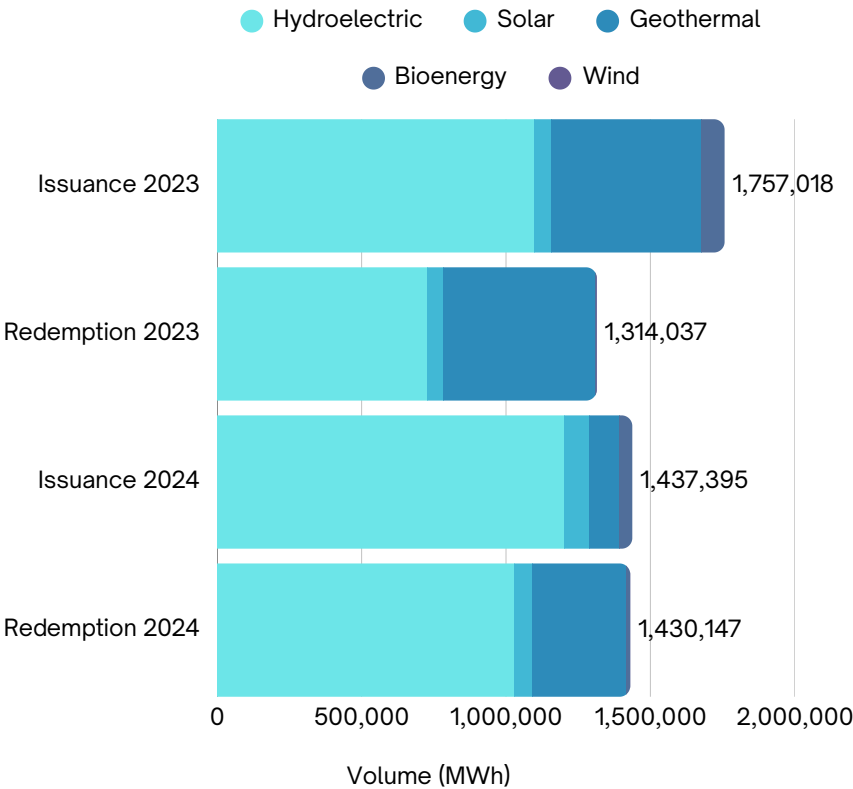
Company	REC	RE100	SBTi	Category	Activity
Huawei Technologies	NO	NO	YES	Technology Providers	Telecommunications equipment, smartphones, and IT infrastructure
Meta	YES	YES	NO	Cloud Computing & Internet Services	Social media, virtual reality, and online advertising
Microsoft	YES	YES	YES	Cloud Computing & Internet Services	Software, cloud computing, and hardware
Mitsubishi Electric	YES	NO	YES	Technology Providers	Electronics, automation systems, and industrial equipment
Schneider Electric	YES	YES	YES	Technology Providers	Energy management and automation systems
Toshiba	YES	NO	YES	Technology Providers	Electronics, energy systems, and infrastructure
BDx Indonesia	NO	NO	NO	Data Centre	Data center provider (colocation and connectivity services)
DCI Indonesia	NO	NO	NO	Data Centre	Data center provider (colocation, cloud, and managed services)
NeutraDC (Telkom)	NO	NO	NO	Data Centre	Data center provider (owned by Telkom Indonesia)
Open DC	NO	NO	NO	Data Centre	Data center provider (open-source data center design)
EDGE DC	YES	NO	NO	Data Centre	Data center provider (hyperscale data centers)
GoTo	YES	NO	YES	Technology	E-commerce and digital services

Table 4 presents a comparative analysis of national and multinational data processing companies, categorised into three groups: technology providers (e.g., Microsoft, Schneider Electric, Toshiba), cloud computing and internet services (e.g., Google, Meta, and Microsoft), and data centres (e.g., BDx Indonesia, NeutraDC, and EDGE DC). Among the national entities, DCI Indonesia, NeutraDC (Telkom), and BDx Indonesia represent Indonesia's local players. Notably, PT Ekagrata Data Gemilang (EDGE DC) has set a milestone as the first Indonesian data processing company to leverage Renewable Energy Certificates (RECs) by procuring them through PLN's system [11].

