

WORKING PAPER

Corporate green power procurement options in Indonesia

Taking stock of demand and charting the path forward

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Suggested Citation: Gonçalves, T., R. Khairun Zain, C. Melo Ribeiro, A. Fajar Utomo, and E. Saraff. 2026. "Corporate green power procurement options in Indonesia: Taking stock of demand and charting the path forward." Working Paper. Jakarta: WRI Indonesia. Available online at doi.org/10.46830/wriwp.23.00172.

Highlights

- More than 11,000 companies worldwide—accounting for over 40 percent of global market capitalization—have set science-based targets to lower carbon emissions. To reach these targets, companies must buy electricity from green sources such as solar and geothermal.
- While Indonesia has expanded its suite of mechanisms for purchasing green power, many of its neighboring countries offer more options, leaving it at a comparative disadvantage.
- Our survey of companies in Indonesia revealed that they prefer green power procurement options that are straightforward and affordable. Most saw unbundled renewable energy certificates (RECs) as the best short-term option. In the long run, many prefer mechanisms which currently have limited availability, such as on-site generation and contracts with off-site generators.
- To help Indonesian stakeholders identify options for the expansion of green power procurement, we examined measures that other countries have taken to help companies pursue these mechanisms, such as novel business models and enhanced data transparency.
- To respond to green energy demand and attract investment, Indonesian stakeholders could lower barriers to on-site generation, mature the market for unbundled RECs, enhance the public communication of utility contracts, and pursue grid rental for off-site generation.

Executive summary

Introduction

As of August 2026, more than 11,000 companies (accounting for more than 40 percent of global market capitalization) have validated science-based targets to lower carbon emissions (SBTi n.d., 2026). Many of these companies operate in Indonesia or have supply chains there. To remain attractive for investment, Indonesia will need a diverse suite of green power purchasing mechanisms that enable such companies and their suppliers to reduce emissions.

Indonesia has already taken steps to diversify its suite of green power purchasing options. Within its highly regulated power market, characterized by substantial vertical integration, four types of green power purchasing mechanisms are available:

- On-site generation
- Unbundled energy attribute certificates (EACs), locally known as renewable energy certificates (RECs)
- Utility contracts, locally known as Green Energy as a Service: Dedicated Source (GEAS DS)
- Direct contracts with off-site generators

Nonetheless, Indonesia lags behind its neighbors in offering attractive arrangements for these mechanisms. Grid-connected rooftop solar photovoltaics (PV) is subject to quotas, while information on the pipeline of GEAS DS is not readily accessible to the public. Meanwhile, RECs lack evidence of additionality and safeguards against double counting. Lastly, contracts with off-site generators are available only in privately licensed electricity business areas (known in Indonesia as *Wilayah Usaha* or *Wilus*), with wider access legally unresolved. These considerations risk putting Indonesia at a disadvantage vis-à-vis its neighbors.

About this working paper

This study, conducted with the Asia Clean Energy Coalition (ACEC), identifies the industrial sector's preferences regarding such mechanisms in Indonesia. It also describes precedents for their implementation in a set of primarily middle-income countries whose power sectors resemble Indonesia's.

We used two methods to collect these data. First, we surveyed corporate members of ACEC, RE100, and the Clean Energy Investment Accelerator (CEIA), as well as a subset of their supply chain partners. We received 56 responses (a 12 percent response rate). We then conducted a rapid narrative review on green power procurement mechanisms within and outside of Indonesia. Finally, drawing on the survey findings, secondary data on demand size, and a review of international

experiences, we developed a series of considerations for enhancing green power procurement mechanisms in Indonesia. These considerations reflect the authors' analysis and should not be interpreted as representing the formal positions of all ACEC, RE100, and CEIA members.

While we could not measure our survey population's electricity consumption, RE100's 2024 Annual Disclosure Report places the annual consumption of its 133 members in Indonesia at 3 terawatt-hours (TWh) (RE100 and CDP 2025b). Since our population included an additional 333 companies, we hypothesize that green power demand among members of climate-ambitious corporate coalitions in Indonesia is substantially higher. Moreover, even our population is unlikely to capture all corporate green power demand in Indonesia, as evidenced by the more than 600 companies that had purchased RECs as of 2025 (Direktorat Retail dan Niaga 2025a).

Key findings

In this working paper, we summarize our findings on preferences regarding each mechanism and key findings from our review of international experiences. The former should be understood in the context of constrained corporate choice in Indonesia, where access to multiple green power procurement

Box 1 | Key terms

Energy attribute certificate (EAC): A "birth certificate" which attests that a specific amount of electricity generated from green sources. EACs (locally known as RECs) are purchased as tradable certificates listing the attributes of green electricity. Buyers claim these attributes by permanently removing EACs from circulation and may purchase EACs together with the actual electricity (i.e., "bundled") or without it (i.e., "unbundled").

Emission factor: The amount of greenhouse gases (GHGs), or specifically carbon dioxide (CO₂), released per unit of electricity generated or fuel consumed.

Residual emission factor: The emission factor of a particular jurisdiction after green electricity use claimed through EACs (bundled or unbundled) has been subtracted.

Double counting: A situation where two or more parties claim emissions reductions from the same green electricity. This can occur when ownership of green energy is not clearly tracked due to missing residual emission factors or a lack of sufficient information on an EAC.

mechanisms remains limited. Thus, respondents' perceptions may reflect limited exposure rather than a mature assessment, biasing responses towards mechanisms which are currently more recognized or accessible.

- **Unbundled EACs or RECs.** Unbundled EACs or RECs are currently the preferred option and perceived as the easiest to procure in Indonesia. International experience suggests that their effectiveness depends on strong systems for traceability and emissions accounting, such as frequent updates to the emission factor and residual emission factor, which help buyers accurately report emissions.
- **On-site generation.** On-site generation is the second most preferred option, though there are polarized views on how easy it is to deploy. International experience suggests that long-term adoption relies on early incentives followed by expanded business models and measures to ensure grid reliability.
- **Contracts with electric utilities.** Companies expressed polarized views on the difficulty of pursuing this mechanism. The option ranked third among preferred mechanisms, which may reflect limited awareness, since Perusahaan Listrik Negara (PLN), the national electric utility, had only recently launched its Green Energy as a Service: Dedicated Source (GEAS DS) as of the date of our survey. International experience suggests that strong uptake is correlated with buyer awareness of the cost structure and generation sources.
- **Contracts with off-site generators.** Companies perceived this option as the most difficult but also showed strong interest. International experience suggests this mechanism is often made available in gradual steps, in consultation with buyers, and in response to salient national issues such as energy security and industrial competitiveness. Availability is possible via exemptions to the single-buyer model (where the only customer for generators is the utility) or via comprehensive power sector reform.

Conclusions and considerations for Indonesian stakeholders

A comparison with other countries' green power purchasing mechanisms revealed options for the Indonesian government and PLN to consider as they respond to buyers' demand for green energy:

- **Lower barriers to on-site generation.** Raise caps for grid-connected rooftop PV while taking steps to mitigate oversupply and preserve system reliability, such as storage deployment, appropriate allocation of grid cost and curtailment risk, and close operational coordination between transmission and distribution. Further, provide revenue options for the utility and clarify that RECs from grid-connected rooftop PV can go to the generators.
 - **Mature the market for RECs.** Pursue a comprehensive policy for RECs to enhance their credibility, transparency, and eligibility for trading. Moreover, add newer power plants to PLN's REC program to enable compliance with voluntary action frameworks and regularly update both the grid and residual emission factors to prevent double counting. Lastly, given corporate interest in greater additionality, continue to enhance mechanisms beyond RECs.
 - **Enhance public communication of utility contracts.** Increase awareness of GEAS DS by further promoting it. Publish the list of power plants allocated to GEAS DS, as well as their cost structure and commissioning timelines, to help buyers make informed decisions.
 - **Pursue joint utilization schemes.** The Ministry of Energy and Mineral Resources (MEMR) may play a more active role in off-site generation pilots by further clarifying the procedures required for joint utilization of the grid and updating regulations to stipulate fair and transparent grid rental fees for off-site generation. Lessons from early implementation may point to possible adjustments to the joint utilization scheme as it moves toward wider adoption.
- Regarding *how* to pursue the above, Indonesian authorities may wish to consider the following:**
- **Broader institutional leadership for green power.** Indonesia competes with neighboring countries for foreign direct investment and supply chains. Green power purchasing mechanisms may be part of an industrial competitiveness and investment strategy which relies on ministries such as the Ministry of Industry and the Ministry of Investment in addition to MEMR, which already plays a central role.
 - **Buyer consultations.** Indonesian authorities may benefit from continuing to engage in dialogue with companies to ensure reforms respond to market needs. This can be done through transparent stakeholder consultation during rulemaking, structured socialization of new regulations, and continued outreach to buyers to support understanding and adoption.
 - **Supportive, clear, and predictable regulations.** Indonesian authorities may wish to provide clear and long-term regulatory visibility to buyers. This may include piloting changes among a few buyers, learning from experience, and then gradually expanding eligibility.
 - **Independent or more coordinated regulation.** Creating an independent regulator or strengthening coordination among MEMR, PLN, and other government agencies

may provide clarity about responsibilities, timely policy implementation, transparent decision-making, and responsiveness to buyer demand.

This paper focuses on the perspective of corporate buyers.

These initial considerations are not exhaustive and should not be treated as definitive recommendations. We encourage consultation with additional stakeholders and further analysis to validate our findings.

Introduction

In response to growing awareness of climate change, as of August 2026, more than 11,000 companies worldwide (representing over 40 percent of global market capitalization) have validated science-based targets to reduce emissions (SBTi n.d.; 2026). These targets are now translating into action, with 85 percent of the world's 2,000 largest companies already switching at least a part of their electricity consumption to renewable energy (Jamison et al. 2024).

A company's carbon emissions include direct emissions (Scope 1), emissions from purchased electricity (Scope 2), and emissions from its full supply and consumption chain (Scope 3) (Bhatia et al. 2011). To address Scope 3 emissions, some multinational companies are increasingly expecting their suppliers to report and decrease emissions. Suppliers, in turn, have an incentive to do so in order to remain competitive (Ceres 2022).

Parallel to these developments, Southeast Asia has emerged as a global manufacturing hub. To sustain this growth and remain attractive to multinational companies and their supply chains, Indonesia—the region's largest economy (ASEAN Secretariat 2024; Gaskin et al. 2026; Islam and Beloucif 2024; World Bank 2023a, 2025)—must address not only traditional competitiveness factors but also carbon emissions. Electricity, a critical input for industry, is a key part of this challenge, accounting for up to one-fifth of national emissions (Climate Watch n.d.; IEA 2022). Offering a diverse set of green power procurement options tailored to various corporate needs will therefore support industrial decarbonization while safeguarding Indonesia's economic competitiveness.

Within Indonesia's highly regulated power market, characterized by substantial vertical integration, four types of green power purchasing mechanisms—categorized in accordance with RE100's Technical Criteria (RE100 and CDP 2025a)—are available as of 2026:

- On-site generation
- Unbundled energy attribute certificates (EACs), locally known as renewable energy certificates (RECs)
- Utility contracts, locally known as Green Energy as a Service: Dedicated Source (GEAS DS)
- Direct contracts with off-site generators

However, on-site generation is limited to rooftop photovoltaic (PV) technology and subject to quotas. Meanwhile, utility contracts offer limited transparency regarding costs and generation sources and are currently underutilized, possibly due to companies' limited awareness, resulting from the novelty of GEAS DS. In parallel, Indonesia lacks a comprehensive regulatory framework to respond to the global push for higher standards of credibility for EACs. Direct contracts with off-site generators—where Independent Power Producers (IPPs) sell electricity directly to corporate buyers—are available only in privately licensed electricity business areas (known in Indonesia as *Wilayah Usaha* or *Wilus*), while wider access remains unresolved as the New & Renewable Energy Draft Bill (RUU EBET) is pending. Taken together, these considerations risk putting Indonesia at a disadvantage vis-à-vis its neighboring countries, many of whom have also made strides toward diversifying procurement options.

Box 2 | The role and limitations of unbundled EACs

Unbundled EACs can provide companies with a straightforward way to claim green electricity, particularly where other procurement options are limited. However, because they are not tied to contracts for new or physical electricity delivery, unbundled EACs often lack a strong connection to emissions reductions (Langer et al. 2024; Naik and S&P Global 2021). For buyers seeking more demonstrable links between procurement and new green energy development, additional options are needed. These considerations highlight the value of strengthening Indonesia's existing REC program while continuing to diversify the country's suite of green power procurement mechanisms.

To help Indonesian authorities improve the country's suite of green power procurement mechanisms, this paper identifies companies' preferences regarding said mechanisms. It also describes the implementation of the mechanisms within and outside of Indonesia and uses this information to offer a set of potential actions for consideration. We find that companies want a broad range of affordable and practical green power purchasing mechanisms, and that international precedents point to several options for achieving this vision. These include enshrining EACs into law, updating Indonesia's grid emissions intensity (grid emission factor), expanding subnational quotas for on-site generation, increasing utility product transparency, and updating and enforcing regulations to roll out contracts with off-site generators. Indonesian authorities can use these considerations as inspiration in their quest to enhance the country's attractiveness to investment.

Methodology

To gather information on companies' preferences for green power procurement, we administered a survey, described in more detail below. In parallel, we evaluated the state of Indonesian legislation on green power procurement by identifying the relevant sections of existing legislation and through a series of engagements with corporate electricity buyers between 2024 and 2025 (see Appendix A for information on these engagements). We also carried out a literature review of international experiences with green power procurement mechanisms and compared them with the Indonesian context.

Together, the survey and the literature review were designed to help us understand companies' perspectives on green power procurement mechanisms, identify the challenges facing the adoption of such mechanisms in Indonesia, and compile a list of measures that the Indonesian government can pursue to respond to corporate buyers' demand for green energy.

Survey

SURVEY TARGETS AND QUESTIONS

We administered a survey—available in English, Bahasa Indonesia, and Mandarin Chinese—to understand preferences on green power procurement mechanisms among corporate members of select climate-ambitious coalitions in Indonesia. We treated membership in any of three voluntary green power coalitions—Asia Clean Energy Coalition (ACEC), RE100, and the Clean Energy Investment Accelerator (CEIA)—as a proxy for climate ambition. We circulated the survey by email. It was administered via SurveyMonkey and contained 42 questions (see supplementary material).

