

Decarbonizing Indonesia's Power Sector

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Giving Green

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Questions and comments are welcome at hello@givinggreen.earth.

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Summary

- **Why is Indonesia's power sector decarbonization important?**

  Indonesia contributes to roughly 2.5% of global emissions as the world's fifth-largest emitter. Under a business-as-usual scenario, Indonesia's emissions are projected to reach 1.6 billion metric tons of CO_2-equivalent (tCO_2e) by 2050. Between 2024 and 2050, the share of Indonesia's emissions from the power sector is projected to increase from 25% to 40%. Given Indonesia's rapid economic growth, accelerating power sector decarbonization is essential to avoid long-term lock-in to high-emission pathways.

- **How could efforts to support Indonesia's power sector decarbonization reduce greenhouse gases?**

  Reducing energy sector emissions in Indonesia will require simultaneous scaling of clean energy capacity alongside a shift away from a coal-based economy. Strengthening the grid infrastructure is also critical to delivering clean power from production sites to consumption sites and to integrating power from intermittent renewable energy sources.

- **What do our findings suggest are the most promising philanthropic pathways for reducing energy sector emissions in Indonesia?**

  Based on our evaluation of scale, feasibility, and funding need, we think the most promising philanthropic sub-strategies center around:

  1. Providing technical assistance and capacity-building support to high-growth industrial provinces with energy transition planning and implementation
  2. Advancing policy and regulatory reforms that accelerate clean energy deployment
  3. Supporting evidence generation (research and pilots) to derisk clean energy and transmission projects
  4. Mobilizing the corporate sector to drive clean energy market and policy reform via industrial and commercial customer coalitions
  5. Advocating for policy reforms to reduce subsidies and incentives for coal and facilitate retirements and repurposing of coal assets

- **Is there room for more funding?**

  We estimate that efforts to reduce Indonesia's power sector emissions receive an average of $8 million USD in foundation funding per year, equivalent to 1.4% of total global philanthropic funding by foundations for power sector decarbonization.

Total public and private climate finance for Indonesia's power sector decarbonization stands at roughly $1.8 billion annually, just 9% of the $19 billion estimated to be required each year to meet the sector's 2030 decarbonization goals on a net zero pathway.

Based on this funding data, we think efforts to reduce Indonesia's power sector emissions are severely underfunded.

- **Are there major co-benefits or potential risks?**

  Power sector decarbonization in Indonesia offers meaningful co-benefits around energy access and security, air quality, and job creation. At the same time, a poorly managed transition could limit access to affordable and reliable energy for vulnerable communities. Further, unaddressed risks related to job losses and stranded assets may generate broader social resistance to the energy transition.

- **What are the key uncertainties and open questions?**

  We are most uncertain about political willingness to support the energy transition, which has a direct impact on the pace of policy reforms. Similarly, we are uncertain if clean energy might be perceived as being at odds with Indonesia's development and energy security priorities, particularly as geopolitical shocks risk continued reliance on coal. We are also uncertain about the role of nuclear and geothermal energy, given regulatory, infrastructure, and financing constraints.

- **What is the bottom line, and what are the next steps?**

  Indonesia's power sector decarbonization is among the highest-leverage opportunities in climate philanthropy, yet it remains significantly underinvested.

  Given the growing relevance and the magnitude of impact of Indonesia's power sector on global emissions, and the extent to which it remains underfunded, we think it is important to direct more philanthropic funding toward supporting Indonesia's power sector decarbonization.

  We recommend that philanthropists consider funding organizations that are working to address the challenges outlined in this report and consider grants aligned with the strategies we have laid out.

  The findings in this report will inform the grantmaking strategy for the Giving Green Fund and our list of Top Climate Nonprofits. Therefore, donors interested in progressing this work can choose to donate directly to the Giving Green Fund.

  Read the glossary of terms for this report here.

Background

As the fourth most populous country in the world, **Indonesia is the fifth-largest contributor to greenhouse gas (GHG) emissions, accounting for roughly 2.5% of global emissions or approximately 1.3 billion tCO_2e**.[1] These emissions are expected to continue to rise as the economy grows, with **electricity demand projected to triple by 2060**.[2] At the same time, Indonesia's per capita emissions remain 30% lower than the global average of 6.6 tCO_2e at around 4.7 tCO_2e per person.[3] This contrast highlights the importance of balancing development priorities with decarbonization for Indonesia.

The power sector is the second-largest source of GHG emissions in Indonesia, accounting for about 40% of emissions when excluding land use, making it a critical lever for decarbonization.[4] In recent years, Indonesia has signaled the ambition to decarbonize its economy with several presidential announcements indicating a full renewable energy transition alongside phasing out all fossil-fueled power plants in the next 10-15 years.[5] While these high-level pledges may signal strong political intent, their translation into credible domestic policies has been lacking. This gap between commitments and policies is reflected in Indonesia's National Energy Policy (Kebijakan Energi Nasional, or KEN) and the Second Nationally Determined Contributions (SNDC) draft submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2025. With a goal to achieve net-zero by 2060, clean energy is expected to

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[1] Excluding land use emissions. "Indonesia's emissions accounted for 2.5% of global GHG emissions. In 2024, Indonesia's GHG emissions increased by nearly 5% (+62.5 Mt CO_2eq) compared with the year 2023 (see Table 1), becoming the sixth largest emitter." Crippa et al., 2025; Indonesia is the fifth-largest emitting country when countries are ranked individually, excluding the EU27 as a single bloc, which EDGAR (Crippa et al, 2025) ranks as the fourth-largest emitter.

[2] Based on electricity demand growth in the National Electricity Plan (RUKN), where demand grows from 539 TWh in 2025 to 1,813 TWh in 2060 in the chart: "RUKN's electricity demand and per capita electricity consumption aligned with Nation Energy Plan". PLN, 2025

[3] Table 1: 2024 GHG emissions ($MtCO_2$ eq), shares in global emissions, changes relative to 2023, emissions per capita (tCO_2 eq/cap), and CAGR (1990-2024) (%). "Indonesia's per capita emissions were 4.7 tCO_2eq/cap in 2024." Crippa et al., 2025

[4] Indonesia's land use sector accounted for 1.3 billion tCO_2e emissions. The power sector accounts for about 25% of emissions when including land use but 40% of emissions when excluding land use. Based on calculations from EDGAR. Crippa et al., 2025; Greenhouse gas emissions by sector, Indonesia, 2023. Our World In Data, 2026; Emissions from the land use, land-use change, and forestry (LULUCF) sector account for about 50% of Indonesia's GHG emissions. Despite its significance, we deprioritized research on this sector this year due to uncertainty regarding the effectiveness of potential decarbonization approaches. The sector also receives substantially greater philanthropic support than other sectors (five times that of the power sector). We remain open to reassessing the decarbonization opportunities within the LULUCF sector in future years as the evidence base and intervention landscape evolve.

[5] "At the 2024 G20 Summit, President Prabowo announced plans to phase out all fossil-fueled power plants within 15 years and develop 75 GW of renewable energy capacity. He later reiterated this goal alongside Brazilian President Lula, suggesting Indonesia could achieve 100% renewable energy within 10 years, sooner than the initial projection of 2040. In subsequent addresses, Prabowo emphasized Indonesia's commitment to a full renewable transition by 2035." IESR, 2026

contribute to only 19-23% of the primary energy mix in 2030 and 70-72% in 2060.[6] Despite the limited political willingness in recent years, President Prabowo's 2025 announcement to achieve 100 GW of solar capacity by 2029 is a promising signal of renewed ambition and has generated enthusiasm among civil society actors, potentially creating a policy window to advance more ambitious clean energy policies.[7]

Currently, Indonesia's power sector remains heavily dominated by fossil fuels, with clean energy sources playing a limited role in the national energy mix. As of 2024, clean energy sources contributed to only 18% of electricity generation. Among clean energy sources, hydropower was the primary contributor at 7.4%, followed by geothermal energy at 5%. Biomass-based generation represented a comparable share of 6%. In contrast, wind and solar energy accounted for a negligible share of just 0.5%.[8]