Akin to the manufacturing sector, the data processing industry demonstrates significant potential for REC demand, with many companies actively utilising them. Furthermore, the multinational companies on the list largely purchase RECs as they are RE100 and/or SBTi members. The multinational leadership is shown in the technology provider and cloud computing & internet service companies, while the data centres are dominated by emerging local companies, with mere REC purchases. Hence, it remains a considerable challenge to encourage more emerging local firms to engage more substantially in the REC market. Another similarity is the fact that there are mounting data processing start-ups in Indonesia, PLN's REC retail product could also serve as a viable choice for small-scale companies to take part in the REC market and participate in greening the power grid.

4. Status Quo of REC Demand

Figure 2 REC Issuance and Redemption in Indonesia Recorded in I-REC Registry per October 2024



The benchmarking year recorded a total of 1.7 million MWh of RECs issued in Indonesia, followed by a slight decline to 1.4 million MWh in the subsequent year. In contrast, REC redemption exhibited a steady upward trend, increasing from 1.3 million MWh to 1.4 million MWh. This divergence highlights growing demand amidst declining issuance, suggesting that Indonesia’s REC market is grappling to keep pace with global interest in RE.

The technological composition of REC issuance is dominated by solar energy, reflecting its widespread adoption locally. However, hydroelectric power leads in terms of total REC volume issued and redeemed. Notably, in 2024, geothermal REC redemption (327,450 MWh). This is particularly striking given Indonesia’s status as the ASEAN country with the highest geothermal potential, underscoring a need to address this apparent contradiction [12].

5. Policy and Regulatory Landscape

Indonesia currently experiences a vacuum in the national RE regulation, limiting its commitments to non-binding documents such as the National Energy Policy (NEP) 2014 and the National Electricity General Plan (RUKN). The only binding regulations focus on mechanisms like feed-in tariffs (FiT), investment in RE projects, and procurement procedures for electricity generated from RE sources.

The most pertinent existing law is Presidential Regulation No. 112 of 2022 on the Acceleration of Renewable Energy Development for Electricity Supply (Perpres 112/2022). The most notable aspect within the regulation is the standardisation of Power Purchase Agreement (PPA) terms that established a market-accepted template for PPA, ensuring a clear ownership structure and enhancing the bankability of RE projects.

Notably, Law No. 7 of 2021 on Carbon Tax and Nationally Determined Contributions (NDC) aims to incentivise businesses to reduce emissions through RE and energy conservation initiatives. This law harmonises tax regulations and uses them as a tool to discourage emissions, facilitating the achievement of Indonesia’s NDC targets.

Encouragingly, the government is currently drafting the New and Renewable Energy Bill (RUU Energi Baru dan Terbarukan) within the House of Representatives. This proposed legislation includes provisions for a Renewable Energy Portfolio Standard (RPS), which would require businesses to incorporate a specified percentage of RE into their operations.

Indonesia hosts a significant number of multinational companies, the majority of which are committed to RE100 and/or SBTi and drive REC demands. A clear framework governing RECs is essential to enhance the market's appeal, particularly for these multinationals. This framework should designate a national authority to oversee REC management. A comprehensive legal product could also boost the advocacy of RECs amongst private actors. Ultimately, laying a solid legal foundation will not only support the development of the REC market in Indonesia but also align it with international standards, fostering greater engagement from global investors.

6. Ways Forward

Empowering SMEs with Simple REC Products: Endorse REC products for early entry companies with low REC minimum purchase requirements, taking an example of the PLN's REC product for retailers.

Registering more RE facilities in other main grids beyond Java: As diversification emerged as a strategic challenge, adding RE facilities will diversify the REC technologies and contribute to RECs volume growth in the market. Moreover, such registration could increase REC market liquidity and accessibility by allowing a broader range of end-users across the countries to participate.

Establish Strategic Policy Nudge for Energy-Intensive Industries: As Indonesia is home to significant numbers of smelting industries, companies in such sectors must be pushed to contribute more substantially to achieving national RE targets by laying out the policy that obligates them to have a certain amount of RE mix to their operations. Moreover, observing their tendency to establish independent power plants, policy approach should oversee these power plants and seek suitable incentives for smelters to opt for RE sources.

Embedding RECs in Export Standards: With international policies like the EU's CBAM influencing trade, Indonesia can mandate or promote REC procurement as part of export strategies, particularly for energy-intensive goods.

This approach bolsters competitiveness in global markets while advancing sustainability. The CBAM, which imposes fees on imports with high-carbon production, is expected to drive REC adoption in key sectors like smelting. As a BIMP-EAGA supply chain hub, investing in RECs can help Indonesia align with decarbonisation efforts, mitigate CBAM costs, and achieve economic and environmental goals.

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