In total, 466 companies were invited to complete the survey. These constitute the survey's population and represent the full population of interest. All such companies are either members of the aforementioned coalitions or supply chain partners of textile, apparel, and footwear brands who are part of such coalitions. All 466 companies have operations in Indonesia. Over half (244 companies; 52 percent) of the companies surveyed hailed from the textile, apparel, and footwear sector. Of these, most (228 companies) were upstream supply chain companies. The other half (222 companies) comprised 10 other sectors as categorized under the Global Industry Classification Standard (GICS). The survey remained available for four months, from December 2024 to March 2025.

The survey included qualitative questions about the level of adoption, drivers, preferences, and challenges relating to green power procurement and quantitative questions about the companies' electricity demand. Results from the quantitative part were not included in our analysis due to the small number of reliable responses. Instead, we relied on surveys previously conducted by RE100 among a subset of the survey population

to gauge demand. The survey also attempted to gauge buyers' willingness to pay for green power options via a Discrete Choice Experiment (DCE), which is not evaluated here due to a low response rate (6 percent).

SURVEY SAMPLE AND CORRECTION OF SELECTION BIAS

In administering the survey, we set out to understand the preferences of *all* climate-ambitious companies that are part of the survey population described above. Considering that the survey yielded 56 usable responses—equivalent to 12 percent of those contacted—a key concern was therefore to ensure that the responses received were representative of the full population of companies we sought to study. Specifically, we were concerned that overrepresentation of certain company profiles might overemphasize certain preferences and underemphasize others. To correct for this selection bias, we took a series of steps to re-weight survey results. These steps are described in Appendix B.

International experiences

SELECTION CRITERIA

Our goal was to focus on countries with some level of similarity to Indonesia, with the assumption that their experiences are consequently more relevant to the Indonesian context. We used a set of economic and market factors to inform our selection of countries:

- **Income level:** Examples are drawn primarily from middle-income countries. While challenges and considerations vary considerably within this bracket, we sought to assess the feasibility of reform even outside of the oft-cited examples of North America and Europe.
- **Single-buyer model:** Indonesia's power market follows a single-buyer model where privatized generation is sold to a single buyer, which then handles transmission and distribution to consumers. To account for this fundamental characteristic of Indonesia's power market, we included countries featuring similar market structures—either currently or in the past 50 years. We purposefully chose a long window of time to include examples highlighting the long-term results of power market reform, which often unfolds over multiple decades.
- **Similar power mix:** Since each energy source entails unique considerations, we sought to include a few examples from countries that, like Indonesia, have high levels of electricity generation from coal, natural gas, or both.

Many countries featured in this section do not fit all three criteria. Rather, the authors intended to include at least one example for each of the criteria identified.

Other potentially relevant criteria not considered in this study include countries' levels of climate ambition (as measured by climate targets and their deadlines) and institutional factors such as systems of government and rule of law. We excluded climate ambition to also highlight examples from countries that pursued power market reform due to economic and security motivations, sometimes prior to the creation of any national climate targets. Meanwhile, institutional factors were excluded because we sought to underscore that green power procurement mechanisms can be rolled out under various types of government. That said, we do believe these are pertinent considerations that merit inclusion in future attempts to localize our analysis to Indonesia.

Analysis

International examples of green power procurement mechanisms were drawn from Brazil, Chile, China, India, Malaysia, Thailand, and Vietnam. For each, between one and two green power procurement options (Table 1) were chosen for the analysis based on whether they were the country's most recently announced green power procurement mechanism or its most used mechanism.

For each mechanism described in further detail, the authors conducted a rapid narrative review that examined relevant regulations, peer-reviewed literature, and grey literature in English, Portuguese, Spanish, and Malay. Source materials generally came from within the decade preceding this publication. For each mechanism, authors compiled data on local power market structure, mechanism design, cost structure, eligibility criteria, and a time series of enabling regulations and green energy generation.

We organized descriptions of international experiences by mechanism and sought to identify cross-country patterns and correlations between mechanism rollout and level of adoption. We then used these patterns and apparent correlations to present hypotheses about measures that Indonesian stakeholders could consider when responding to corporate demand for green energy. Further research is needed to confirm the validity of such hypotheses, but we hope they are a valuable starting point.

To evaluate the status of procurement options in Indonesia and identify options for improvement, we relied on years of experience helping develop green power procurement mechanisms for corporate energy buyers in the country. Since 2019, we have led dozens of workshops and dialogues with corporate buyers, as well as the national utility, Perusahaan Listrik

Table 1 | **List of green power purchasing mechanisms described in this paper, by country**

	BRAZIL	CHILE	CHINA	INDIA	MALAYSIA	THAILAND	VIETNAM
Own on-site generation							
Direct contracts with on-site generators							
Direct contracts with off-site generators							
Contracts with electric utilities							
Unbundled energy attribute certificates (EACs)							

Note: This table should not be interpreted as a list of all green power purchase mechanisms available in each country. Instead, green cells highlight only the mechanisms described in this paper. Table 2 provides an overview of all mechanisms available in each country.

Source: WRI and ACEC authors.

Negara (PLN), and relevant ministries. A non-exhaustive list of such engagements is available in Appendix A. Through these, we could understand the design and respective challenges of each mechanism in Indonesia. To substantiate this analysis and verify the information disclosed in these engagements, we also conducted a rapid narrative review of relevant power sector regulations and grey literature in Bahasa Indonesia. Takeaways from this hybrid approach are listed in the sections covering the Indonesian context.

Survey results and discussion

In this section, we analyze the results of our survey with regard to the status and challenges of green power purchasing among corporate buyers in Indonesia, as well as their preferences for such power. The types of procurement mechanisms referenced have been adjusted from RE100's Technical Criteria (RE100 and CDP 2025a) to employ a narrower definition of "contracts with electricity suppliers" that focuses specifically on utility contracts. For a general introduction to each category, see Appendix C.

Size of demand

Because of the small number of reliable responses to the quantitative questions in our survey, we could not measure the survey population's electricity consumption. That said, RE100's 2024 *Annual Disclosure Report* places the electricity consumption of RE100 members in Indonesia at 3 terawatt-hours (TWh) (RE100 and CDP 2025b). Since RE100's 133 members in Indonesia represent 29 percent of our survey's population, we hypothesize that green power demand among the remaining 71 percent makes for a substantially higher total across the three coalitions surveyed. Moreover, our population is unlikely to capture full corporate green power demand in Indonesia, as evidenced by the more than 600 companies who had purchased RECs as of 2025 (Direktorat Retail dan Niaga 2025a). It is also possible that there is further green power demand among the more than 30,000 medium and large industrial manufacturing enterprises in Indonesia (BPS-Statistics Indonesia 2023) that are not currently REC buyers or members of the three climate-ambitious corporate coalitions surveyed for this paper.

Actual and preferred green power procurement mechanisms

ACTUAL CONSUMPTION

As of 2023, unbundled EACs—locally known as RECs—and on-site generation were the predominant mechanisms for green power procurement in Indonesia (Figure 1),

accounting for 36 percent and 30 percent of responses, respectively. This finding is aligned with RE100's 2024 *Annual Disclosure Report*, which found unbundled EACs to be the most common green power procurement mechanism among RE100 members (RE100 and CDP 2025b). Respondents described EACs as straightforward because they do not require land use or upfront investment by the buyer. Similarly, the widespread adoption of on-site generation may reflect its relatively low complexity compared to other types of procurement (see Appendix C). Less frequent choices included contracts with the utility (10 percent) and direct contracts with off-site generators (9 percent). The prominence of EACs and on-site generation should be understood in the context of constrained corporate choice in Indonesia, where mechanisms such as contracts with off-site generators and the utility are either less accessible or very novel.

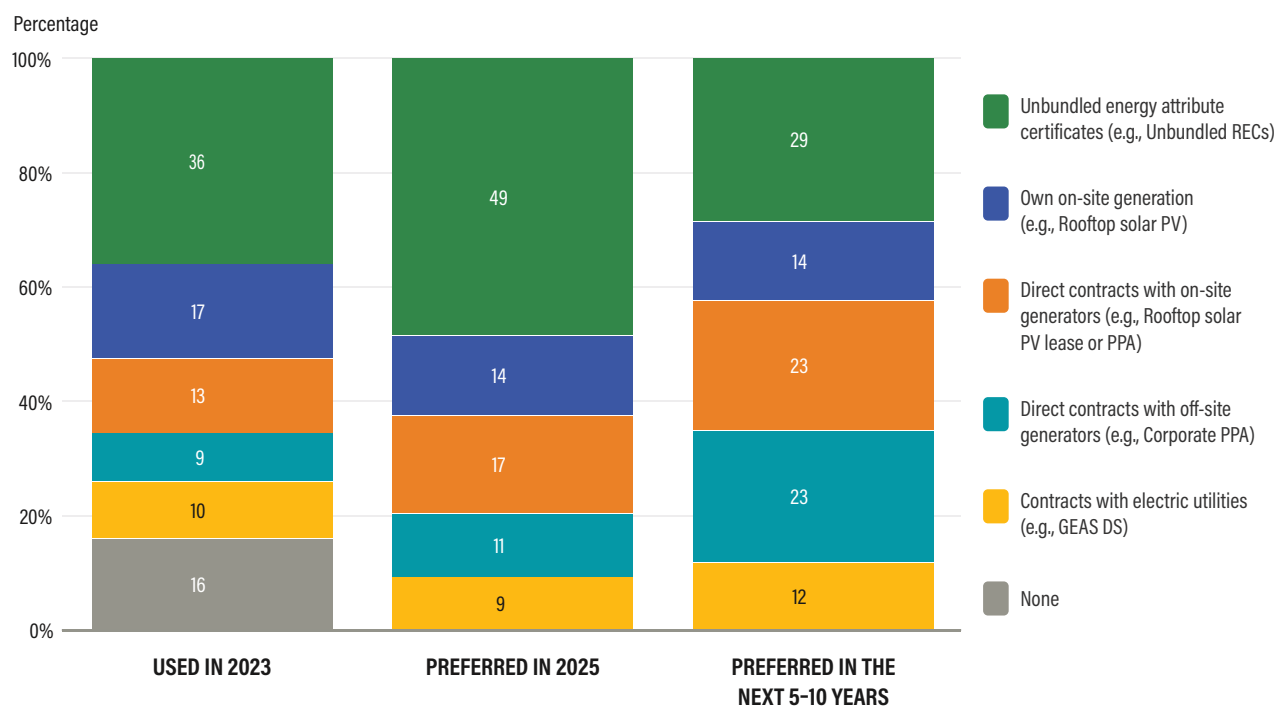
Lastly, 16 percent of coalition members and their supply chain partners did not consume any green power. Supply chain partners accounted for most of these responses, which may suggest they are less sensitive to the voluntary drivers of green power adoption identified above.

PREFERENCES

Looking at preferences today, unbundled EACs take the lead, being chosen by almost half (49 percent) of coalition members and their supply chain partners. On-site options (comprising own on-site generators and direct contracts with on-site generators) rank second. These results mirror actual procurement, where unbundled EACs and on-site generation also dominate. This finding should similarly be understood in the context of constrained corporate choice in Indonesia. Respondents' perceptions may reflect limited exposure rather than a mature assessment of mechanisms, biasing responses towards mechanisms which are currently more accessible.

Looking ahead to the next 5–10 years, on-site generation (37 percent) and EACs (29 percent) remain the top preferences, but interest in direct contracts with off-site generators rises to 23 percent. The growing interest in such contracts suggests a desire among buyers for large-scale options that offer greater additionality than EACs, in light of looming decarbonization targets. Utility contracts remain the least preferred option. Future preferences may remain biased towards on-site generation and EACs due to buyers' greater familiarity with these mechanisms compared to contracts with the utility (which were relatively novel at the time of the survey) and off-site generators (which remain largely restricted).

Figure 1 | **Share of green power procurement mechanisms used by respondents in 2023 (n = 56), alongside their preferred mechanisms in 2025 and the next 5-10 years**



Source: WRI and ACEC authors.

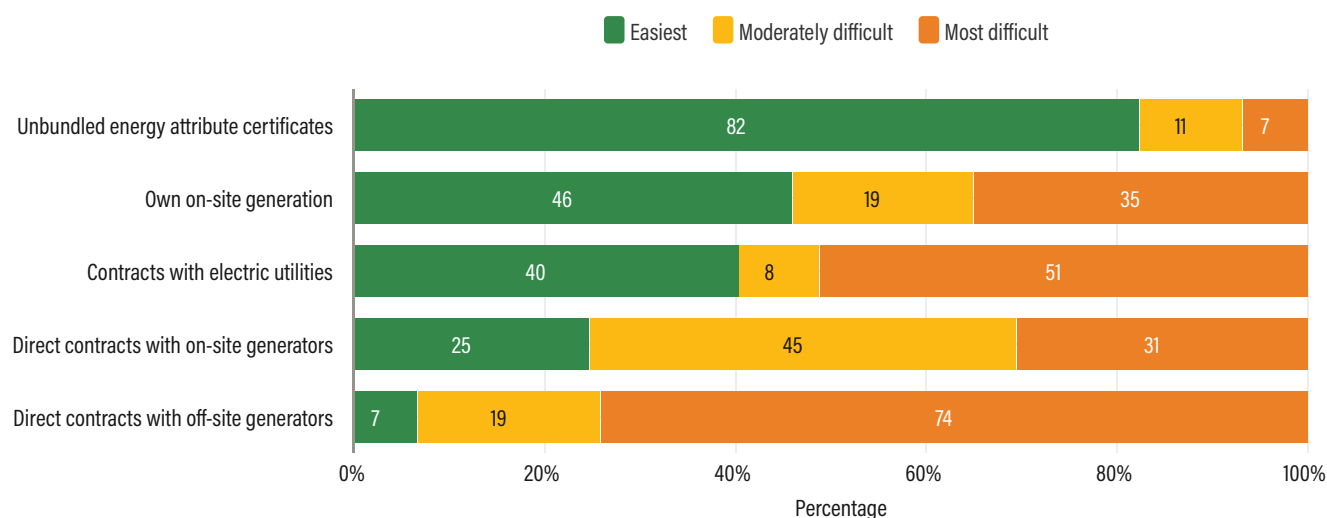
Difficulty of adopting green power procurement mechanisms

Across the board, unbundled EACs were regarded as the easiest mechanism to pursue (Figure 2). Commonly cited reasons for this include affordability, availability, flexibility, and international recognition. This result is aligned with our earlier finding that unbundled EACs are currently the most prevalent and preferred mechanism. Direct contracts with off-site generators were deemed by far the most difficult to implement. Reasons cited include high costs, lack of enabling regulations, contract and permit complexity, and the challenge of transferring electricity from generators to buyers via the utility's transmission infrastructure.