Indonesia faces substantial institutional barriers to power sector decarbonization. Existing policy and regulatory frameworks offer artificial cost advantages for coal mining and power generation through subsidies and supporting legal frameworks, distorting market economics and making renewable alternatives less financially attractive, despite being inherently cost-competitive.[9] These policies persist despite Indonesia's net-zero ambitions and are reinforced by the country's heavy economic reliance on coal and the deep-seated interests of political actors in the coal industry.[10] State ownership, monopolization, and the centralization of the electricity grid under Perusahaan Listrik Negara (PLN)—the state-owned electric utility company—further compound the challenges facing clean energy projects as PLN utilizes procurement mechanisms and tariffs that prioritize coal-fired power, aligning with current national policies.[11] Policies

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[6] "Government Regulation No. 40 Year 2025 on National Energy Policy set out the ambition to transform by 2030, 2040 and 2060, primary energy supply mix with shares of new & renewable energy as follows: (i) 19-23% in 2030, (ii) 36-40% in 2040, & (iii) 70-72% in 2060." UNFCCC, 2025

[7] "Speaking during a groundbreaking ceremony, President Prabowo Subianto said the government is serious about realizing the program and is aiming to develop 100 GW within three years. According to a statement published by the government, the program will be carried out in phases with the initial phase targeting 17 GW of new capacity. Under this first phase, 14 solar plants with a combined capacity of 5.2 GW are already in various stages of development." PV Magazine, 2026

[8] "In 2024, Indonesia relied on fossil fuels for 82% of its electricity [...] Indonesia's largest source of clean electricity is hydro (7.4%). Its share of wind and solar (0.5%)..." Ember, 2025, based on 2024 electricity data for Indonesia.

[9] "Coal has long been perceived as the cheapest and most accessible source of electricity, largely due to Indonesia's abundant coal reserves, regardless of the falling costs of renewables [...] because coal plants receive subsidies, fixed contracts, & preferential dispatch rights. These market distortions prevent planners & policymakers from recognizing the true costs of the national energy economy, making it increasingly difficult for clean energy to compete with coal." IEEFA, 2025

[10]" With a young coal fleet, a high share of coal in the energy mix and local economies in coal regions highly dominated by the mining industry, the country ranks highest in the world in terms of exposure to the effects of a coal phase out." Wuppertal Institute, 2025; "Since Indonesia became a democracy, business elites have increasingly moved into formal political office, transforming state–business relations from hierarchical patronage to a more fused configuration of public authority and private capital." Apriliyanti et al., 2026

[11] "PLN does not operate independently. Its plans, priorities and prices are politically determined. Although PLN is the main actor in the electricity sector, the rules of the game are set by the ministries, which align with the President's will and priorities." Apriliyanti et al., 2024

favoring coal impose significant financial strain on PLN, limiting its capacity to self-finance grid investments. PLN's vertically integrated structure also makes it difficult to attract capital for grid expansion and modernization, constraining integration of variable renewable energy (VRE).[12]

Addressing these barriers requires a three-pronged approach leveraging insider advocacy, outsider pressure, and evidence generation. Given the critical role of policy reforms, an insider approach would ensure direct and sustained engagement with national decision-makers on coal phase-down as well as clean energy phase-in. Policy advocacy is likely most effective when delivered by credible and trusted organizations to key decision-makers, grounded in rigorous technoeconomic analysis demonstrating economic benefits of clean energy adoption aligned with Indonesia's development goals.

We think the impact of insider advocacy would materialize over a longer time horizon, with limited organizations well-positioned to execute these efforts. On the other hand, outside advocacy is more tractable in the near term, leveraging the collective bargaining power of industrial and commercial customers as well as subnational institutions from provinces with high energy and industrial growth to signal market demand for clean energy and advocate for power sector decarbonization. These two approaches are well complemented by research, modeling, and pilots that, in parallel, can help generate evidence needed to derisk clean energy projects, especially non-utility-scale models, and identify new financing models for transmission projects for PLN to attract more investments.

[12] "Under PLN's vertically integrated structure, transmission investment competes internally with generation development, fuel procurement, distribution expansion, and several policy-driven Obligations [...] From a lender or investor's perspective, this blurs the distinction between fundamentally different risk profiles within the same utility." IEEFA, 2026

Pathways to Decarbonize Indonesia's Power Sector

Summary of key pathways to reduce power sector emissions in Indonesia

- **Fossil fuel transition:** Indonesia remains highly dependent on coal, both for power generation and as economic activity, with captive coal capacity continuing to expand alongside industrial demand. Hence, reducing reliance on a coal-based economy is critical to create a level playing field for clean energy while avoiding long-term carbon lock-in.
- **Clean energy deployment:** Clean energy deployment remains limited in Indonesia, despite the country's substantial resource potential. Building momentum on new clean energy projects—especially renewables like solar and wind—is essential to rapidly substitute coal-based power, and needs to be enabled by appropriate policies, market design, and financial derisking.
- **Grid expansion and modernization:** Grid expansion has lagged behind electricity demand, while renewable resources and major demand centers are geographically mismatched. Integrating variable renewable energy will require proactive expansion and modernization of the grid infrastructure to maintain reliability and meet growing electricity demand sustainably.

We prioritize all of the above pathways, given their interdependent and mutually reinforcing role in enabling power sector decarbonization in Indonesia. We think Indonesia's energy transition should be framed as an economic development opportunity, with power-sector decarbonization serving as a pathway to industrial competitiveness, energy security, and long-term economic growth.

Fossil Fuel Transition

As a result of existing political economy challenges, sticky incumbent policies, and new energy demand drivers, coal remains deeply embedded in Indonesia's energy system and continues to expand despite the country's long-term decarbonization ambitions. Coal accounted for about 54 GW of the 100 GW of total electricity generation capacity in Indonesia. Of this 54 GW, roughly 41 GW comprises on-grid coal-fired power plants (CFPPs) operated by PLN, while the remainder consists of off-grid captive CFPPs.[13] PLN's

[13] "As of 2024, the country operates approximately 54 GW of CFPP capacity, making coal the largest source of electricity. PLN manages around 41 GW of this, with 21 GW from its own fleet and

10-year electricity plan reflects continued investment in grid-connected coal power with about 6 GW additions planned by 2034. More recently, Indonesia has seen rapid expansion in off-grid captive CFPPs with capacity doubling in just the last two years and an additional 20 GW expected to be added by 2031.[14] The latest national energy plan reflects this continued reliance on coal with planned capacity expansions until 2034 and growth in coal-related emissions until 2038.[15] In the proposed net zero scenario, 26% of the energy mix still consists of coal and gas, with abatement expected from carbon capture and utilization technologies despite their low technology readiness levels.[16] As electricity demand grows, coal investments risk locking in fossil fuel dependence and slowing the transition to cleaner sources of generation.

Economic dependence on coal: Indonesia is the largest exporter of thermal coal, with robust infrastructure and a supply chain to support continued mining operations and high domestic coal reserves that are expected to last more than 40 years.[17] The coal mining industry contributes to around 4% of Indonesia's national gross domestic product (GDP) and around 11% of export earnings.[18] Additionally, coal mining offers significant royalty revenues and tax support for local and national government budgets.[19] Provinces of East Kalimantan, South Sumatra, and South Kalimantan contributed a combined 80% of the national coal output, with coal playing a critical role in regional economic development

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20 GW operated by IPPs under contractual scheme." IEEFA, 2025; Captive CFPPs refers to on-site or localized coal-fired power generation facilities built by a specific industrial or commercial customer—such as a mine, smelter, or manufacturing plant—to meet its own electricity needs instead of buying power from the grid.