As for on-site options, direct contracts with on-site generators were rated as moderately difficult. However, perceptions of owning on-site generators were strongly polarized. Few respondents (19 percent) rated this mechanism as moderately difficult. Instead, 46 percent of respondents ranked it among the easiest options, and 35 percent ranked it as among the most difficult. This bimodal split, in place of a central tendency, points to two distinct buyer groups. Those citing the greatest difficulty (largely from the textile, apparel, and footwear sector) pointed to high upfront costs and long payback periods. It is also possible that the sector's aging

building stock (Medina 2020; Purnomo 2014; Tempo 2019) poses challenges due to roofs that have become fragile or were otherwise not designed to bear the weight of solar panels. Meanwhile, companies that ranked this option as easiest cited regulatory clarity and ease of obtaining permits. We hypothesize that this divergence may relate to company size; while bigger companies have large revenues and profit margins to afford an on-site project, the same may not be true for smaller companies. Since we did not collect data on company size or find secondary sources on the size of companies that are not publicly traded, further research is needed to confirm this hypothesis.

Similarly, respondents expressed widely divergent views on utility contracts, available through PLN's GEAS DS. Only 9 percent of respondents rated this mechanism as moderately difficult. Meanwhile, 51 percent perceived GEAS DS as among the most difficult mechanisms—citing geographic availability and concerns about data accuracy and transparency—and 40 percent perceived it as among the easiest, citing no need to invest in green power systems, the ease of procuring with PLN, a stable supply, and local green power availability. Other possible reasons could include its higher price compared to unbundled EACs and a lack of understanding of the mechanism. Launched in 2024, GEAS DS may be simply too novel, meaning uptake is yet to come.

Figure 2 | **Buyers' perceived difficulty of adopting green power procurement mechanisms (n = 56)**

Notes: Respondents were asked to "rank the green power procurement options for corporate procurement in Indonesia today—from those having the weakest barriers (easiest to implement) at the top to those with the strongest barriers (most difficult to implement) at the bottom." "Easiest" comprises ranks one and two, "moderately difficult" corresponds to rank three, and "most difficult" includes ranks four and five.

Source: WRI and ACEC authors.

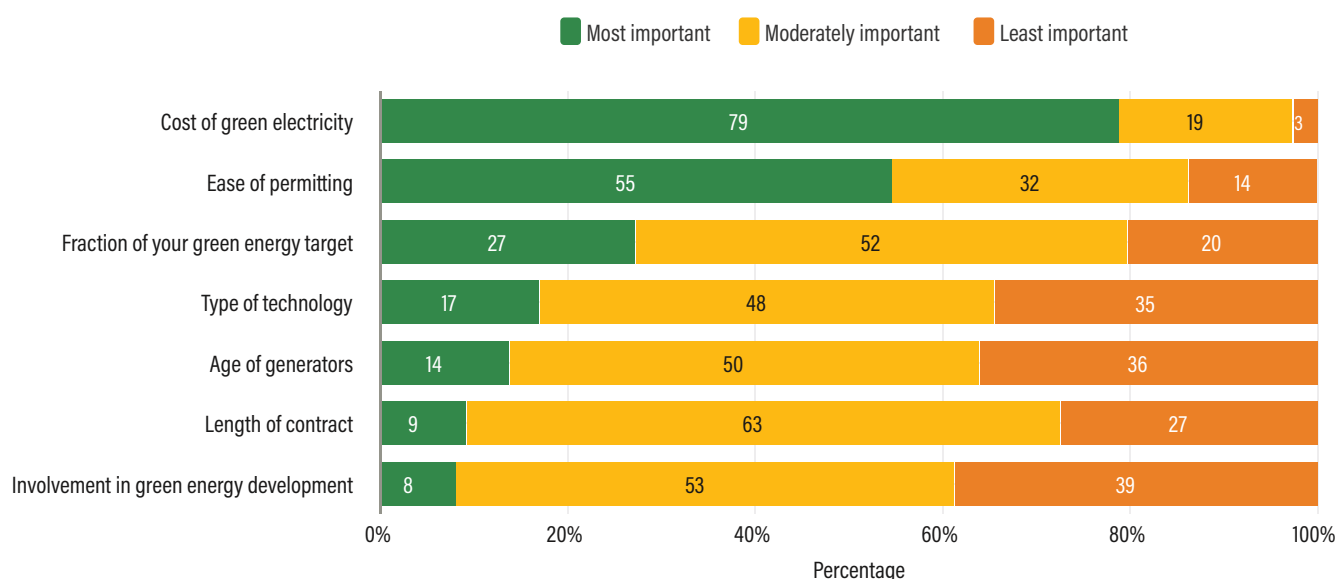
Factors influencing green power procurement choices

Electricity costs (79 percent) and the ease of obtaining permits (55 percent) are the top factors considered by respondents when selecting green power options. This suggests that green power procurement mechanisms that are at once affordable and straightforward with regard to local compliance are by far the most likely to gain traction among companies. The third consideration is procurement size, suggesting companies prefer options that make a large contribution to their green electricity targets. Twenty-seven percent of companies rate

this as the most important consideration and around half of them (52 percent) find it at least moderately important.

Other factors, such as type of technology, age of generators, level of buyer involvement in green power development, and length of contracts, are overall perceived as moderately important. Among these, length of contract was most often seen as moderately important (63 percent). The other options were regarded as least important by at least one third of survey respondents.

Figure 3 | **Most important, moderately important, and least important considerations when choosing between green power procurement mechanisms (n = 56)**



Notes: Respondents were asked to "rank the aspects that your company deems most important when choosing among green power procurement options." The category "most important" comprises ranks one and two, "moderately important" corresponds to ranks three, four, and five, and "least important" includes ranks six and seven.

Source: WRI and ACEC authors.

Key takeaways

- **Unbundled EACs or RECs:** This is currently the most widely used and preferred mechanism. Companies generally perceive it as the easiest option to procure.
- **On-site generation:** This is the second most common and preferred mechanism. However, respondents had polarized views on its procurement difficulty.
- **Contracts with the utility and off-site generators:** Neither mechanism is widely used. Companies report drastically different levels of difficulty pursuing utility contracts (locally known as GEAS DS), possibly due to their very recent introduction to the market. Meanwhile, companies consistently rank contracts with off-site generators as the most difficult option.

Our findings should be understood in the context of constrained corporate choice in Indonesia, where multiple mechanisms remain limited or inaccessible. Thus, respondents' perceptions may reflect limited market exposure rather than a mature assessment of each mechanism, biasing responses towards mechanisms that are currently more accessible. Either way, companies clearly seek procurement options that are

affordable and easy to implement. Companies also show an interest in a diverse menu of mechanisms where options with greater additionality, such as on-site generation and contracts with off-site generators, feature prominently.

Indonesian and international experiences with green power procurement mechanisms

To provide options for the enhancement of power procurement mechanisms in Indonesia, we compared them to mechanisms in Brazil, Chile, China, India, Malaysia, Thailand, and Vietnam. Table 2 summarizes the availability of each procurement mechanism within the private sector in these countries compared to Indonesia. The types of mechanisms below have been adjusted from RE100's Technical Criteria (RE100 and CDP 2025a) to employ a narrower definition of "contracts with electricity suppliers" that focuses specifically on utility contracts. For a general introduction to each category, see Appendix C.

Table 2 | Comparison of green power purchasing mechanisms' availability in Indonesia and selected countries

GREEN POWER PURCHASING MECHANISM	INDONESIA	VIETNAM	THAILAND	MALAYSIA	INDIA	CHINA	CHILE	BRAZIL	LEVEL OF CONSUMER EFFORT ^a
Own on-site generation	Partial	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Highest
Direct contracts with on-site generators	Partial	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High
Direct contracts with off-site generators	Partial	Yes	Partial	Yes	Yes	Yes	Yes	Yes	High
Contracts with electric utilities	Yes	No	Yes	Yes	Yes	Yes	No	No	Medium
Unbundled energy attribute certificates (EACs)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Low

Note: a. Defined as the level of involvement of corporate buyers in the development of renewable power (Bird et al. 2021).

Sources: ANEEL 2022; Bird et al. 2021; BloombergNEF 2025b; CEBI and Allotrope Partners 2024; Chikkatur 2024; EnergyTag and The Lantau Group 2026; Gao et al. 2025; Griebenow and Ohara 2019; IEA 2018; InvestChile 2026; Kannasoot 2024; Krishnan et al. 2020; RE100 and CDP 2025a; Watanagase 2024; Yuan et al. 2019.

To classify the availability of each mechanism across countries in Table 2, we used the following criteria:

- **Yes:** The mechanism is prescribed in regulation or legislation. It is not subject to quotas, though there may be eligibility thresholds such as minimum voltage or demand size. There are recent instances of the mechanism's use. In the case of utility contracts, availability through utility subsidiaries is acceptable. In the case of EACs, lack of a locally prescribed mechanism is acceptable if consumers have access to international options such as International Renewable Energy Certificates (I-RECs) and Tradable Instruments for Global Renewables (TIGRs).
- **Partial:** The mechanism is prescribed in regulation or legislation but is limited to certain sectors, subject to quotas that fall short of demand, or not adopted beyond isolated cases due to mechanism design, lack of regulatory clarity, or lack of regulatory enforcement.
- **No:** The mechanism is not prescribed in regulation or legislation, or there has been no uptake due to an absence of local and (if applicable) international market offerings.

Our classifications were made by consulting written sources and subsequently confirmed via expert consultation with reviewers knowledgeable of mechanisms in the countries above.

On-site generation¹

THE INDONESIAN APPROACH TO ON-SITE GENERATION

On-site generation is one of the most accessible mechanisms in Indonesia. However, business uncertainty lingers due to various regulatory changes between 2018 and 2024 (Table 3). During this time, the mechanism shifted away from net billing (where excess electricity is sold to the grid below retail price) and net metering (where excess electricity is sold at retail price) towards self-consumption (where excess generation cannot be sold). This has reduced the financial return for corporate energy buyers seeking to generate solar electricity on site (also called "on-site generators").

In parallel, a maximum-allowed-capacity model was replaced with a cluster quota system where caps on on-site generation are assigned to specific industrial "clusters." Under this new system, on-site generators seeking grid-connected rooftop solar PV installations must secure licenses on a first-come, first-served basis (MEMR Reg. 2/2024). Once the quota is reached, the remainder are waitlisted. In dense industrial areas with high demand, waiting lists can be substantial, as evidenced by the 375 megawatts (MW) waitlisted in January 2026, 72 MW of which originated in the Jamali system alone (Direktorat Retail dan Niaga 2025b). These quotas are set conservatively to accommodate an oversupplied grid and protect reliability by reducing generation intermittency (Cabinet Secretariat of the Republic of Indonesia 2024). Increasing quotas to meet demand will require a solution to these considerations.

Meanwhile, under MEMR Regulation No. 2/2024, unless otherwise provided by regulation, EACs associated with rooftop PV systems connected to an IUPTLU (Electricity Supply Business License Holder for Public Interest) are allocated to the Government of Indonesia rather than the generator. This creates uncertainty regarding the ownership of environmental attributes and the associated environmental claims for electricity generated by these rooftop PV systems.

Another challenge is that certain on-site technologies (namely floating and ground-mounted solar PV) are excluded from rules that benefit rooftop PV. MEMR Regulation No.

11/2021 stipulates that buyers must be charged for their ability to access the grid through capacity and emergency charges. Under MEMR Regulation No. 2/2024, grid-connected rooftop PV is exempt from these charges. As this exemption does not apply to floating or ground-mounted solar PV, buyers who wish to optimize their vacant land or a body of water face higher costs. While these technologies could theoretically be deployed at a large scale, the self-consumption model currently in place incentivizes buyers to size on-site projects only for on-site consumption, thus avoiding grid issues and competition with electricity supply from the utility.

Table 3 | **Timeline of on-site generation regulations in Indonesia**

	2018	2019	2021	2024
Prevailing ministerial regulation	MEMR Reg. 49/2018	MEMR Reg. 13/2019, as amended by Reg. 16/2019	MEMR Reg. 26/2021	MEMR Reg. 2/2024
Coverage	PLN customers only	PLN customers only	Integrated IUPTLU (Electricity Supply Business License Holder for Public Interest) customers	Integrated IUPTLU customers
Offtake mechanism	Net billing (65% of tariff)	Net billing (65% of tariff)	Net metering (100% of tariff)	Self-consumption
Permit	<i>Izin operasi</i> (IO; operational license)	IO	IUPTLS (Captive Power Supply Business License)	IUPTLS
Emergency and capacity charge	Emergency charge = applicable Capacity charge = 40 hours	Emergency charge = N/A Capacity charge = 5 hours	Emergency charge = N/A Capacity charge = 5 hours	Emergency charge = N/A Capacity charge = N/A
Maximum capacity (as a percentage of subscription capacity)	100%	100%	15% (most common approved rate)	No maximum capacity, but a quota exists
Ownership of energy attribute certificates (EACs)	N/A	N/A	N/A	Without further regulation, EACs are owned by the Government of Indonesia

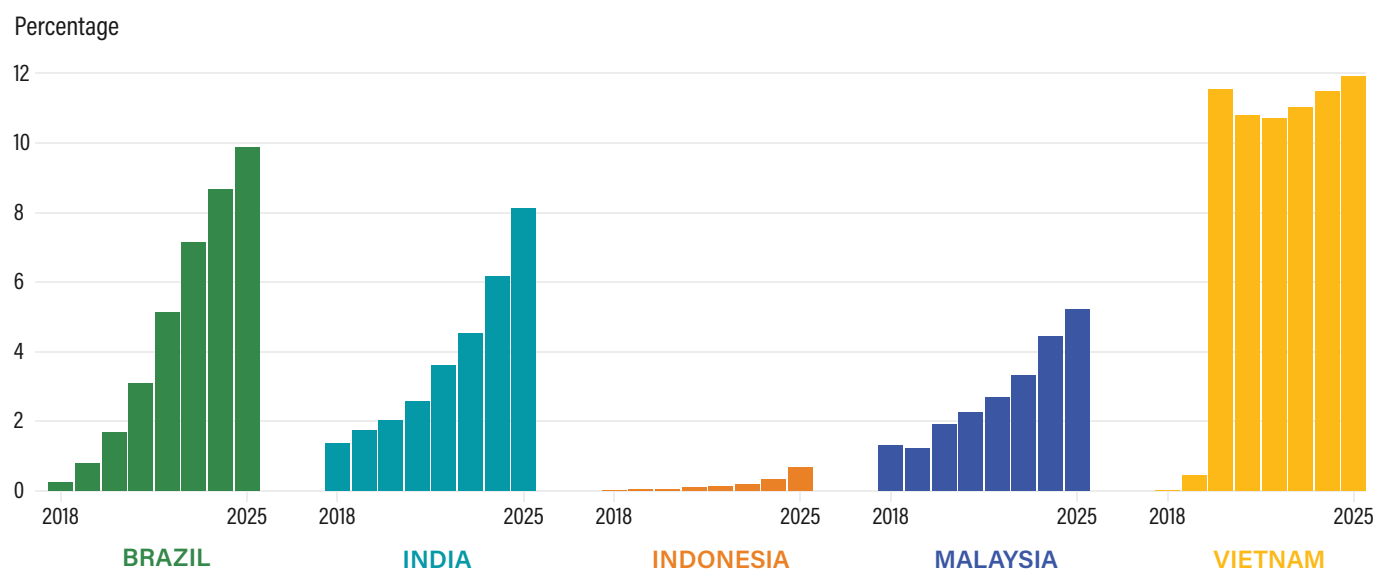
Note: MEMR refers to Indonesia's Ministry of Energy and Mineral Resources.

Sources: Direktorat Retail dan Niaga 2025a; IRENA 2019; MEMR Regulations No. 49/2018, 13/2019, 16/2019, 26/2021, and 2/2024; Simoglou et al. 2025.

Despite the limitations above, national deployment of grid-connected rooftop solar PV rose from 2 megawatts-peak (MWp) in 2018 to 773 MWp in 2025 (Direktorat Retail dan Niaga 2025b), signaling an appetite for this mechanism. Even so, commercial PV installations (i.e., excluding residential and utility installations) remain far below those of other countries

whose on-site generation mechanisms are described in this paper (see Figure 4). The generally more restrictive direction of recent regulatory changes (e.g., caps on on-site generation, buyers' inability to claim on-site EACs, and removal of compensation for excess generation) is a possible reason behind this performance lag.

Figure 4 | Commercial PV as a share of total installed electric capacity in selected countries



Source: BloombergNEF 2026.

WHAT OTHER COUNTRIES HAVE DONE TO SUPPORT ON-SITE GENERATION

In Vietnam, a generous feed-in tariff (FIT)—or compensation to the generator for electricity generated on-site and then fed into the grid—was offered in 2017 and 2019 (Nguyen 2020). This FIT led to a rapid increase in rooftop solar capacity from nearly zero in 2018 to almost 10,000 MW in 2020 (VPEG 2019, 2020). The legalization of direct contracts with onsite generators further accelerated deployment. However, limited grid and storage investments led to curtailments (i.e., reduced output), prompting authorities to shift away from FITs toward a self-consumption model (Le 2022; Le et al. 2022; Vinh 2025; World Bank 2020). Surplus exports are now capped at 20 percent of monthly generation and compensated at regulated market prices (Vinh 2025), reflecting a reorientation toward controlled rooftop solar growth aligned with grid conditions and system stability.

Meanwhile, Malaysia has witnessed steady on-site generation growth supported by early financing and tax incentives; namely, the Green Technology Financing Scheme and Green Investment Tax Allowance for solar projects, and Green Investment Tax Exemption for solar-related services (MGTC 2020). As deployment increased (MGTC 2023), authorities raised the commercial and industrial sector's quota from under 500 MW to 1,700 MW. Since 2021, Malaysia has expanded compensation and business models, including via Net Energy Metering (NEM) 3.0 until 2025 (SEDA n.d.) and later Solar ATAP (Accelerated Transition Action Programme), which removed the national quota and raised the installation

cap from 75 to 100 percent of maximum demand. Virtual aggregation (Suruhanjaya Tenaga 2026b) and rooftop leasing (Suruhanjaya Tenaga 2025) have also been introduced.

In India, the government set and later expanded targets for on-site generation, supported by credit lines and credit enhancement programs for rooftop solar PV developers (Gulia and Garg 2020; Gulia et al. 2023). Crucially, to mitigate concerns from distribution companies, authorities introduced compensation mechanisms (IEA 2021) and aggregated rooftop PV models (Asian Development Bank 2022; Kajol et al. 2020) to incentivize participation. The Ministry of New and Renewable Energy also diversified available models and launched PM Surya Ghar Muft Bijli Yojana, a national platform that helps buyers, developers, and financiers meet (Patil et al. 2025). While this platform focuses on the residential sector, it may offer a blueprint for the industrial sector in other countries.

In Brazil, on-site generation is often discussed under the broader term “distributed generation,” which encompasses additional arrangements for small-scale solar, such as remote self-consumption and shared generation. Brazilian commercial PV capacity grew 70-fold between 2018 and 2025 (BloombergNEF 2026). This was driven by a combination of fiscal incentives (such as the Circulation of Goods and Services tax exemption), net-metering models, public finance, and exemptions from distribution network usage charges. However, this rapid expansion contributed to oversupply during periods of

high distributed generation (Peroni 2026). Since distributed generation is not centrally dispatched, the system operator has historically managed surplus by curtailing utility-scale power plants. To manage this curtailment risk, Brazil recently adopted an emergency framework under which the operator coordinates with distribution companies to reduce generation connected to distribution networks during critical surplus conditions. In parallel, authorities introduced gradual payments of distribution network components for new distributed generation to ensure proper grid cost allocation and better align deployment with grid capacity. By offering an adjustment period and keeping certain tax exemptions, authorities were able to support continued growth (Agência Câmara Notícias 2022).

Based on the challenges faced in Indonesia and the trajectories of the countries above, there are opportunities that the Indonesian authorities and PLN could explore further to encourage on-site generation. These include:

- **Better aligning on-site generation quotas with corporate buyers' demand:** The quota system was designed to ensure grid stability, but it does not always align with demand in industry-dense areas. Expanded access to variable on-site generation could be paired with steps to mitigate oversupply and ensure grid reliability, such as storage deployment, appropriate grid cost and curtailment risk allocation, and close operational coordination between transmission and distribution.
- **Ensuring the utility has a pathway for participation:** In India, distribution companies are incentivized to participate in on-site generation via compensation mechanisms and aggregated rooftop PV models. A similar arrangement may be possible in Indonesia.
- **Ensuring clarity over ownership of EACs from grid-connected rooftop PV:** Grid-connected rooftop PV can help corporate buyers reduce emissions, but only if they can credibly claim the EACs associated with the green electricity generated. The treatment of EAC ownership and claims relating to rooftop PV is not yet specifically governed. Thus, in the absence of further regulation, the economic value of reducing emissions defaults to the government. Greater regulatory clarity is needed so companies can use EACs from rooftop PV to credibly support emissions-reduction claims.
- **Exempting further technologies from capacity and emergency charges:** On-site technologies such as ground-mounted and floating solar could benefit from the same exemption from capacity and emergency charges that has been applied to rooftop PV until they reach market maturity.

As this paper focuses primarily on buyers' perspectives, further analysis is needed to confirm these approaches are feasible in Indonesia and to identify the optimal ways of adopting them.

Unbundled energy attribute certificates (EACs)²

THE INDONESIAN APPROACH TO UNBUNDLED EACS

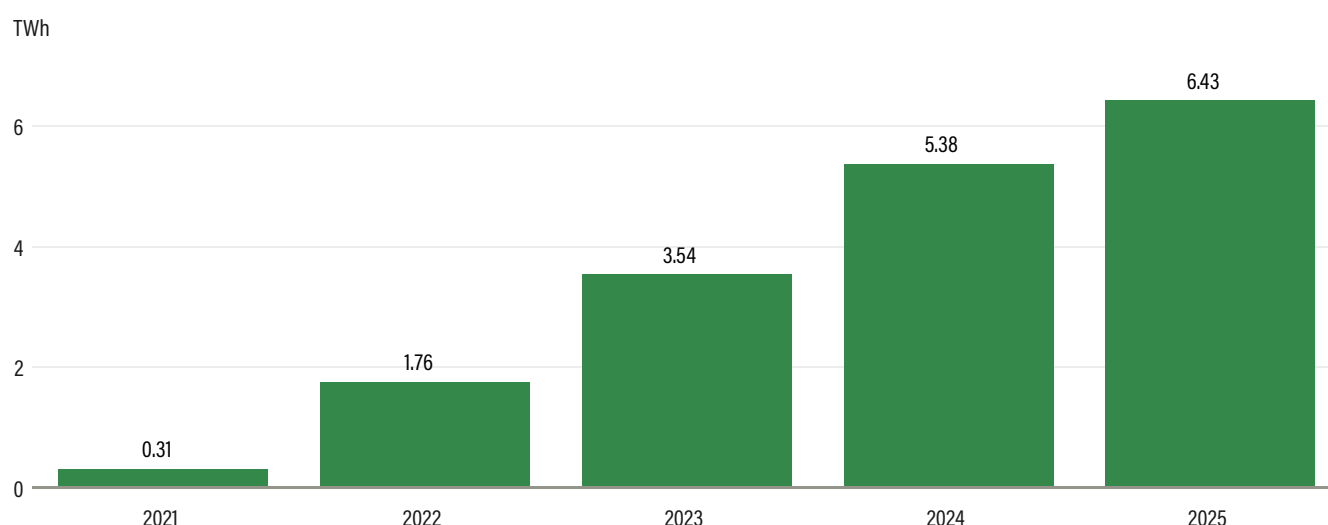
Since its launch in 2020, the unbundled EAC/REC program of the national utility, PLN, has been widely adopted (Figure 5). By the end of 2025, PLN had sold over 17 TWh of RECs (Kavitha 2026). Over 600 companies have participated in the program (Direktorat Retail dan Niaga 2025a).

PLN offers RECs from 10 green power plants, including 4 geothermal plants, 5 large hydropower plants, and 1 small hydropower plant. As of September 2025, the average age of these plants was 25 years (Direktorat Retail dan Niaga 2025a). This can be a challenge for buyers seeking to comply with voluntary action frameworks that prioritize new deployment (e.g., RE100's 15-year age limit) to advance emissions reductions (RE100 2022). Because cross-border REC trades rely on compliance with such voluntary frameworks, the age of participating green power plants could limit integration with neighboring countries' EAC markets (Merdekawati et al. 2024).

Meanwhile, the low number of buyers and sellers hinders efficient price discovery and market transparency. There is also confusion regarding purchasing platforms. In 2025, the Indonesia Commodity and Derivatives Exchange (ICDX) introduced a centralized REC exchange supervised by the Commodity Futures Trading Regulatory Agency (Bappebti) under the Ministry of Trade (Isaac and Razak 2025). However, Bappebti's approval has yet to be shared by other pertinent regulators; namely, the Financial Services Authority (*Otoritas Jasa Keuangan*; OJK) and MEMR. Although ICDX's platform could help expand the market, its usefulness and credibility remain limited without regulatory assurance from all relevant authorities that companies are allowed to trade RECs among themselves.

A more fundamental issue relates to the risk of double counting. The government and PLN have not updated the national emission factor (i.e., the rate of emissions per unit of electricity generated in the country) since 2021. Not only that, but they have also never issued a residual emission factor (i.e., the rate of emissions per unit of electricity not associated with EACs). Per RE100's Technical Criteria and further guidance on credible claims (Braslawsky et al. 2016; RE100 and CDP 2025a), this data is foundational to certainty of unique ownership. In its absence, emissions reductions associated with EACs risk being double counted or claimed by buyers who do not participate in the REC program.

Figure 5 | Annual PLN REC sales between 2021 and 2025



Notes: Excludes sales of RECs legally owned by developers. TWh = terawatt-hour.

Sources: Antara News 2025; Kavitha 2026.

WHAT OTHER COUNTRIES HAVE DONE TO SUPPORT UNBUNDLED EACS

China has developed a robust national EAC system—Green Electricity Certificates, or GECs—and embedded it in energy transition policies (National Development and Reform Commission 2023). The system stands out for its regular disclosure of residual grid emissions (BloombergNEF 2024a). By doing so, authorities prevent the double counting of green power between those who purchase GECs and regular grid users. Frequent updates also help buyers with timely reporting for voluntary and compliance purposes (BloombergNEF 2024b). Notably, GECs are traded with independent supervision, ensuring price transparency. Furthermore, official rules and guidelines now clarify the certificates' lifecycle management and how GECs coexist with the voluntary emission reduction market without potential for double counting. They also clarify rules for the allocation of GECs across regions, including that the volume of GECs claimed by consumers or within cities and provinces cannot exceed their respective grid offtake amount (National Development and Reform Commission 2026; National Energy Administration 2025; National Energy Administration and Ministry of Ecology and Environment 2024).

Based on the challenges identified in Indonesia and the example of China's management of EACs, there are some opportunities to enhance RECs in Indonesia. These include:

- **Adding newer green power plants to the REC program:** Voluntary action frameworks may require RECs purchased from recently installed power plants (e.g., RE100's 15-year age limit). Adding compliant plants to the program would help buyers to make credible emissions reduction claims and contribute to Indonesia's regional EAC market integration.
- **Developing a comprehensive REC policy:** PLN has established unbundled RECs as a corporate green electricity product supported by an internationally recognized tracking system. Indonesian regulators could further strengthen the REC ecosystem by establishing environmental integrity standards, increasing transparency, and clarifying the conditions under which RECs can be issued, transferred, and claimed.
- **Issuing a residual emission factor and updating the grid emission factor more frequently:** China has embedded the regular disclosure of residual grid emissions into its EAC system, enhancing transparency and helping prevent double counting through frequent updates.