[14] "The electricity master plan reveals Indonesia's intent to increase its coal capacity by 26.8 GW in seven years. Captive coal is the main driver of this coal expansion, representing over 20 GW of new coal capacity. Consequently, coal generation is expected to surge and reach its peak in 2037, with a 62.7% higher generation than current level." Ember, 2025

[15] "The SNDC draft, submitted to UNFCCC on October 27, 2025, sets Indonesia's renewable energy mix target of 19%–23% by 2030—falling short of the global benchmark to reach 79% by the same year—and projects the energy sector's emissions peak by 2035-2038." IESR, 2026

[16] Share of coal and gas in 2026 based on RUKN 2060 Generation Mix (p.22). "In the RUKN 2025-2060, achieving net zero emissions by 2060 is presented as theoretically possible, yet more than half of the 2060 electricity mix still depends on "new energy" (nuclear, hydrogen, and ammonia) along with fossil-fuel plants equipped with carbon capture and storage (CCS) [...] CCS projects worldwide have so far delivered limited results, with no large-scale example proving commercially viable at the scale required for deep decarbonization." IESR, 2026

[17] "As the world's largest thermal coal exporter, the country has long leaned on the commodity as a cornerstone of its economy. In 2024, it produced a record 836 million tonnes, nearly 18% above the government's target. [...] The MEMR estimates that Indonesia's coal reserves will last for about 41 years, indicating at least medium-term supply security." ESI, 2025

[18] "In 2022, the coal sector contributed approximately 3.6% to the national GDP [...] Coal accounted for 11.4% of the total export value of goods in 2022, helping the country to achieve a balanced trade sum between imports and exports in the last decade." Wuppertal Institute, 2025

[19] "The sector contributed more than half, or 50.9%, of total national revenue generated by natural resources, significantly boosting Dana Bagi Hasil (DBH), the revenue-sharing mechanism between the central and regional governments. DBH funds shared by the central authorities with the regions reaching IDR99.4 trillion [$5.3 billion] in 2023, up from IDR68.7 trillion [$3.8 billion] in 2022." ESI, 2025

and employment opportunities.[20] As the largest exporter of refined nickel, Indonesia is expecting significant industrial growth due to the boom in global nickel demand.[21] In recent years, energy demand from nickel mining and smelting operations has driven rapid and ongoing expansion of captive CFPPs.[22] Given the classification of the nickel industry-related projects as projects of national strategic importance, these CFPPs fall outside Indonesia's coal moratoriums.[23] Similarly, the government plans to pursue coal downstreaming applications—particularly coal-to-methanol projects—which it has also classified as projects of national strategic importance, extending Indonesia's reliance on coal beyond the power sector.[24] Danantara, Indonesia's sovereign wealth fund, is directly involved in advancing these projects, creating the risk of coal demand persisting or shifting to new uses even as CFPP capacity declines.[25]

Policies and regulations: Overall, the Indonesian government disproportionately favors subsidies for fossil fuels over clean energy sources, allocating about 66% of energy subsidies to fossil fuels.[26] Historically, several market interventions and

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[20] "In East Kalimantan, Indonesia's largest coal-producing province, coal mining accounted for 11% of total employment in 2020, and in South Sumatra & North Kalimantan, it contributed 3% & 4%, respectively [...] In East Kalimantan, coal mining represents 30-35% of regional GDP." ESI, 2025; "The three major coal-producing provinces in Indonesia are East Kalimantan, South Sumatra and South Kalimantan. Their combined output is around 80% of the national production." Wuppertal Institute, 2025

[21] "Home to the world's largest nickel reserves, Indonesia produced nearly two-thirds of global raw nickel (mine production) in 2024, exceeding the combined output of all other producers. [...]At the same time, demand for nickel is expected to grow significantly. Under the International Energy Agency's net-zero scenario, global nickel supply would need to roughly double by 2050, driven mainly by low-carbon technologies such as electric vehicle (EV) batteries." WRI, 2026

[22] "Driven by energy-intensive demand from nickel processing, Indonesia's captive coal capacity already exceeds 15 GW in 2024. If current trends continue, capacity could more than double to over 32 GW by 2031 — nearly the size of Germany's coal power fleet." Ember, 2025; "Breaking down the current distribution by industrial sector, the nickel industry remains the primary captive coal user, with 15.4 GW in operation and 2.5 GW in construction." CREA, 2026

[23] "Despite the fact that a coal moratorium has been practically enforced under Presidential Regulation No. 112 Year 2022, Indonesia continues to integrate new coal power generation into the national power systems — both on-grid and off -grid. This has been made possible through specific exemptions for coal projects already included in PLN's 10-year business plan RUPTL 2025-2034, as well as for captive power plants dedicated to "national strategic projects" that contribute to value-added processing. Furthermore, Indonesia's National Electricity General Plan, RUKN 2024-2060, outlines the continued expansion of coal capacity by 26.8 GW over the next seven years, driven largely by over 20 GW of industrial captive power projected to peak in 2037 (Ember, 2025)." CREA, 2026

[24] "The Indonesian government has designated the project as a National Strategic Project, enabling faster regulatory approvals and smoother implementation while aiming to establish a commercially viable coal conversion business." ChemAnalyst, 2026

[25] "Indonesia seeks to boost coal gasification projects using funding from its newly launched sovereign wealth fund Danantara Indonesia, the country's energy minister said [...] The coal gasification projects are part of the 21 natural resource processing projects worth $40 billion that the government seeks to accelerate." Reuters, 2025

[26] "The government allocates about two-thirds of total subsidies to energy primarily for fossil fuels, which are projected to reach IDR 1,023 trillion [$57 billion] by 2026—accumulated in just five years. These subsidies have placed a growing burden on the national budget and continue to reinforce

incentives—including loan guarantees, tax exemptions, tariff waivers, preferential tax rates, rebates and allowances, price caps, market obligations, and support for research and development—have enabled the expansion of coal mining and power generation activities over the last decade.[27] The Domestic Market Obligation (DMO)—which mandates a minimum 25% of the coal output allocation for domestic consumption—and Domestic Price Obligation (DPO)—a cap of $70 per metric ton on the price of domestic coal, well below global market rates—are the most significant market instruments that make CFPPs attractive investments for PLN and independent power producers (IPPs).[28] Both of these policies artificially suppress the cost of coal-power generation by lowering procurement costs and offering predictable revenues to CFPPs through assured sales to PLN. Another hindrance to coal retirement or transition to clean energy is the Corruption Eradication Law, which criminalizes activities that cause "state financial or economic losses." Since PLN's CFPPs can be classified as state-owned assets, PLN officials risk dismissal or imprisonment for their involvement in renewable energy procurement or early retirement of owned CFPPs.[29]

Political economy of Indonesia: Indonesia's political system is characterized by close ties between politicians and domestic businesses. Thus, shifts from coal are complicated by vested interests of political figures in coal businesses, creating institutional impediments to translation of commitments and presidential pledges to policies.[30]

Interventions: Addressing these multidimensional challenges requires understanding the needs and motivations of stakeholder groups most impacted by coal transition. Proactive, nonconfrontational engagements demonstrating the critical relevance of economic alternatives can help reduce resistance to transition and build buy-in for alternatives to the coal-based economy. Insider advocacy with politicians can help showcase the social

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Indonesia's dependence on fossil fuels. Without comparable incentives for renewables, scaling up renewable energy will remain challenging in a market that favors fossil fuels." IESR, 2026

[27] Summary of subsidies and support for coal industry in the section "(Socio-)Economic Costs" and "Table 5. Estimates of Subsidies to Coal from 2014 to 2017." Wuppertal Institute, 2025

[28] "To ensure affordable domestic supply, the MEMR mandates producers to allocate 25% of their output to the local market under a DMO policy. The DPO sets maximum regulated prices of USD70 per tonne for domestic electricity generation and USD90/tonne for certain industries." ESI, 2025; Independent Power Producer is a private entity that owns and operates electricity generation facilities under long-term Power Purchase Agreements (PPAs) to sell power to PLN.

[29] "As PLN's CFPP are state-owned, early retirement could incur losses to the state. Thus, respondents claimed that PLN officials who approve the early retirement of a state-owned CFPP could be dismissed or even imprisoned by the Indonesian Supreme Audit Institution or the Corruption Eradication Commission for mishandling state-owned assets." Rauch, 2024

[30] "Since Indonesia became a democracy, business elites have increasingly moved into formal political office, transforming state–business relations from hierarchical patronage to a more fused configuration of public authority and private capital. [...] Under these conditions, resistance to decarbonization often reflects not external pressure from firms, but the internalization of business interests within state institutions themselves. The alignment between economic elites and political officeholders enables carbon-intensive development strategies to be framed as imperatives of growth, affordability, and energy security, thereby reinforcing regime resistance from within the central state apparatus." Apriliyanti et al., 2026

and economic costs of coal in the medium-to-long term and implications for Indonesia's energy security and economic competitiveness.[31]

Similarly, a window of opportunity is open to engage with coal businesses and support them with transition planning and diversification as they face declining coal demand in key markets, shifting investor preferences, and concentration risks.[32] In communities and provinces with high coal dependence, piloting economic diversification opportunities early on can help secure social license for transition. While engagement with key politicians and ministries may help build support to reduce market distortions created by DMO and DPO, additional technoeconomic analysis and evidence-backed narratives will be required to demonstrate the social and economic costs associated with continued reliance on a coal-based economy.