Contracts with electric utilities

THE INDONESIAN APPROACH TO UTILITY CONTRACTS

In 2024, seeking to offer a product with greater additionality than unbundled EACs, PLN launched a new mechanism named Green Energy as a Service: Dedicated Source (GEAS DS). This mechanism bundles EACs with electricity supply by offering buyers a long-term utility contract for new and specified green power plants. Two GEAS DS packages are available. The first consists of plants already under development. The second features plants that are not yet under development (i.e., at the pre-procurement stage).

Since its launch, uptake of GEAS DS has been limited. Reasons may include its higher price compared to unbundled EACs or a limited understanding of the mechanism due to its novelty. Another factor may be that a list of dedicated power plants and other relevant information (such as GEAS DS product design and the power plants' commissioning dates) is not readily available to prospective buyers. While PLN has previously presented the list of dedicated power plants at events for buyers, this information is not widely available to consumers via the utility's website.

The cost structure for plants that are not yet under development (the second package) can be described as the PPA tariff (or a pre-determined ceiling price if the PPA tariff exceeds it) minus the avoided fuel cost. In other words:

$$\text{GEAS DS Charge} = \min(\text{PPA Tariff},^3 \text{Ceiling Price}^4) - \text{fuel avoided cost}^5$$

If the buyer chooses to subscribe to plants that are already under development (the first package), a lower price is awarded. In both packages, there is a registration fee of US\$923,⁶ and the cost structure only becomes effective once the plant is operational.

The launch of GEAS DS signaled PLN's openness to meet the demand from buyers for more green power options. H&M, the Swedish multinational clothing company, was among the first subscribers, securing 30 MW of solar PV in June 2024 (Rakhmi 2024).

WHAT OTHER COUNTRIES HAVE DONE TO SUPPORT CONTRACTS WITH ELECTRIC UTILITIES

Within the Association of Southeast Asian Nations (ASEAN), Thailand is the latest country to offer utility contracts (BloombergNEF 2025a). Thailand's Energy Regulatory Commission (ERC) published notification B.E. 2566 in 2023 (Osborne et al. 2025), outlining two types of Utility Green Tariffs (UGTs): UGT 1 from seven existing hydropower plants; and UGT 2 from 175 new wind, solar, and solar-plus-

battery plants (EGAT n.d.). These programs were designed to provide options for companies seeking green energy and thus to maintain Thailand's attractiveness to investment (Praiwan 2024a, 2024b).

Thailand's UGT 2 stands out for cost transparency in its tariff structure, which helps buyers understand costs and improves trust and predictability. The scheme replaces three variable elements of the cost structure otherwise used by the Electricity Generating Authority of Thailand (EGAT)—fluctuating fuel costs, producers' energy payment, and fuel adjustment—with a fixed green energy cost over a 10-year contract (Kannasoot 2024). Although UGT 2's launch was paused due to elections in February 2026, it is expected to resume later in the year.

UGT 1 is designed for corporates seeking a more straightforward, off-the-shelf option. It is available through an annual subscription with a simpler tariff structure that includes a premium to cover EAC administrative costs. Both UGT programs are clearly outlined on EGAT's website (EGAT n.d.).

The lessons above point to the following opportunities for Indonesia to improve GEAS DS:

- **Attract buyer interest by more heavily advertising GEAS DS.** Additionally, build on consultations held during the design phase by hosting post-launch consultations with buyers, inviting them to offer perspectives on how the mechanism could be further refined to fit their needs.
- **Update the current communication platform to make the power plant list and other relevant information readily available to buyers.** Such visibility, including on cost structure and commissioning timelines, may help buyers make informed decisions.

Contracts with off-site generators

THE INDONESIAN APPROACH TO CONTRACTS WITH OFF-SITE GENERATORS

By Indonesian law,⁷ the sale of electricity to other parties requires the seller to acquire a license to a business area (*Wilayah Usaha* or *Wilus* in Bahasa Indonesia). The biggest *Wilus* holder is the national utility, PLN, which manages almost all transmission and distribution. Contracts with off-site generators are prohibited within PLN's *Wilus* areas. This arrangement generally prevents other parties (e.g., independent power producers, also known as off-site generators) from selling their electricity directly to buyers; however, as of July 2026, lawmakers were reconsidering this restriction under the pending New & Renewable Energy Draft Bill (RUU EBET).

That said, per Government Regulation (GR) 14/2012 jo. GR 25/2021 and Ministerial Decree 11/2021 of MEMR, in

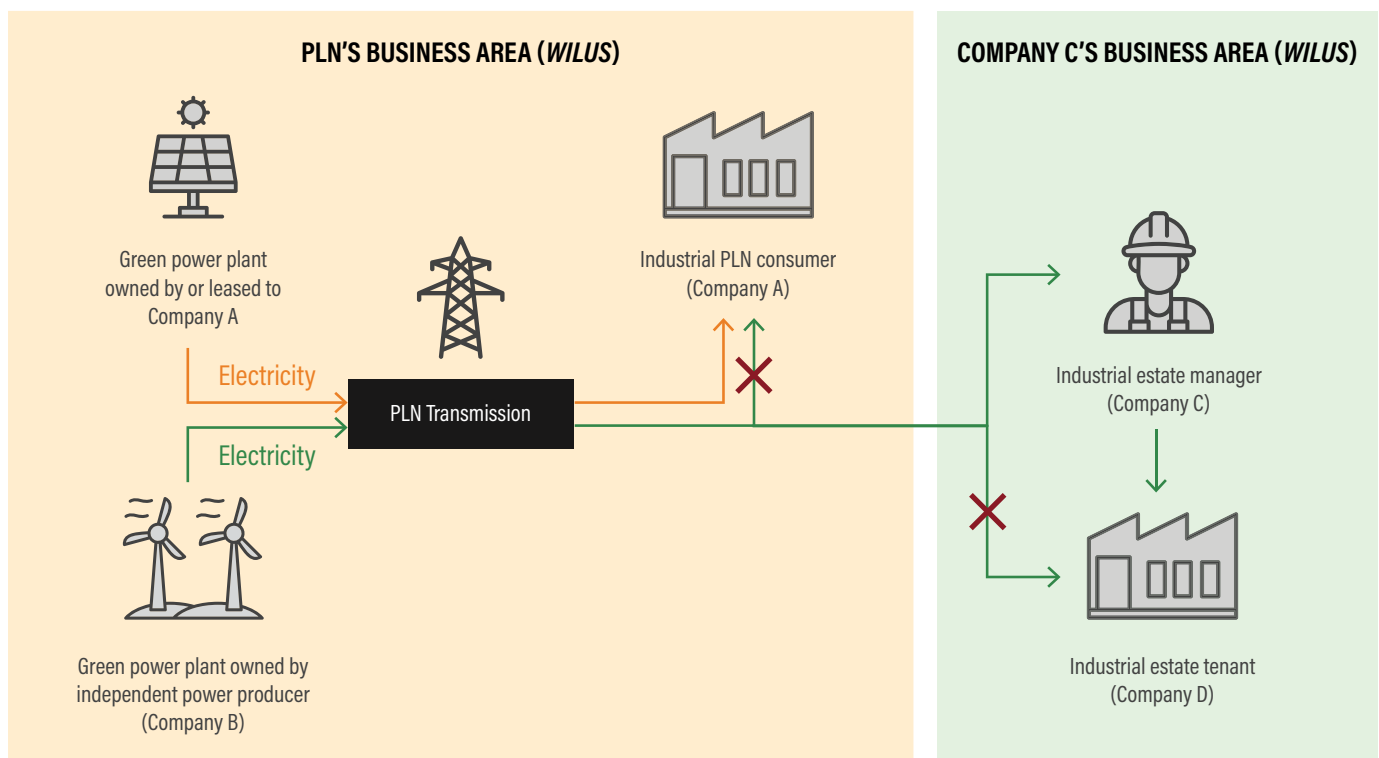
certain circumstances, the grid owner must provide opportunities for joint utilization of the transmission network, granting buyers the possibility of accessing off-site power plants. In other words, there are theoretically two schemes (Figure 6) currently available for buyers to acquire electricity from off-site power plants:

- **Joint utilization of the grid between the grid owner and corporate buyer utilizing a “captive power license” or IUPTLS (a license for a company to generate electricity for its own use) (Thomas et al. 2025).** Prerequisites include that the grid owner, typically the holder of the *Wilus* where corporate buyers and power plants are located, is willing to rent out the grid. If so, then corporate buyers may own or lease off-site green power plants under a

captive power license. This arrangement ensures that no electricity transaction occurs between corporate buyers and off-site power producers.

- **Joint utilization of the grid between the grid owner, the industrial estate, and the power producer (Thomas et al. 2025).** Corporate buyers access green power through an industrial estate that must secure its own *Wilus*. Prerequisites include that the grid owner, typically the holder of the *Wilus* where the power plants are located, is willing to rent out the grid. The industrial estate, now a *Wilus* holder, aggregates demand from corporate buyers and strikes contracts with off-site power producers through a power purchase contract.

Figure 6 | Illustration of joint utilization schemes



Note: Company A has a captive power license (IUPTLS) to access electricity from an off-site green power plant that it either owns or leases. Company A cannot sign contracts with independent power producers. Company C is a *Wilus* holder that can sign contracts with off-site power producers on behalf of Company D. Company D may not sign contracts but can acquire its own captive power license. Red "X" icons refer to the two arrangements that are not permitted under Indonesian law.

Source: MEMR 2024.

WHAT OTHER COUNTRIES HAVE DONE TO SUPPORT CONTRACTS WITH OFF-SITE GENERATORS

In Chile and Brazil, supply crises spurred reforms that opened the sector to private participation, unbundled utilities, created wholesale and retail markets, and established independent regulators. These developments laid the groundwork for contracts with off-site generators called power purchase agreements (PPAs) (Casimis and Odeh 2018; Griebenow and Ohara 2019; Lima et al. 2019; Serra 2022). The goal was to increase competition, transparency, and quality of service.

Such reforms were often gradual and entailed several legislative updates. In Brazil, authorities initially rolled out PPAs among larger, more sophisticated buyers (Law 9.074/1995). Law 10.848 of 2004 then consolidated the institutional architecture of the regulated and free contracting environments. Eligibility has gradually expanded since, culminating in the Ministry of Mines and Energy's Normative Ordinance 50/2022, which made all high- and medium-voltage consumers eligible to participate in the free electricity market starting in 2024. Such eligibility will be extended to all consumers by 2028 under Law 15.269/2025 (Carregosa 2025). Early on, incentives such as grid-use tariff discounts were employed to stimulate the adoption of PPAs. Recent reforms restricted new discounts, reflecting a transition from early market-creation incentives toward more cost-reflective pricing (Neves 2025).

In Chile, early reforms lacked anti-trust safeguards, leading to market concentration. Subsequent laws addressed this issue, enabling small generators to enter the market (Serra 2022). These measures were complemented by a renewable portfolio standard (RPS) requiring a minimum amount of green power generation among electricity companies (Casimis and Odeh 2018). This policy was introduced in 2008 and remained in place until 2013, at which point green energy had become cost-competitive and on track to surpass the original target without further policy support. Additionally, the country undertook transmission reform in 2016 (Law 20.936) to create an independent system operator, open access to the transmission grid, and enable contracts between generators and off-site customers. Key elements of Chile's reform were the creation of competitive conditions, open access to the grid, sufficient transmission capacity, and the elimination of information privileges for suppliers.

More recently, as foreign investment poured into ASEAN (QIMA 2025; Sullivan 2025), countries in the region have sought to stand out from their neighbors. One differentiation strategy has been to enable industrial consumers to pursue off-site generation and reduce their emissions.

Vietnam began institutional reforms in the 2000s, creating competitive electricity generation and wholesale markets which laid a foundation for the rollout of the Direct PPA (DPPA) mechanism. This mechanism was first proposed in

2017, when a group of large companies made the case to the Ministry of Industry and Trade (MoIT) for the expansion of green energy options (CEIA 2021; Wells 2021). After several iterations, a DPPA offering both virtual and physical options launched in 2024 (Nguyen and Apanada 2024; Nguyen and Nguyen 2024). The mechanism was later revised through Government Decree No. 57/2025/ND-CP to expand the eligibility of corporate buyers and generators.

In Peninsular Malaysia, reforms began in the early 1990s and 2000s, with a focus on decentralizing the power sector and establishing an independent regulator to make governance more effective and accountable (Kumar et al. 2021). Subsequent reforms promoted competition, energy security, and green power, including by allowing third-party access to national grids. Momentum for off-site PPAs accelerated after Singapore's moratorium on new large-scale data centers pushed data center investment—and associated power demand—into Malaysia (Ministry of Trade and Industry 2021; World Bank 2023b). Suruhanjaya Tenaga, a local regulator, launched a one-time Corporate Green Procurement Program (CGPP) offering corporate buyers a nationwide 800 MW virtual PPA quota for solar PV, which was fully subscribed within four months (Suruhanjaya Tenaga 2023a, 2023b). After this show of enthusiasm, Malaysia developed an uncapped and permanent physical PPA option, known as the Corporate Renewable Energy Supply Scheme (CRESS) (Suruhanjaya Tenaga 2026a). As of September 2026, more than 3,000 MW of green energy projects had been registered under CRESS (PETRA 2026).

Based on Indonesia's experience and the examples above, opportunities for Indonesian authorities to address demand for off-site generation include the following:

- **Procedural clarity:** Provide regulatory clarity regarding the procedures required for the implementation of joint utilization, such as necessary submissions, review periods, grid owner responsibilities, and dispute mechanisms. MEMR can play a more active role in governing the joint utilization scheme, including dispute resolution.
- **Price clarity:** Update regulations to stipulate fair and transparent grid rental fees that cover the cost of the ancillary services needed to maintain grid reliability.
- **Gradual transition from pilot projects to wider adoption:** Pursue joint utilization gradually, starting with a few buyers and moving toward wider adoption. Lessons from early implementation may point to possible adjustments to the joint utilization scheme.

Considerations for Indonesian stakeholders

Indonesian stakeholders, including PLN and ministries such as MEMR, may wish to consider the following options as they respond to the demand from climate-ambitious companies for green power:

- **Lower barriers to on-site generation:** Raise subnational capacity quotas for grid-connected rooftop solar PV in industry-dense areas where demand exceeds existing limits. In parallel, take steps to mitigate oversupply and ensure grid reliability, such as storage deployment, appropriate grid cost and curtailment risk allocation, and close operational coordination between transmission and distribution. Further, ensure the utility has a pathway for participation by, for example, offering compensation schemes related to on-site generation. Lastly, clarify that EACs from on-site generation can go to buyers (thus enabling credible emissions claims) and consider an exemption from capacity and emergency charges for ground-mounted and floating solar.
- **Mature the market for unbundled RECs:** Pursue a comprehensive policy for EACs (locally known as RECs), which may enhance their credibility, transparency, and eligibility for trading. Moreover, add newer power plants to PLN's REC program to enable compliance with voluntary action frameworks and support regional EAC integration. Further, regularly update both the grid and residual emission factors to prevent double counting. Lastly, we note the debate on the additionality of unbundled RECs and survey results suggesting corporate interest in mechanisms offering more credibility and additionality as reasons to diversify the suite of mechanisms beyond RECs.
- **Enhance public communication of utility contracts:** Increase public awareness of PLN's GEAS DS by further promoting it to corporate buyers. Publish the list of power plants allocated to the program as well as their cost structure and commissioning timelines to help buyers make informed decisions. Further, expand geographic coverage and gather perspectives from buyers on possible refinements to GEAS DS.
- **Pursue joint utilization schemes:** MEMR may play a more active role in off-site generation pilots by further clarifying the procedures required for joint utilization of the grid (such as necessary submissions, review periods, grid owner responsibilities, and dispute mechanisms) and updating regulations to stipulate fair and transparent grid rental fees that cover the cost of ancillary services needed to maintain grid reliability. Lessons from early implementation may point to possible adjustments to the joint utilization scheme as it moves toward wider adoption.

Regarding *how* to pursue the above, Indonesian stakeholders may wish to consider the following:

- **Broader institutional leadership for green power:** Across the countries examined, power sector reforms often took off in response to issues of national concern, such as energy security. In Indonesia, a salient issue is competition with neighboring countries for foreign direct investment and supply chains. Green power purchasing mechanisms may be part of an industrial competitiveness and investment strategy that relies on ministries such as the Ministry of Industry and the Ministry of Investment, in addition to MEMR, which already plays a central role in the power sector.
- **Buyer consultations:** Consultation with buyers allows authorities to better understand the benefits and challenges for companies, and findings thereof can be used to enhance the next phase of implementation. Indonesian authorities may benefit from continuing to engage in dialogue with companies to ensure reforms are responsive to the market's needs. This can be done through transparent stakeholder consultation during rulemaking, the structured socialization of new regulations, and continued outreach to buyers to support understanding and adoption.
- **Supportive, clear, and predictable regulations:** The contrasting examples of Brazil (where long-term regulatory visibility has correlated with steady green power growth) and Vietnam (where abrupt regulatory changes aligned with a "boom and bust" scenario) suggest that Indonesian authorities may wish to provide clear and long-term regulatory visibility to buyers. This may include piloting changes among a few buyers, learning from the experience, and then gradually expanding eligibility.
- **Independent or more coordinated regulation:** Enhancing procurement mechanisms appears to require clarity on responsibilities, timely policy implementation, transparent decision-making, and responsiveness to buyer demand. Creating an independent regulator or strengthening coordination among MEMR, PLN, and other government agencies may help achieve these.

Evidence from other countries suggests that an increase in green power uptake could relate to one or more measures listed above. However, these initial considerations are not exhaustive, are focused on the perspective of buyers, and should not be treated as definitive recommendations. We encourage consultation with additional stakeholders as well as further analysis to validate our findings.

Appendix A. List of engagements and workshops with climate-ambitious companies in Indonesia

To evaluate Indonesia's green power procurement options and identify the opportunities for improvement, we relied on engagement with corporate buyers on the topic. Below is a list of engagements and events held to discuss green power procurement options in Indonesia.

1. ACEC Indonesia Working Group Meeting
 - i. When: Friday, March 13, 2026 (Virtual).
 - ii. Topic: Updates on Indonesia's green power procurement landscape, including the ACEC Indonesia paper, RE100 priorities, engagement with MEMR and PLN, green tariffs, off-site PPAs, RECs, on-site solar, and the ASEAN Power Grid.
 - iii. Number of attendees: five organizations represented.
 - iv. Participants: Corporate renewable energy buyers, research organizations, climate philanthropy, renewable energy advocacy groups and industry associations.
2. ACEC Indonesia Working Group Meeting
 - i. When: Tuesday, December 16, 2025 (Virtual).
 - ii. Topic: Request for Input to Forthcoming ACEC Indonesia Paper.
 - iii. Updates on corporate renewable energy demand, the ACEC Indonesia paper and review process, regulatory developments, and engagement with MEMR and PLN.
 - iv. Number of attendees: 19 organizations represented.
 - v. Participants: Corporate renewable energy buyers from the technology, data center, electronics, apparel, footwear, food and beverage, and consumer goods sectors; renewable energy developers; financial institutions; research organizations; and industry and climate advocacy groups.
3. GEAS Corporate Session with PLN
 - i. When: Thursday, September 18, 2025.
 - ii. Topic: Socialization of GEAS Product with its generator pipeline.
 - iii. Number of attendees: 56.
 - iv. Participants: KPN Group, GoTo, Schneider Electric, Astra, Bosowa Energasindo, CTI, Coca-Cola Europacific Partners Indonesia, PT MRT Jakarta, PT GJI, H&M, PT Ever Shine Tex Tbk, UNIQLO, Danone, Princeton Digital Group, PT Ajinomoto, PT Krakatau Chandra Energi, PT Indorama, PT Mitra Kiara Indonesia, PLN, BASF Indonesia, Adidas, KCE, Centratama, Astra, PT MRT Jakarta, PT Solusi Bangun Indonesia, PT Indofood, PT Denso Indonesia, PT SMT, PT Yasulor, SBI, CEMINDO, and EDGE DC.
4. Joint Member Gathering—CEIA, RE100, and ACEC
 - i. When: Wednesday, September 10, 2025.
 - ii. Topic: Discussion on preliminary demand mapping analysis for corporate renewable energy procurement in Indonesia.
 - iii. Number of attendees: 40.
 - iv. Participants: PT Mitra Kiara Indonesia, New Balance, Danone, Coca-Cola Europacific Partners Indonesia, Astra Infra, Haskoning, H&M, Astra, PT Denso Indonesia, Princeton Digital Group, NIKE, Unilever, Schneider Electric, Multi Bintang Indonesia, and PT Mitra Kiara Indonesia.
5. CEIA Afternoon Coffee
 - i. When: Wednesday, March 12, 2025.
 - ii. Topic: Update on developments in the electricity sector and industrial decarbonization.
 - iii. Number of attendees: 25.
 - iv. Participants: Coca-Cola Europacific Partners Indonesia, Danone, Astra, Sinergi ID, NIKE, Multi Bintang Indonesia, Nutrifood, H&M, UNIQLO, and Centratama.
6. CEIA Afternoon Coffee
 - i. When: Friday, October 25, 2024.
 - ii. Topic: Power wheeling as a green power procurement option.
 - iii. Number of attendees: 16.
 - iv. Participants: Danone, H&M, Coca-Cola Europacific Partners Indonesia, PT Denso Indonesia, PT Ever Shine Tex Tbk, NIKE, and APP Sinarmas.
7. CEIA Webinar Session
 - i. When: Thursday, March 7, 2024.
 - ii. Topic: Briefing on new rooftop solar regulation (PerMen 2/2024).

Appendix B. Further information on survey methodology and data treatment

Demand data limitations and alternative estimation approach

Responses to questions about electricity demand size were disregarded since we received only 30 answers above 0, and 5 of these were multiple orders of magnitude larger than the average response. We were still able to partially gauge demand through data in RE100's 2024 *Annual Disclosure Report* (RE100 and CDP 2025b). Specifically, 29 percent of this paper's population is represented in RE100's survey, totaling 133 companies. Seven of them are also members of CEIA, ACEC, or both.

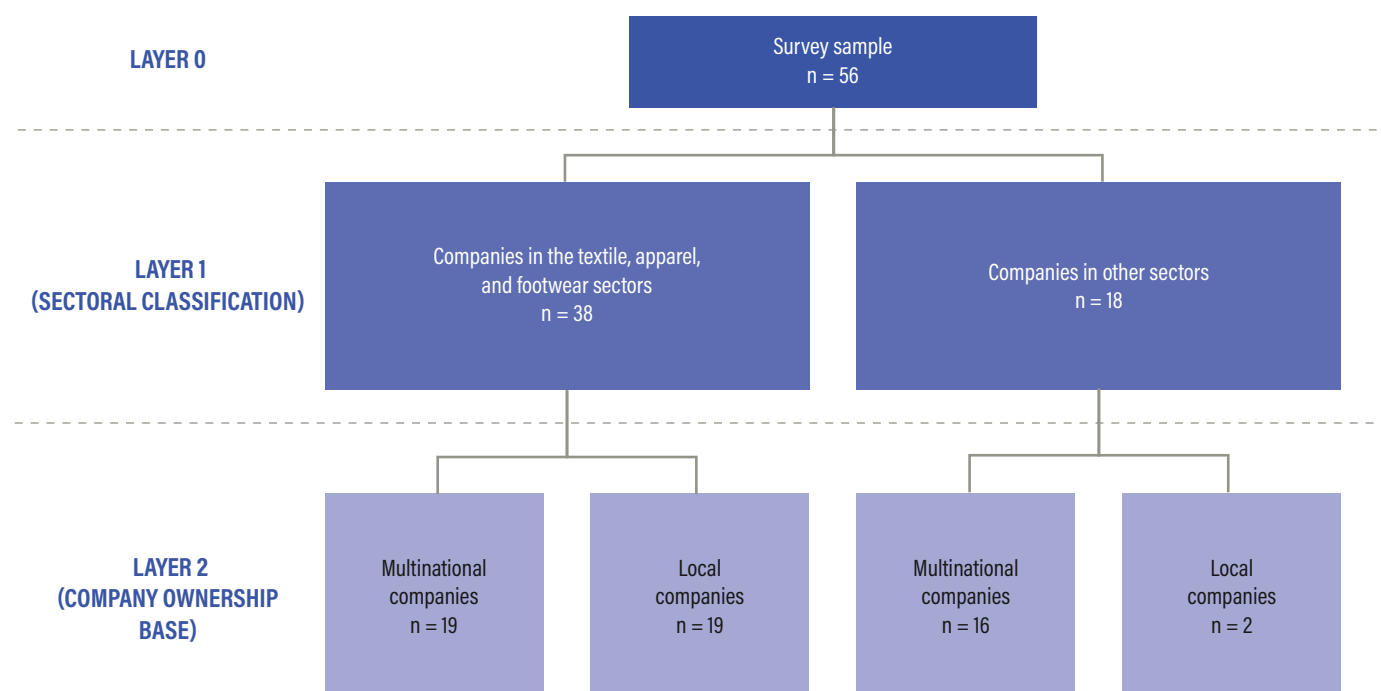
Correction of selection bias

The survey yielded 56 usable responses, equivalent to 12 percent of those contacted. Within this sample, 68 percent of companies operate in the textile, apparel, and footwear sector, while the remaining 32 percent come from other sectors, including consumer discretionary, consumer staples, financials, information technology, and materials (MSCI 2026) (Figure B-1). This distribution is comparable to that of the survey population, where textile-related firms also constitute more than half of all companies.

However, a closer analysis by ownership type (multinational versus local firms; Figure B-1) reveals a key imbalance. Multinational companies are significantly overrepresented within the textile, apparel, and footwear group; they account for 50 percent of the sample but only 16 percent of the corresponding population. Without adjustment, this overrepresentation risked biasing the results toward the perspectives of multinational textile, apparel, and footwear firms.

To address this imbalance, we adjusted the sample to better reflect the actual distribution of multinational and local companies in the textile, apparel, and footwear group in the survey population. We did so by calculating a weight factor for each subgroup. The weight factor is the ratio of a group's proportion in the population to its proportion in the sample (Equation 1). Thus, the subgroup that was overrepresented in the sample was multiplied by a weight factor of less than one, whereas the underrepresented group was multiplied by a weight factor greater than one; this lent greater weight to the previously underrepresented subgroup and lessened the weight of the previously overrepresented group.

Figure B-1 | Groups and subgroups within the survey sample



Note: Layer 0 represents the aggregated survey sample. Layer 1 separates companies in the textile, apparel, and footwear sector from companies in other sectors (consumer discretionary, consumer staples, financials, information technology, and materials). Layer 2 separates multinational companies from local companies.

Source: WRI and ACEC authors.

$$w_A = \frac{\frac{\text{population group A}}{\text{population}}}{\frac{\text{sample group A}}{\text{sample}}}$$

Equation 1: Formula used to correct selection bias. In this equation, w_A represents the weight, which divides the proportion of “group A” (e.g., multinational companies within the textile group) within the population by the proportion of the same group within the sample.

Applying this measure reduced the weight of multinational companies in the textile, apparel, and footwear group by 32.5 percent and increased the weight of local companies by 167.5 percent, bringing both groups in line with their actual proportions in the population. We did not apply this correction to the “other sectors” group, where multinational and local companies were already proportionately represented. Once we had a reweighted set of results for the textile, apparel, and footwear group, we combined the revised results from each of the two groups (the reweighted “textile, apparel, and footwear” on one hand and the crude “other sectors” on the other), creating a revised set of results that mitigated against the main source of selection bias we previously identified.

Sectoral distribution and characteristics of non-respondents

The sectors that did not respond to the survey (and which are therefore part of the population but not the sample) include communication services (N = 3), energy (N = 11), healthcare (N = 5), industrials (N = 25), and real estate (N = 6). We hypothesize that companies in the energy sector chose not to respond due to their role as suppliers rather than consumers of electricity. Communication services, healthcare, and real estate together represent only 3 percent of the total sampled population, which statistically reduced their likelihood of responding to the survey. Although industrials were better represented (N = 25), their non-respondents were typically suppliers of equipment or specialized services to other industrial firms. As they are distant from end consumers and offer specialized or complex products and services, these companies are perhaps less influenced by reputational concerns or buyer pressure to meet climate targets.

We formed no hypothesis on the preferences of non-respondents—particularly industrial firms—due to the absence of data on their energy consumption, firm size, revenue, and profit. No evidence was found that non-respondents would hold systematically different views.