Specifically, we think advocacy should target policies such as DPO to reflect market coal prices, reform the Corruption Eradication Law to remove barriers to early retirement of CFPPs, create legal frameworks for retirement and repurposing of CFPPs, and strengthen the carbon tax and emissions trading scheme, among others. Advocacy to advance the phase-down of CFPPs should be supported by evidence generation around technoeconomic and operational feasibility of repurposing options as well as potential financing mechanisms.[33]

Clean Energy Deployment

Indonesia will need to substantially scale clean electricity generation to meet its rising energy needs while staying on a net-zero trajectory. Based on Indonesia's National Electricity Plan (RUKN), clean energy capacity must increase from around 13 GW in 2024 to 326 GW by 2060 to stay on a net-zero trajectory, implying a 25-fold expansion over 35 years. More than 50% of this capacity addition needs to come from VRE sources, including solar and wind, which currently stand at less than 1 GW of combined capacity. Among clean energy sources, the theoretical potential of solar is highest, followed by wind, hydropower, geothermal, and ocean energy.[34] Despite a significant

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[31] Quantifying the external costs of coal—including the public health burden from air pollution—can help demonstrate the true economic cost of Indonesia's reliance on coal.

[32] "Indonesia's coal production is forecast to continue its gradual downward trend through 2035, driven by ongoing mine depletion, tightening environmental regulations and structural shift towards renewable energy domestically and across key export markets." Mining-Technology, 2025; " Many coal producers in Indonesia derive nearly all their revenue from fossil fuels, with limited diversification [...] A large portion of production comes from a single mine. Many of the companies rely on one primary mine for 89-90% of their total output." ESI, 2025

[33] Repurposing options may include battery energy storage systems, thermal energy storage, hydrogen or ammonia production, agrivoltaics, and other uses. The Climate Investment Funds categorizes coal plant repurposing concepts into five broad end uses: electricity generation, energy storage, hydrogen and ammonia production, carbon sinks, and non-energy, non-carbon uses. Climate Investment Funds, 2023

[34] "RUKN 2025-2060 establishes comprehensive roadmap targeting 73.6% renewable energy mix (326 GW capacity) by 2060 from total 443 GW generation capacity, supporting Indonesia's Net Zero Emission commitment by 2060 or earlier [...]Technology diversification strategy acknowledges Indonesia's exceptional renewable resource endowment exceeding 3,686 GW

resource base and the important role of renewables in decarbonizing the power sector, deployment—particularly solar and wind—has remained limited due to policy, regulatory, financial, and infrastructure barriers that reduce the attractiveness of renewable energy relative to fossil-fuel generation.[35]

Policy and regulatory barriers: Clean energy deployment in Indonesia remains constrained by a range of policy and regulatory barriers that increase project risk and reduce profitability relative to fossil-fuel generation. The impact of DMO and DPO is most significant in weakening the economic case for renewable energy investment.[36] At the same time, regulatory frameworks to support development of clean energy projects are either missing or difficult to navigate, leading to complex procurement processes and opaque land acquisition and permitting requirements increasing development costs and delaying project execution. For example, procurement frameworks often lead to uneven risk allocation in power purchase agreements (PPAs), shifting commercial and regulatory risks onto developers, reducing project bankability.[37] The absence of power wheeling mechanisms prevents IPPs from directly supplying customers who are willing to pay for clean electricity, constraining both demand growth and investment.[38]

Despite the existing multi-layered regulatory framework for energy and electricity planning shown in **Figure 1**, political and economic considerations often lead to shifts in targets, resulting in conflicting targets across policies and weakening coherence in long-term planning and implementation.[39]

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theoretical potential spanning solar (3,295 GW), hydropower (95 GW), geothermal (29 GW), bioenergy (33 GW), wind (155 GW), and ocean energy (60 GW)." Supra-International, 2025

[35] "The renewable installed capacity has only grown by 854.57 MW annually over the past few years, far below the fossil fuel which has increased by 4.58 GW. This slow growth of renewable plants highlights the need for enhanced regulation, infrastructure, and financial mechanisms to increase the deployment of these RE potentials." IESR, 2025

[36] "Indonesia faces a significant challenge in attracting green investment because its electricity tariffs are relatively cheap, making them some of the lowest in the Asia-Pacific region [...] The generation costs associated with renewable energy projects are typically higher than the subsidised power tariffs established by the government. The low electricity tariffs in Indonesia have impeded PLN and IPPs to invest in renewable energy projects." Prakoso et al., 2025

[37] "PLN's procurement processes tend to be plagued by poor communication with the market, short bidding timelines, and low-quality documentation. Developers must deal with insufficient documentation, the lack of credibility of tender documents, and the short period between tender announcements and bid submissions, resulting in additional costs, low levels of competition, and 'speculative bids.' [...] Currently, RE is not considered a national priority program, i.e., one where the government assists developers to secure land. This is very different from some countries that provide land for RE projects, generating low prices. [...] Developers also encounter complexity when obtaining permits, often involving numerous stakeholders and various regional-level processes. The issues related to land and permits are frequent causes of project delays and increased costs." Halimatussadiah et al., 2024

[38] Power wheeling allows industrial and commercial customers to procure clean energy directly from an independent power producer, bypassing the utility as energy supplier while still utilizing the grid for transmission purposes and paying 'wheeling charges' to the utility.

[39] "The revised KEN sets an emissions peak by 2035 and targets clean energy development comprising 70–72% of the energy mix by 2060 [...] This trajectory diverges from the RPJPN, which envisions a 70% renewable share by 2045 as part of the Golden Indonesia 2045 agenda. These

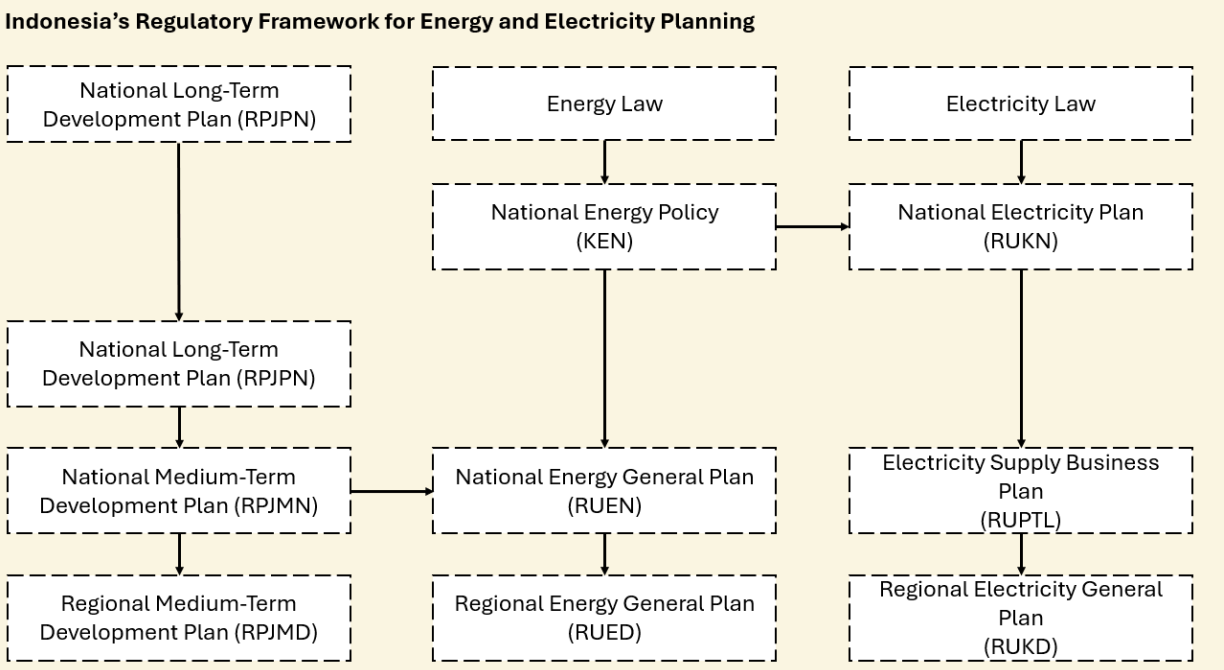


Figure 1: Indonesia's regulatory framework for energy and electricity planning[40]

Frequent legislative changes and weak coordination across government institutions and planning processes increase uncertainty for investors. **Figure 2** demonstrates the complexity in the electricity planning processes and critical role of alignment across various stakeholder groups to ensure policy coherence. Finally, renewable energy targets are not consistently reflected in power sector investment plans, resulting in mixed signals about Indonesia's commitment to renewable energy deployment and the long-term direction of the energy transition.[41]

inconsistencies stem from shifting policy priorities and institutional constraints, as KEN targets are often revised to align with political and economic considerations." IESR, 2025

[40] Adapted from diagram on p. 62 describing the regulatory framework. IESR, 2025

[41] "Renewable energy targets are not always harmonised with power sector investment plans, and coordination across multiple, sometimes overlapping, frameworks remains difficult. Fossil fuel subsidies further distort market signals, reducing the appeal of renewables for private investors." GTR, 2026; "Indonesia has undergone significant legislative changes in the renewable energy sector. [...] The ongoing alterations to laws and regulations have created uncertainty for prospective investors in the business." Halimatussadiah et al., 2024

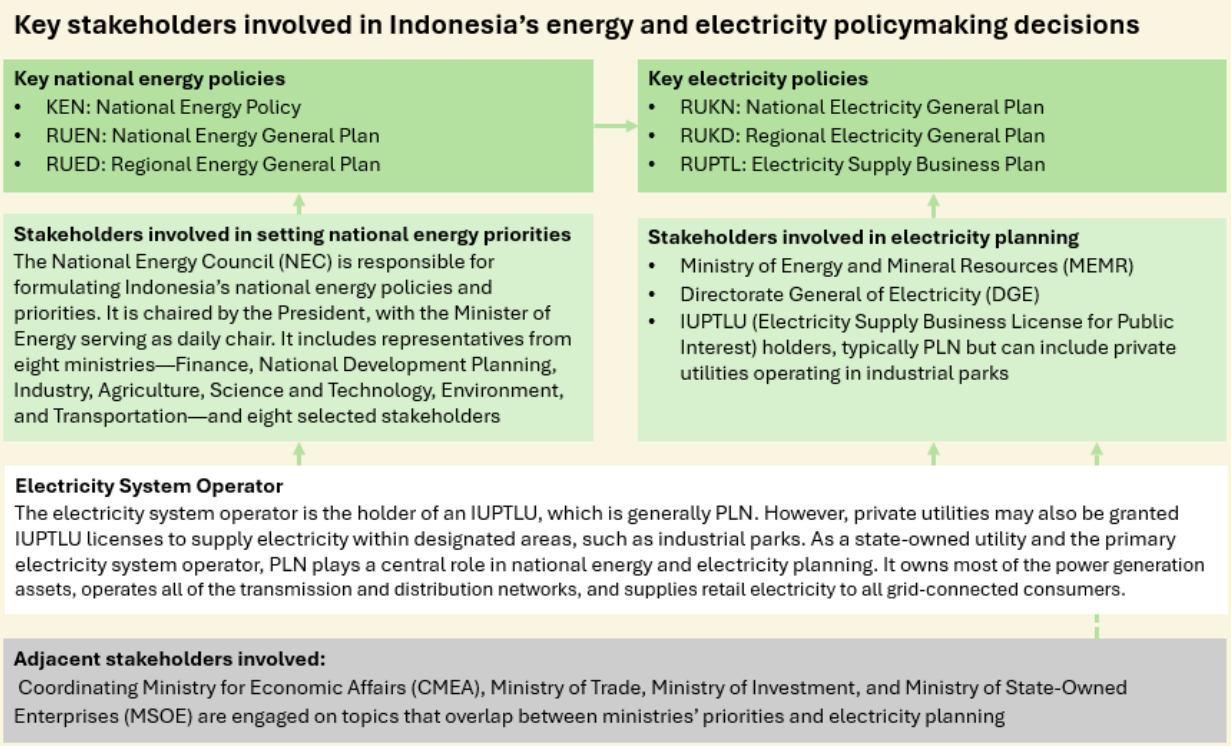


Figure 2: Key stakeholders involved in Indonesia's energy and electricity policymaking decisions[42]

Financial barriers: Many financing challenges stem from the policy and regulatory barriers described above, which increase project risk and development costs. While there is growing investor interest in Indonesia's renewable energy sector, fossil-fuel projects continue to attract a larger share of capital.[43] Additional factors constraining investments in clean energy include limited familiarity with renewable energy projects among domestic financial institutions, perceived technology and off-taker risks, and an underdeveloped market for renewable energy finance.

Access to financing is particularly challenging for local developers and for non-utility-scale deployment models such as rooftop solar, community solar, and battery energy storage systems.[44] These projects often lack the scale, track record, or

[42] Adapted from Figure 19, "Overview of the Energy Market in Indonesia," in the Climate Investment Funds report, with additional input from the IESR team. CIF, 2023

[43] "The renewable energy sector in Indonesia has significant challenges in securing local financing. The nation's financial institutions lack adequate experience and comprehension in precisely assessing renewable energy projects, leading to a sense of heightened risks and a deficit of confidence in the viability of such initiatives." Prakoso et al., 2025

[44] "Banks generally favor large-scale projects that offer greater cost efficiency, as small-scale projects often entail similar administrative costs but yield lower returns. They also prioritize sponsors with strong credit histories to minimize credit risks." IESR, 2025; "...with local developers generally finding it harder to access competitively priced capital. The disparity is the result of the local industry's general difficulties in accessing international funding and the lack of experience with local RE project finance." Halimatussadiah et al., 2024

contractual arrangements needed to secure affordable financing. At the same time, public funding and international climate finance crucial to derisk emerging technologies and business models are insufficient relative to investment needs, limiting the pace of renewable energy deployment.[45]

Interventions: Creating an enabling environment for clean energy deployment would require policy advocacy centered around the critical role of clean energy to achieve Indonesia's growth and development aspirations. The economic and developmental case—including co-benefits offered by renewables such as job creation, energy access, improved air quality and associated public health outcomes, and industrial competitiveness—needs to be clearly demonstrated to key decision-makers across ministries. Effective advocacy narratives should build on existing coal phase-down efforts while advancing the case for clean energy as a driver of economic opportunity. Such narratives should draw on rigorous cost-benefit analysis across multiple scenarios, illustrating not only the costs avoided through the clean energy transition, but the broader economic gains unlocked by its deployment. Grounding advocacy in evidence-based analysis would strengthen buy-in for clean energy projects and support informed decision-making.

Specifically, we think advocacy should target policies that enable renewable procurement and deployment through power wheeling, standardized and bankable PPA frameworks, legal frameworks for firm energy sources like geothermal and nuclear, non-utility-scale deployment models, and transparent renewable energy auction mechanisms.

Simultaneously, reducing the risk perception of renewable energy projects is critical to building early momentum despite the existing policy environment. Supporting research and pilot initiatives can help generate evidence around risk profiles and viability of various clean energy deployment and business models, including rooftop solar, community solar, and floating solar, which is valuable for investors and developers exploring clean energy projects. Such efforts would lay the groundwork for rapid scale-up, positioning clean energy for accelerated deployment as policy support continues to expand.

Grid Expansion and Modernization

Scaling Indonesia's renewable energy generation will require a parallel and equally ambitious expansion of its transmission and distribution infrastructure. Historically,

[45] "Private financiers from Indonesia's four largest commercial banks are showing growing interest in renewable energy projects, with financing rising by 23% in Q1 2025 reaching IDR 36 trillion. However, this figure remains small compared to the mining and quarrying sector, which continues to expand rapidly, reaching IDR 267 trillion by mid-2025. This indicates that extractive industries still dominate Indonesia's financing landscape. [...] From the financing aspect, international financial support, particularly aid and grants, remains limited. The stagnation of JETP financing, exacerbated by the U.S. withdrawal, has disrupted the flow of international funds. [...] At the national level, government budget allocations for renewables declined compared with the previous year [2024], signaling weak support for clean energy deployment." IESR, 2026

investments in grid expansion have been insufficient, with growth in transmission infrastructure severely lagging behind electricity demand growth.[46] PLN's Electricity Supply Business Plan (RUPTL) seeks to address these challenges through substantial investments in transmission expansion, inter-island interconnections, and development of a national 'Super Grid' that connects generation with demand centers.[47] With an estimated $24 billion needed in transmission investments over 10 years, neither PLN nor private capital is currently positioned to deliver investment at the required scale.[48] Three interlocking challenges make grid infrastructure structurally difficult to finance in Indonesia.