Appendix C. Overview of green power procurement mechanisms

On-site generation

On-site generation refers to electricity-generating equipment that is located on the consumer's premises. Often, on-site generation refers to rooftop solar photovoltaics (PV), but it may also refer to ground-mounted PV, floating PV, or other green sources. On-site generation can be further categorized based on its compensation mechanism:

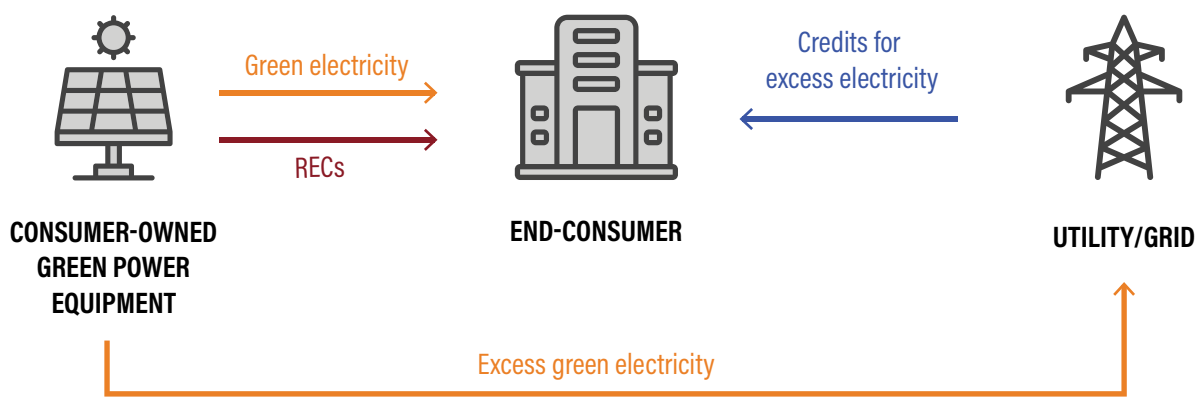
- **Gross metering (buy-all, sell-all):** All energy generated is exported to the grid at a fixed rate (usually a feed-in tariff). The corporate buyer is paid through a bill deduction or in cash.
- **Net metering:** Excess energy is exported to the grid at a rate equal to the electricity tariff (1:1 ratio). The corporate buyer is paid through a monthly bill deduction or in credits for future consumption.
- **Net billing:** Excess energy is exported at a rate typically lower than the electricity tariff. In some cases, excess generation can be consumed by up to three subsidiaries on the premises.
- **Self-consumption:** Export to the grid (if any) is not compensated.

On-site generation equipment may be owned by the consumer (Figure C-1) or by a third party (Figure C-2). With direct ownership (also known as the CAPEX model), the consumer is responsible for investment in the generation assets. In such cases, the operation might be carried out in-house or outsourced to a third party.

With third-party ownership (also known as the OPEX model), the consumer typically enters a long-term power purchase agreement (PPA) and pays the developer per energy unit produced and consumed.

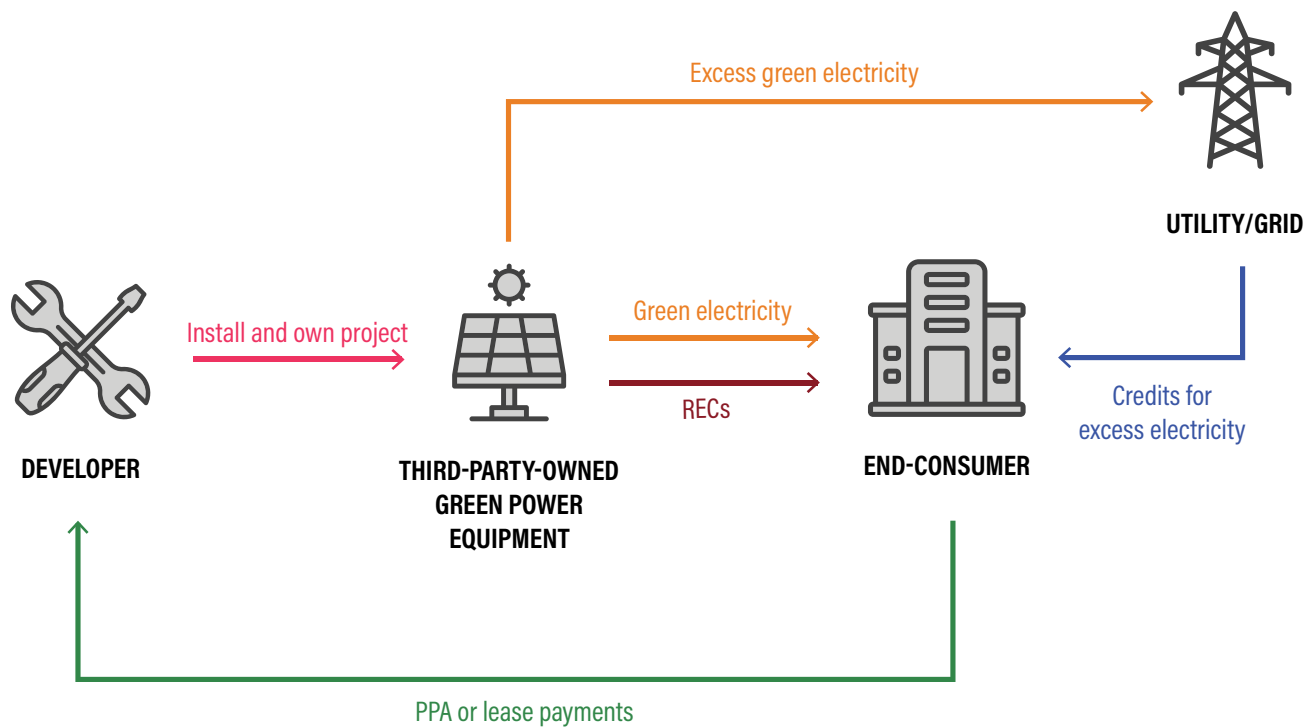
In some cases, utilities may aggregate the demand of multiple corporate buyers into a unified arrangement based on an analysis of consumption patterns (Sarangi and Taghizadeh-Hesary 2021).

Figure C-1 | Conceptualization of consumer-owned on-site generation



Source: WRI and ACEC authors.

Figure C-2 | Conceptualization of third-party ownership of on-site generation



Source: WRI and ACEC authors.

Unbundled energy attribute certificates

Energy attribute certificates (EACs) are a mechanism used to track green power generation and its attributes, such as the technology used in production and related emissions. EACs avoid the double counting of green power generation, as whoever keeps (“retires”) any given EAC is the only party able to claim the associated emissions reductions. EACs can be “bundled,” or purchased in combination with the physical delivery of electricity. When purchased without such delivery, they are termed “unbundled EACs.”

Certain jurisdictions have a local EAC system available. These include the European Union’s Guarantees of Origin (GOs), the United States’ Renewable Energy Certificates (RECs), and China’s Green Electricity Certificates (GECs). In the absence of a local system, voluntary international options such as International Renewable Energy Certificates (I-RECs) and Tradable Instruments for Global Renewables (TIGRs) are also available (Hardison et al. 2020). In all cases, the integrity of the EACs issued and claimed relies on adherence to international best practices. In Indonesia, EACs are known as renewable energy certificates (RECs).

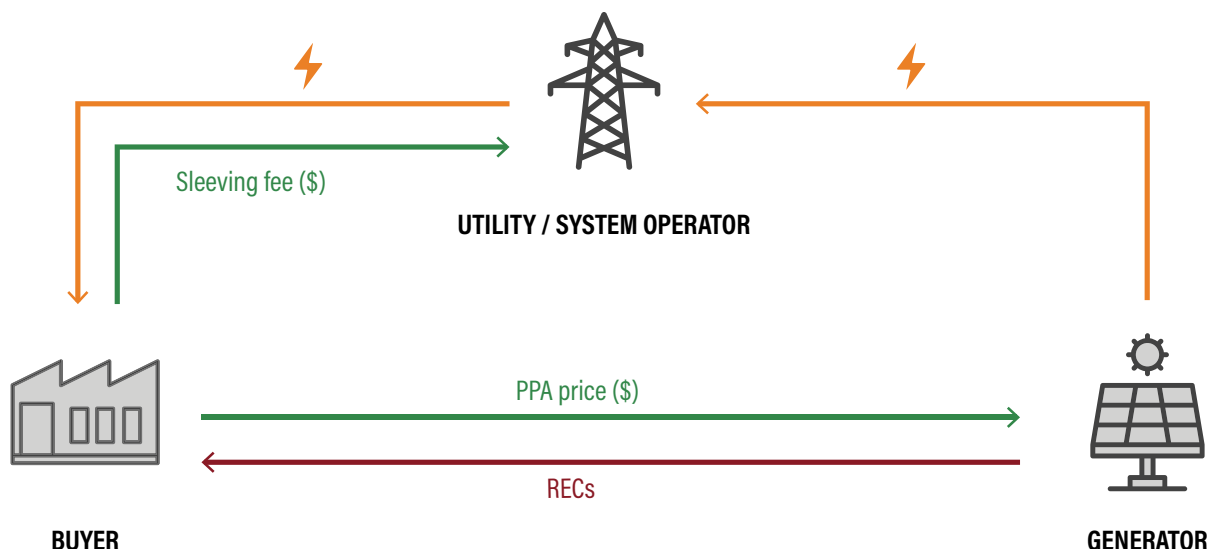
Contracts with electric utilities

In single-buyer power markets (where the only customer for generators is the utility), buyers can sometimes sign up for voluntary utility programs known as green tariffs. These allow large electricity consumers to purchase green power and associated EACs from a specific large-scale project (or set of projects) via a special utility rate (EPA n.d.). There are two types of green tariffs (RE100 and CDP 2025a):

1. **Project-specific supply contract:** A utility enters a power purchase agreement (PPA) with a green power generator and dedicates the PPA to one or more buyers through a long-term agreement. In some cases, buyers may participate in procurement; for instance, by providing land or equity for development via a trilateral contract with the utility and developer (also known as a sleeved PPA; Figure C-3).
2. **Retail supply contract:** A utility creates a pool of green power generators—typically existing ones—and sells the bundled power and EACs to corporate buyers. This “subscriber model” typically has a shorter contract duration than project-specific supply contracts.

Within both arrangements, program costs are specifically allocated to participating corporate customers, rather than the utility’s general pool of customers.

Figure C-3 | **Conceptualization of sleeved PPAs, a common type of green tariff**



Source: Watanagase 2024.

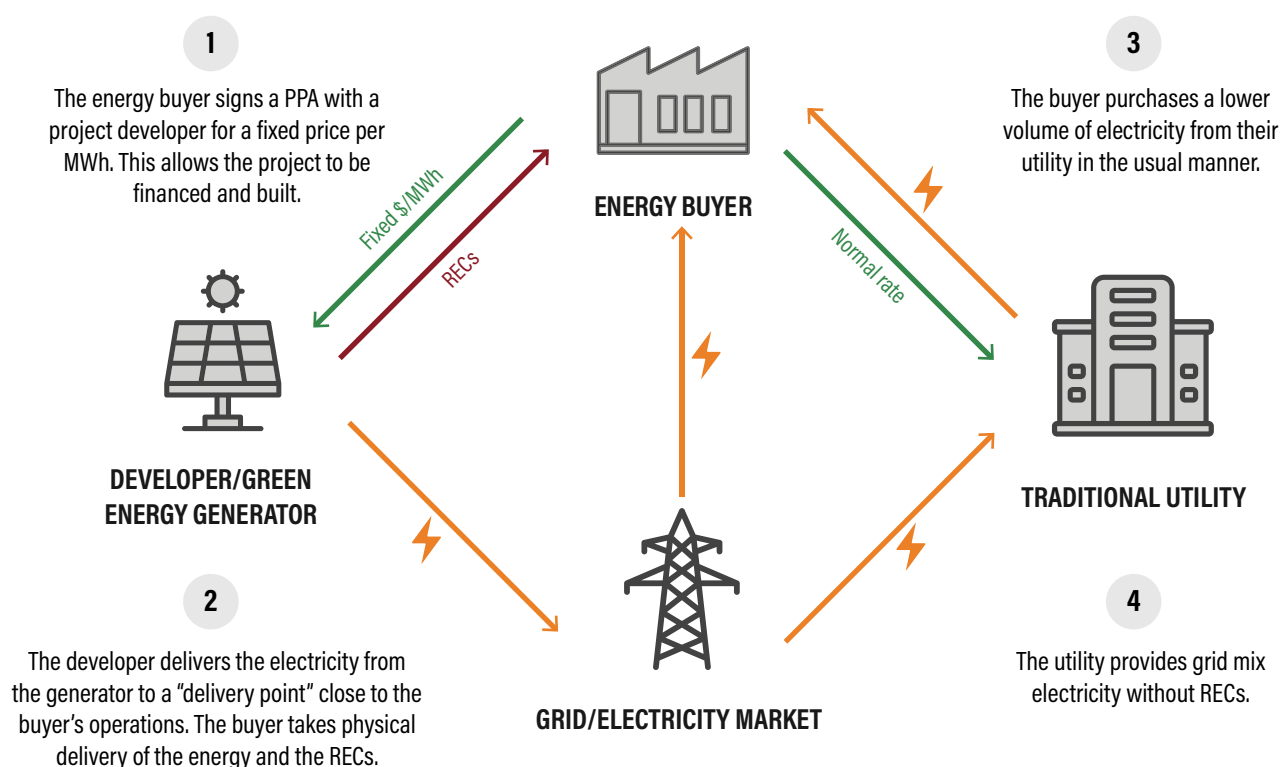
Contracts with off-site generators

In some markets, corporate buyers have the option to purchase green power and/or related EACs directly from Independent Power Producers (IPPs) via off-site power purchase agreements (PPAs). Off-site PPAs are common in both middle- and high-income countries, including Australia, Brazil, China, India, Mexico, and parts of the United States (IEA 2020). They often afford corporate buyers the highest level of additionality and are secured by means of a long-term contract with an IPP that guarantees energy supply over a predetermined timeframe at a fixed price. There are two categories of off-site PPAs, depending on consumer preference and the type of electricity market:

■ **Off-site physical PPA:** The generator physically delivers electricity, often to a “delivery point” near the consumer’s location, whereupon the consumer takes legal title to the energy (RMI and WRI 2019). This electricity is typically bundled with its associated EACs (Figure C-4). This option is most common in deregulated (or retail choice) markets, which allow companies to pursue this type of arrangement.