Geographic fragmentation and resource-demand mismatch: Indonesia's power system is highly fragmented, consisting of multiple isolated and weakly interconnected grids spread across its archipelagic geography. Indonesia's strongest renewable resources are concentrated in regions such as Sumatra, Kalimantan, Sulawesi, and eastern Indonesia, while major demand growth is driven by industrial estates, urban centers, and economic zones located elsewhere.[49] The mismatch between resource availability and grid connectivity increases the risk perception of renewable energy projects due to greater uncertainty around grid access, curtailment risk, and project economics. Limited inter-island interconnection capacity forces continued reliance on captive power and diesel generation, increasing system costs.

The existing transmission network was largely designed around centralized coal-fired generation serving relatively isolated regional grids.[50] The transition toward a power

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[46] "Between 2020 and 2024, Indonesia's power infrastructure expanded, but still fell short of meeting rising electricity demand. Transmission and distribution (T&D) lines grew at annual rates of 10.1% and 1.5%, or 6,242 ckm and 17,269 ckm per year, while substation capacity increased by 3.1% for main substations & 2.9% for distribution substations. Electricity consumption rose faster, with CAGRs of 10.3%, 3.4%, and 6.3% at the high-, medium-, and low-voltage levels." IESR, 2026

[47] "..the 2025-2034 RUPTL puts a particular emphasis on plans to develop a "Green Enabling Super Grid." [...] The objective of this initiative is to overcome the mismatch between the potential of NRE - largely concentrated in regions such as Sumatra, Kalimantan, Sulawesi, and Nusa Tenggara - and the centres of demand in Java, Madura and Bali. This Super Grid will be supported by smart grid technologies and flexible generation capabilities, with the goals of enhancing system efficiency, reliability, sustainability, and cross-island interconnectivity." Ashurst, 2025

[48] "Indonesia's Electricity Supply Business Plan (RUPTL) 2025–2034 requires an average annual transmission investment of USD2.4 billion to support large-scale renewable energy deployment, industrial electrification, and inter-island grid integration. Realized investment has averaged only USD1.4 billion annually since 2019." IEEFA, 2026

[49] "Java and Sumatra dominate the transmission network, whereas regions such as Kalimantan, Sulawesi, and eastern Indonesia continue to suffer from inadequate infrastructure. These gaps hinder the optimal integration of renewable energy from resource-rich areas like East Kalimantan and East Nusa Tenggara, which have substantial solar and wind potential but lack sufficient grid connectivity. [...] While demand is concentrated in Java and Bali, the most abundant renewable energy resources are located outside these regions. Industrial parks, mainly located in Sulawesi and Kalimantan, are generating substantial baseload electricity demand in regions with historically limited grid infrastructure." Tenggara Strategics, 2025

[50] "Indonesia's electricity grid was built around centralised coal-fired power plants on its major islands – a configuration not designed for integrating variable renewable energy (VRE) or managing power flows across the archipelago's fragmented grids." GTR, 2026

system with higher VRE shares, industrial electrification, battery storage, and potentially regional power trade requires a fundamentally different network architecture, including stronger inter-island connections, greater system flexibility, higher levels of digitalization, and a more integrated national grid. Significant modernization gaps persist as smart-grid infrastructure remains underdeveloped, with limited energy storage, advanced metering, automated fault detection, and real-time load management capabilities. Grid codes and market frameworks designed for firm energy generation are insufficient to integrate renewable energy variability, forecasting, or flexible dispatch.[51] Together, these constraints reduce system efficiency and limit the grid's ability to accommodate a more distributed, renewable-intensive power system, creating a high baseline risk perception that compounds the financial and structural barriers described below.

Transmission financing constraints: PLN's annual investments in recent years fall short of investment requirements based on RUPTL. As a vertically integrated utility, PLN operates across generation, fuel procurement, transmission, distribution, and retail electricity supply. Transmission assets remain embedded within PLN's consolidated balance sheet, which fails to reflect the lower risk profile of transmission investments and prevents investors from evaluating them as a distinct low-risk infrastructure asset class.[52] Instead, transmission investments are primarily financed through PLN's corporate balance sheet, including retained earnings, bank lending, multilateral financing, and sovereign-supported borrowing, rather than through dedicated project-finance structures that can access a broader pool of institutional and private capital.[53]

Moreover, transmission costs are bundled within overall electricity tariffs and PLN's broader cost structure, making cash flows less transparent and difficult to ring-fence. Tariff setting is also influenced by affordability and political considerations, with subsidies and compensation mechanisms frequently used to bridge the gap between regulated tariffs and PLN's underlying costs.[54] Together, these factors reduce revenue transparency, complicate risk allocation, and weaken the bankability of transmission assets for private and institutional investors.

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[51] Based on the section "Five weaknesses define Indonesia's current power system constraints". GTR, 2026

[52] "Under PLN's vertically integrated structure, transmission investment competes internally with generation development, fuel procurement, distribution expansion, and several policy-driven obligations. Although transmission is one of the lowest-risk and most economically productive segments of the power system, it is financed through the same corporate balance sheet that absorbs fuel price volatility, foreign-exchange exposure, subsidy timing risk, and long-term power purchase commitments. From a lender or investor's perspective, this blurs the distinction between fundamentally different risk profiles within the same utility." IEEFA, 2026

[53] "Transmission finance is typically heavily reliant on corporate balance sheets, requiring adherence to specific financial ratios that can constrain funding capacity. This dependence may limit scalability and increase the financial exposure of PLN." CPI, 2026

[54] "Without a fee, transmission costs are currently bundled into overall electricity tariffs, making it harder to isolate these revenue streams to strengthen project viability." IEA, 2023; "A key factor impacting financial returns is a restricted, regulated tariff based on cost recovery that limits the variability of revenue models." CPI, 2026

PLN's structural constraints: As a state-owned enterprise, PLN is mandated to provide affordable electricity to consumers, limiting revenue from the sale of electricity. Under the DMO, coal producers are obligated to supply coal to PLN at a regulated price, and PLN is obligated to purchase it, ensuring use of relatively cheap domestic coal for power generation. Separately, PLN purchases electricity from IPPs through long-term PPAs, which can lock in coal-based generation for decades. A surplus in the Java-Bali grid has forced PLN to continue to pay IPPs for contracted power under existing long-term contracts despite lower consumption, straining PLN's financials and diminishing capacity to invest in clean energy as well as transmission projects.[55] The underutilization of existing CFPP capacity in the region further disincentivizes investments in new clean energy projects.[56]

Critically, PLN's financial distress is a result of policies, market obligations, and procurement structures that favor coal. These mechanisms drive continued dependence on coal and constrain PLN from investing in the grid, thereby exacerbating challenges to power sector decarbonization within Indonesia's politically constrained energy transition.

Interventions: Indonesia's grid investment challenge is triply constrained by (i) a geographical mismatch between renewable resources and demand centers that makes inter-island transmission expensive and complex, (ii) PLN's deteriorating financial position driven by policies that favor coal procurement limiting its capacity to self-finance grid expansion, and (iii) a financing architecture that makes transmission structurally unattractive to private and institutional capital. We think policy advocacy efforts described in earlier sections, if successful, would ease PLN's financial constraints by reducing coal procurement obligations but will likely be insufficient to unlock the scale of financing needed for grid modernization and building inter-island transmission. Improving the attractiveness of transmission as an asset class is therefore crucial to support in parallel.

We think evidence generation efforts are in early stages of assessing potential financing models like joint ventures, public-private partnerships (PPPs), infrastructure investment trusts (InvITs), collective investment schemes for infrastructure, and ring-fenced transmission subholdings to shift transmission financing from PLN's corporate balance sheet toward project finance structures.[57] Continued research and modeling efforts

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[55] "The Java-Bali system possesses a diminished capacity for renewable energy relative to other islands, although it fulfills almost 68% of Indonesia's present electricity consumption of 58 GW." Prakoso et al., 2025; "Take-or-pay and guaranteed off-take obligations in power purchase agreements (PPAs) between PLN and IPPs reduce incentives for thermal units to be flexible and affect system efficiency." ADB, 2025; "Under the ToP, PLN is obligated to pay for electricity produced by IPPs, regardless of whether the power is used. In 2023, the total additional ToP under this condition amounted to Rp 3.9 trillion. This situation places significant financial strain on PLN." Tenggara Strategics, 2025; "This trend [in investments dominated by IPPs for generation projects] is driven in part by PLN's increasing debt burden and obligations under "take or pay" contracts with IPPs, which have constrained its ability to make large capital investments." CPI, 2025

[56] "This surplus stems from outdated electrical regulations that planned power plant projects based on overestimated economic growth projections. The COVID-19 pandemic exacerbated this issue by causing a significant drop in electricity demand." Tenggara Strategics, 2025

[57] Climate Policy Initiative and Institute for Energy Economics and Financial Analysis have done some early work on identifying potential financing models for PLN. CPI, 2026; IEEFA, 2026

alongside engagement with PLN and relevant ministries will be crucial to build the regulatory and institutional support for adoption of these financing structures.

Assessment of Philanthropic Sub-Strategies

We identified five promising philanthropic sub-strategies and evaluated each sub-strategy's scale, feasibility, and funding need (see **Table 1**). For more information on these metrics and our research process, see Giving Green's Research Overview.

Table 1: Scale, feasibility, and funding need of approaches nonprofits use to promote Indonesia's power sector decarbonization

Sub-strategy	Scale	Feasibility	Funding need
Providing technical assistance and capacity-building support to high-growth industrial provinces with energy transition planning and implementation	Medium	High	High
Advancing policy and regulatory reforms that accelerate clean energy deployment	Medium	Medium	High
Supporting evidence generation (research and pilots) to derisk clean energy and transmission projects	Medium	Medium	High
Mobilizing the corporate sector to drive clean energy market and policy reform via industrial and commercial customer coalitions	Medium	High	Medium
Advocating for policy reforms to reduce subsidies and incentives for coal and facilitate retirements and repurposing of coal assets	High	Low	Medium

We chose to center sub-strategies with at least one high and no low ratings in our strategy, while also including sub-strategies with one high and fewer than two lows as supplementary sub-strategies. **Based on the above evaluations, we think the first four of the above philanthropic sub-strategies are promising and also consider supporting the last sub-strategy as valuable.**

We expand on our reasoning for prioritizing these sub-strategies below. Further information on our reasoning for deprioritizing the remaining sub-strategies is available on Giving Green's research dashboard.[58]

[58] In addition to the Indonesia-specific sub-strategies identified in this report, Giving Green's derisking clean electricity investment in low- and middle-income countries (LMICs) strategy takes a cross-cutting, multi-country and regional approach. It identifies philanthropic opportunities to address common investment barriers and increase capital flows for clean electricity deployment across multiple countries. See our *Derisking Clean Electricity Investment in LMICs* report for a comprehensive overview of these cross-cutting strategies.

Providing Technical Assistance and Capacity-Building Support to High-Growth Industrial Provinces With Energy Transition Planning and Implementation

Scale	●●○ Medium
Feasibility	●●● High
Funding need	●●● High

Scale: Medium. We think the mitigation potential of subnational action can be substantial because provincial institutions are responsible for the deployment and implementation of decarbonization efforts. In Indonesia, a few regions—such as Java, Sulawesi, and Kalimantan—are experiencing rapid industrial growth and will likely absorb a large share of future electricity demand.[59] Hence, leveraging the negotiating power and building implementation capacity in these regions can shape long-term emissions trajectories. As the transition grows more complex, subnational planning, procurement, and coordination capability will become increasingly relevant and determine the effectiveness of other mitigation strategies.

Feasibility: High. Decision-making in Indonesia's energy sector has become increasingly centralized, limiting the influence of provincial and local governments on major energy policy decisions.[60] However, subnational institutions remain critical for policy implementation, economic development planning, and project execution.[61] Based on inputs from experts, we think provinces with significant industrial activity and strong projected electricity demand growth will likely have greater ability to shape investment priorities and advocate for enabling policies. Supporting technical assistance and capacity-building in these provinces could help accelerate decarbonization in key economic hubs while informing national policy discussions. Existing initiatives—including low-carbon development planning efforts supported by international partners in several provinces, and the adoption of net-zero ambitions by Bali, Jakarta, East Nusa Tenggara,

[59] "With last year's additions, Sulawesi & North Maluku are firmly established as the island groups with highest captive coal power generation capacity in Indonesia. Large-scale projects announced in Riau Islands (4.75 GW), North Kalimantan (1.1 GW), & West Java (2 GW) signal that these provinces are set to become Indonesia's newest frontiers for captive power growth." CREA, 2026

[60] "Decision-making authority in strategic sectors, such as energy and forestry, is still concentrated at the national level. National climate and energy targets in Indonesia are set through central planning frameworks, such as the National Energy Plan, which serves as the basis for the Provincial Energy Plan." IRID, 2025; "Although Indonesia was once a global model for decentralization, the central government has used new legal frameworks to regain control over regional affairs [...] National transfers to subnational governments are projected to decline significantly, from around 28% of total expenditure in 2023 to approximately 17% by 2026." International Budget Partnership, 2026

[61] "Most of the difficulties faced by local governments in developing robust RUEDs [provincial energy transition plans], are attributable to a lack of capacity as well as limited understanding about clean energy. Many local governments, for example, lack the financial and human resources to undertake the modelling and research work needed to develop RUEDs. Local governments also lack the authority to set a sufficiently attractive renewable power price as set out at the national level. Adding to the challenges, there is a very long bureaucratic process to obtain local parliaments' final approval of RUEDs." OECD, 2021

and West Nusa Tenggara—suggest there is interest among some subnational actors in advancing more ambitious decarbonization strategies.[62]

Funding need: High. Technical assistance at the national level attracts some funding from development partners and philanthropic actors, particularly through established programs.[63] However, support for subnational institutions remains fragmented and inadequate, with gaps in capacity building for energy transition planning, implementation, and coordination.[64] Provincial governments are often resource-constrained and lack the technical expertise required to support decarbonization efforts.[65] We think existing funding support is insufficient relative to the level of sustained engagement required.

Advancing Policy and Regulatory Reforms That Accelerate Clean Energy Deployment

Scale	Medium
Feasibility	Medium
Funding need	High

Scale: Medium. We think enabling clean energy policy reforms has significant mitigation potential because policy and regulatory reform can influence investment decisions across the entire power sector rather than a single technology or project. As electricity demand grows and the power system becomes more complex, enabling frameworks for procurement, market design, and grid planning could unlock significantly larger volumes of clean energy deployment than they can today.

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[62] "Bali and Jakarta are two provinces with strong climate commitments and actions. These provincial governments offer examples of local leadership. Their example also highlights the role non-state actors play in accelerating transitions at local government levels." ClimateWorks, 2025; "West Nusa Tenggara (Nusa Tenggara Timur, NTB) has committed to achieving Net Zero Emissions by 2050. Several other regions have also announced similar commitments, including Bali, which targets NZE by 2045, and East Nusa Tenggara (NTT), which aims to achieve NZE by 2050." IESR, 2025

[63] "The programme has also included significant work to mainstream LCDI [Low Carbon Development Initiative] at the sectoral and local level. BAPPENAS [Ministry for National Development and Planning] signed Memoranda of Understanding with seven pilot provinces – Riau, West Java, Central Java, Bali, South Sulawesi, West Papua and Papua – to mainstream LCDI into their regional development planning document." New Climate Economy, 2022; LCDI work is also supported by development finance support from the U.K. Government

[64] "Most of the difficulties faced by local governments in developing robust RUEDs, are attributable to a lack of capacity as well as limited understanding about clean energy. Many local governments, for example, lack the financial and human resources to undertake the modelling and research work needed to develop RUEDs. Local governments also lack the authority to set a sufficiently attractive renewable power price as set out at the national level. Adding to the challenges, there is a very long bureaucratic process to obtain local parliaments' final approval of RUEDs." OECD, 2021

[65] Public funding support is also limited. "Of the 33 provinces that allocated renewable energy budgets, the top three provinces account for 70% of total subnational renewable spending. Even there, renewable energy spending is marginal with an average of only around 0.1% of the total provincial budget." IESR, 2026

Feasibility: Medium. Indonesia's RUKN alongside the Presidential 100 GW solar power target signals its ambition to reduce emissions and transition away from fossil fuels, but the extent to which these commitments translate into durable policy outcomes remains uncertain.[66] Key decisions are often concentrated among a relatively small number of senior political and bureaucratic actors, making policy change highly dependent on individual champions and limiting external influence. Our understanding is that only a handful of nonprofits have strong relationships with key decision-makers and government agencies for successful advocacy at a national level. Despite these challenges, we think such advocacy is feasible given the increasingly strong economic and business case for clean energy, which is already cost-competitive in many contexts absent policy distortions and coal subsidies.