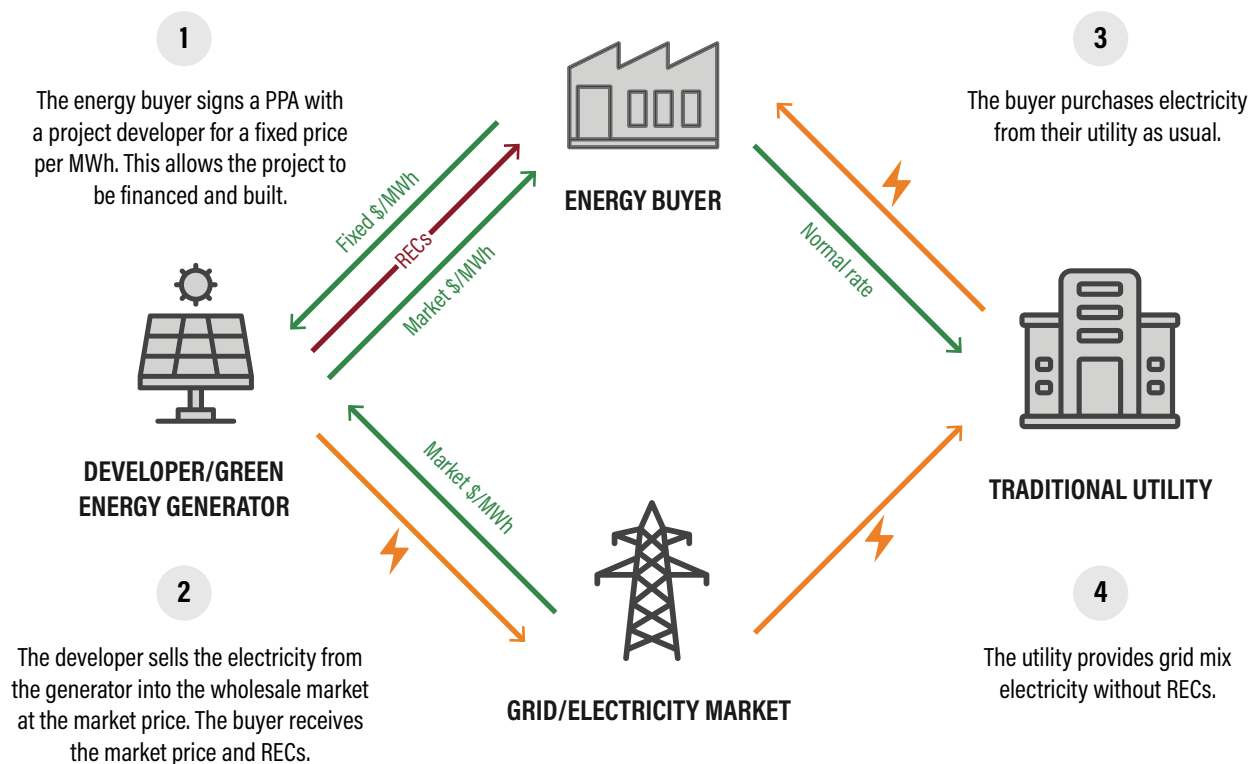
■ **Off-site virtual PPA:** Consumer and generator enter a financial agreement—also known as a contract for difference (CfD)—where the former guarantees payments to the latter based on electricity generated and in exchange for EACs (Figure C-5). The consumer does not receive the electricity. Instead, electricity is sold in the project’s wholesale power market, which may or may not be the same as the corporate buyer’s. When the wholesale market price is higher than the agreed-upon price, the generator pays the difference to the consumer. When the wholesale market price is lower than the agreed-upon price, the consumer pays the difference to the generator (EPA 2016). Since there is no power delivery, the consumer must continue to meet its power needs through regular channels (Kansal 2018).

Figure C-4 | **Conceptualization of off-site physical PPAs**



Source: RMI and WRI 2019.

Figure C-5 | **Conceptualization of off-site virtual PPAs**



Source: RMI and WRI 2019.

List of abbreviations

ACEC	Asia Clean Energy Coalition	IUPTLS	Captive Power Supply Business License (<i>Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Sendiri</i>)
ASEAN	Association of Southeast Asian Nations	kWh	Kilowatt-hour
CEIA	Clean Energy Investment Accelerator	MEMR	Ministry of Energy and Mineral Resources
CfD	Contract for Difference	MoIT	Ministry of Industry and Trade
CGPP	Corporate Green Power Program	MW	Megawatt
CRESS	Corporate Renewable Energy Supply Scheme	MWh	Megawatt-hour
DCE	Discrete Choice Experiment	MWp	Megawatt-peak
DPPA	Direct Power Purchase Agreement	NEDA	New Enhanced Dispatch Agreement
EAC	Energy Attribute Certificate	NEM	Net Energy Metering
EGAT	Electricity Generating Authority	OJK	Financial Services Authority (<i>Otoritas Jasa Keuangan</i>)
ERC	Energy Regulatory Commission	PLN	State Electricity Company (<i>Perusahaan Listrik Negara</i>)
FIT	Feed-in Tariff	PPA	Power Purchase Agreement
GEAS DS	Green Energy as a Service: Dedicated Source	PV	Photovoltaic
GEC	Green Electricity Certificate	REC	Renewable Energy Certificate
GHG	Greenhouse Gas	RPS	Renewable Portfolio Standard
GO	Guarantee of Origin	RUU EBET	New & Renewable Energy Draft Bill (<i>Rancangan Undang-Undang Energi Baru dan Energi Terbarukan</i>)
ICDX	Indonesia Commodity and Derivatives Exchange	Solar ATAP	Accelerated Transition Action Programme
IO	Operational License (<i>Izin Operasi</i>)	TIGR	Tradable Instrument for Global Renewables
IPP	Independent Power Producer	TWh	Terawatt-hour
I-REC	International Renewable Energy Certificate	UGT	Utility Green Tariff
IUPTLU	Electricity Supply Business License Holder for Public Interest (<i>Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Umum</i>)		

Glossary

Additionality: The extent to which a green energy purchase contributes to new green energy capacity or investment that would not have been installed or made in the absence of said purchase.

Attributes: Specific characteristics of green electricity, such as its source (e.g., solar, wind, geothermal), location, time of generation, and emissions associated with production and use. These attributes are documented and tracked within energy attribute certificates (EACs).

Bundled energy attribute certificates (EACs): Certificates attesting that a specific amount of electricity was generated using green technologies. When tied to a contract for electricity delivery, these are called “bundled” certificates. Buyers may claim the green energy use associated with these certificates as long as they can confirm under applicable rules that the certificates belong to them, have not been claimed by anyone else, and are valid for emissions reporting. In Indonesia, these certificates are referred to as bundled renewable energy certificates (RECs) and are a feature of utility contracts.

Capacity quota: The maximum amount of green energy capacity that can be installed in a given region (“cluster”) or sector. The quota is set by regulation in capacity units (e.g., megawatts).

Captive license: Legal authorization to develop generation for a business’s own use and not for trade.

Curtailment: The reduction of electricity generation below the amount a plant could otherwise produce, usually due to grid constraints, system security requirements, or oversupply. In power system operation, curtailment often refers to output reductions instructed by the system operator and should be distinguished from local interconnection limits in distribution networks, which physically restrict how much generation can be connected or exported in the first place.

Direct contract with off-site generators: A procurement mechanism through which corporate buyers purchase green electricity and associated energy attributes directly from an independent power producer whose generation equipment is not located on the buyer’s premises. These contracts are typically long-term arrangements over large-scale green energy projects. They can take the form of physical or virtual power purchase agreements (PPAs). Physical PPAs entail physical delivery of electricity, whereas virtual PPAs are primarily financial arrangements.

Discrete choice experiment (DCE): A survey-based method that asks respondents to choose between hypothetical options made up of different attributes, allowing researchers to measure preferences. It is commonly used to estimate which attributes matter most and what trade-offs respondents are willing to make between them.

Distribution network usage charge: A tariff or fee charged for the use of local electricity distribution infrastructure. These charges are distinct from transmission network charges and are intended to recover the costs of operating, maintaining, and expanding distribution networks.

Feed-in tariff: A fixed payment to generators for each unit of green electricity they generate and feed into the grid.

Green contracts with electric utilities: A procurement mechanism through which corporate buyers purchase green electricity and associated energy attributes from a utility under a dedicated green tariff or supply program. These contracts may be linked to specific green energy projects or a pool of green power plants, with costs allocated directly to participating customers. In Indonesia, this mechanism is known as Green Energy as a Service: Dedicated Source (GEAS DS), available through the national utility, PLN.

Grid emission factor: Grid emissions intensity, measured as the greenhouse gas emissions per unit of electricity generated. Often expressed in kgCO₂e/kWh.

Net billing: An arrangement where energy buyers generate electricity on site or through eligible distributed generation arrangements and sell excess generation to the grid at a price set by the distributor or market, typically at a rate below the retail electricity tariff.

Net metering: An arrangement where energy buyers generate electricity on site or through eligible distributed generation arrangements and pay only for the consumption that exceeds the amount they feed back into the grid. Buyers may be paid through a monthly bill deduction or in credits applied to future consumption, typically at a rate equal to the electricity tariff (1:1 ratio).

On-site generation: Electricity generation located on the consumer’s premises, most commonly through rooftop solar photovoltaics (PV), but also potentially through ground-mounted solar, floating solar, or other green energy technologies. On-site systems can be owned by the consumer or a third party. They may operate under various compensation arrangements, including net metering, net billing, and self-consumption models.

Renewable portfolio standard: A regulatory mandate that requires electricity suppliers or utilities to sell a minimum amount of green energy. It is generally set as a percentage of the supplier’s or utility’s total energy procured and can be raised over time.

Residual emission factor: The emissions intensity of the grid (often expressed in kgCO₂e/kWh) after removing the share of green energy that has already been claimed through EACs; it reflects the carbon intensity of the remaining electricity available to other users once those “green” claims are accounted for.

Unbundled energy attribute certificates (EACs): Certificates attesting to the “green” attributes of electricity generated from green sources, sold separately from the physical electricity itself. Buyers receive the right to claim green energy use but do not receive the actual electricity associated with it. Unbundled EACs depend on robust tracking and residual emission factor rules to avoid double counting and do not necessarily imply additional green energy investment. In Indonesia, these certificates are referred to as unbundled renewable energy certificates (RECs).

Endnotes

1. In this publication, rooftop solar PV and on-site generation are often used interchangeably. Although on-site generation may encompass other types of on-site technologies, rooftop solar PV is the most common.
2. In this publication, the term EAC is used to refer to the procurement type in general terms. Meanwhile, GEAS (not to be confused with GEAS DS) and RECs are used to specifically refer to EACs in Indonesia.
3. For package 1: PPA price awarded by PLN to the IPP.
4. For package 2: Ceiling price outlined in Presidential Regulation 112/2022.
5. Proxied by grid marginal cost based on last year's component C in the System Operation Evaluation Document.
6. Based on the exchange rate (June 2025) of IDR 16,253 per US\$1.
7. Law No. 30 of 2009, subsequently amended by Law No. 6 of 2023 (Article 42 Number 6 Article 10 verse 1 through 6) which turned Government Regulation in Lieu of Law No. 2 of 2022 on Job Creation into law.

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Acknowledgments

Tatsatom Gonçalves and Rezky Zain conceived and developed the paper's analytical framework and methods, with input from Arif Utomo. Rezky Zain and Tatsatom Gonçalves drafted the survey questionnaire. All authors played a role in collecting the survey data, from translation and management of the live questionnaire to outreach and quality checks. Rezky Zain and Caroline Ribeiro conducted the literature review with support from Tatsatom Gonçalves; Rezky Zain focused on the Asian countries and provided crucial expertise on Indonesia, while Caroline Ribeiro focused on the South American countries. Tatsatom Gonçalves, Rezky Zain, and Caroline Ribeiro analyzed survey results. All three also drafted the manuscript, with support from Arif Utomo and Emma Saraff, who contributed to the policy considerations as well as analysis of survey results and literature review findings. Tatsatom Gonçalves and Emma Saraff managed coordination among authors and with contributors. Caroline Ribeiro managed the survey results dataset and bibliography and created most graphs. She also carried the paper through an extensive peer review process, with supervision from Tatsatom Gonçalves and advice from the remaining co-authors.

This paper was possible thanks to the generous support of an anonymous foundation. The authors are deeply appreciative of the persistent support and advice from Alex Perera, Carlos Muñoz Pina, Laura Malaguzzi Valeri, and Taryn Fransen. The ACEC community was instrumental, with Mia Nguyen and Henry Eu providing leadership and strategic guidance while also mobilizing community and industry input to help shape and advance the paper. We are also deeply thankful to Laura Thomas, who provided invaluable support with survey design and the collection of data from RE100 members. The authors further benefited from advice from Simone Athayde, Ashleigh Ruehrdanz, Ekin Birol, Renee Pineda, and Allison Meyer. Our reviewers, Bharath Jairaj, Deepak Krishnan, Alex Perera, Prashanth Varanasi, Henrique Roncada, Sudatta Ray, Min Yuan, Wenquan Zhang, Clorinda Wibowo, Laura Thomas, Meinandra Dwi Anugrah Putra, Clauber Leite, Javier Bustos, Duc Nguyen, and Henry Eu, offered valuable corrections, advice, and feedback that significantly influenced this paper. Shengnian Xu assisted with some of the secondary data referenced in the paper. Kathleen Schalch and Thomas Smith edited the paper for compliance with WRI's style as well as enhanced clarity and flow. Claire Wangui designed the paper. Romain Warnault and Shannon Collins guided the paper through copyediting, design, and proofreading, while Carmel Moersalim and Shinta Sari supported communications surrounding the launch of the paper. The authors wish to express their sincere gratitude to everyone who contributed, while noting that all errors, omissions, and opinions herein are entirely their own.

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About the Asia Clean Energy Coalition

Asia Clean Energy Coalition's vision is for clean energy to power and decarbonize Asia's economies. ACEC mobilizes corporate energy buyers and partners, uniting corporate and national action to accelerate the transition to competitive, scalable, and resilient clean energy across Asia.

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