Funding need: High. Given the outsized impact of advancing renewable energy deployment, philanthropic funders actively support evidence generation and policy design efforts for renewable energy policies, though we were unable to identify concrete funding numbers. We suspect that funding support is not sufficiently directed toward building political willingness through deep engagement with key decision-makers and politicians on the economic case for renewables and insider advocacy to inform regulatory reform. While there is some public sector engagement on renewable energy targets and emerging private sector interest in clean energy procurement, neither is currently sufficient to enable systemic upstream policy reform. Existing funding is therefore limited relative to need and the level of sustained stakeholder engagement required, despite the importance of policy and regulatory change in unlocking broader transition outcomes. Given that climate mitigation funding in Indonesia remains relatively neglected, and the critical role of this sub-strategy in power sector decarbonization, the space can benefit from additional philanthropic capital.

Supporting Evidence Generation (Research and Pilots) to Derisk Clean Energy and Transmission Projects

Scale	🟡🟡⚪ Medium
Feasibility	🟡🟡⚪ Medium
Funding need	🟢🟢🟢 High

Scale: Medium. We think this strategy can unlock deployment at scale by derisking emerging clean energy deployment models (e.g., floating solar, pumped storage) as well as grid expansion and modernization. Indonesia is at an early stage of decarbonization, so evidence generation that reduces investment risk in the near term can unlock long-term capital and investment. As grid and storage constraints become binding with higher renewable energy penetration, the counterfactual impact of early evidence generation is significant.

[66] "RUKN 2025-2060 establishes a clear renewable energy trajectory targeting 73.6% of total generation capacity (326 GW) originating from renewable and new energy sources by 2060." Supra-International, 2025

Feasibility: Medium. Efforts to unlock financing for clean energy and grid infrastructure face fewer political barriers than regulatory reform and can help build the evidence base needed to mobilize larger-scale public and private investment. The Indonesian government has expressed interest in maintaining economic competitiveness and attracting investment, while PLN faces significant financing needs to expand transmission infrastructure and modernize the grid to accommodate growing renewable energy deployment. While there is a lack of precedent for such an approach in Indonesia, we think it should be reasonably feasible because it aligns with existing priorities of the government.

Funding need: High. Catalytic capital for various renewable energy deployment and business models is important to derisk and unlock significant private and public sector finance. Evidence generation, particularly pilots for renewable energy projects, does attract some funding from philanthropic actors and development partners.[67] However, we suspect that funding remains concentrated in discrete studies and pilots rather than sustained evidence generation.[68] PLN's constrained balance sheet and competing operational and expansion priorities limit the scope for sustained experimentation and early-stage innovation. Overall, philanthropic funding to support assessment and testing of various financing models remains limited.

Mobilizing the Corporate Sector to Drive Clean Energy Market and Policy Reform via Industrial and Commercial Customer Coalitions

Scale	🟡🟡⚪ Medium
Feasibility	🟢🟢🟢 High
Funding need	🟡🟡⚪ Medium

Scale: Medium. We expect industrial and commercial consumers to account for a growing share of electricity demand and to play a dominant role in energy consumption by mid-century. Further, growth in the nickel industry and data centers will likely drive significant power consumption over the next decade.[69] Yet, targeted demand-side engagement—on policies such as PPA frameworks and power wheeling—is likely to have a less direct influence on emissions outcomes than systemic upstream policy reforms.

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[67] " In the finance sector, ETP targets the unlocking of upstream financing for bankable energy transition investments in renewable energy sources and energy efficiency projects; and diagnostic and capacity development to resolve technical and economic viability bottlenecks to enable investment flow to the energy transition projects." UNOPS, 2023

[68] "The path forward requires stronger collaboration between government, industry, and academia. Despite growing interest, several knowledge gaps persist: a) Technology–policy mismatch: Emerging solutions like hydrogen, carbon capture, and smart grids lack regulatory pilots. b) Financing frameworks: Limited risk-sharing mechanisms deter private investment despite international funding pledges." RMIT, 2025

[69] "In 2023, it [the nickel industry] consumed about 100 billion kilowatt-hours of electricity, roughly 80% of all household electricity use in Indonesia." WRI, Indonesia, 2026; "Mordor Intelligence estimates that Indonesia's data center IT load capacity will increase from approximately 1.44 thousand MW in 2025 to 3.56 thousand MW by 2030, equivalent to a 19.89% CAGR." DCConnect, 2025

Feasibility: High. We think there is already meaningful interest among industrial and commercial customers in Indonesia to procure clean energy, particularly among companies with Science Based Targets Initiative targets and broader Environmental, Social, and Governance (ESG) commitments. Corporate demand represents a credible lever for change, as corporate procurement contributes to a significant share of PLN revenues and the Indonesian government continues to prioritize attracting foreign investment and maintaining the competitiveness of export-oriented industries.[70] We think corporate advocacy is tractable given it leverages clear economic framing focused on market access, competitiveness, and attracting foreign investment. Importantly, it offers a potential workaround to some of the political economy and policy barriers that have slowed the broader energy transition.

Funding need: Medium. Corporate sector engagement is top of mind for most funders due to relatively high tractability and growing private sector interest in renewable energy procurement, driven by corporate decarbonization commitments. With growth in the nickel industry and expansion of captive power plants, there is an emerging need for engagement within the metals and mining industry to assess implications of clean energy adoption and address adoption barriers by facilitating conversations with PLN.

Advocating for Policy Reforms to Reduce Subsidies and Incentives for Coal and Facilitate Retirements and Repurposing of Coal Assets

Scale	●●● High
Feasibility	●○○ Low
Funding need	●●○ Medium

Scale: High. We think decelerating coal deployment and reducing coal demand across the coal value chain have high mitigation potential due to avoided long-term carbon lock-in. Indonesia's relatively young coal fleet and continued investments in coal mining, power generation, and downstream application are likely to extend its emissions trajectory for decades.[71] Reforms that prevent further expansion of the coal fleet, address coal's artificial cost advantage, remove barriers to CFPP retirement and repurposing, and limit the expansion of coal mining and new downstream uses are therefore likely to yield the largest emissions reductions in the long term.

Feasibility: Low. Political economy barriers make it difficult to reduce policy support for coal in Indonesia. Coal remains a major source of export earnings, government revenue, and employment in several provinces, creating concerns about the economic and social impacts of rapid reform. These barriers extend beyond the power sector, with established interests across coal mining, captive coal-fired power generation for industrial applications, and downstream applications such as coal-to-methanol. At the same time,

[70] "In 2024, industrial & commercial customers accounted for 92 TWh [30.6%] and 58 TWh [19.3%] of electricity consumption out of 300 TWh of total electricity consumption in Indonesia." Sipet, 2025

[71] "The country operates Southeast Asia's largest coal-fired power plant fleet, with 249 units and 45.6 GW in total capacity. Furthermore, the fleet has an average age of less than 15 years compared to the 40-year typical lifespan of a coal power plant." Energy Tracker, 2024

influential political and business actors often have interests in the coal industry, creating resistance to policies that would reduce coal demand or accelerate CFPP retirement. Our understanding is that very few nonprofits have the established relationships and credibility with key decision-makers and ministries needed to be genuinely sought out as trusted advisors on energy policy. As a result, reforms are likely to be gradual and contingent on improvements in political willingness to support clean energy, development of economically credible alternatives for impacted workers and regions, and new pathways to offset state revenues.

Funding need: Medium. Support for coal transition attracts the most significant philanthropic funding across areas such as economic diversification, regional pilots, and research on financing mechanisms. However, we suspect that funding remains limited in its focus on building political willingness through sustained engagement with key decision-makers and insider advocacy on regulatory reform. Progress under the Just Energy Transition Partnership (JETP) has also been slower than anticipated, while private sector incentives to fund politically sensitive transition work remain weak.[72] Recent reductions in bilateral development assistance, including United States Agency for International Development (USAID) funding cuts, further constrain public and international funding support. If stronger political commitment were in place, this space would require even greater funding to address the significant socio-economic impacts of coal transition. While funders are keen to support coal phase-out in Indonesia, few nonprofits have the access and connections needed to execute insider advocacy, limiting opportunities to support this sub-strategy.

Theory of Change for Philanthropic Engagement

Based on current barriers to power sector decarbonization in Indonesia—including limited policy support for renewables, continued support for coal, and heightened risk perception of clean energy and transmission projects—we developed a high-level theory of change for how philanthropic actors can reduce emissions from the power sector in Indonesia. Theories of change enable us to better understand the pathways of influence, the likelihood of each pathway, and the avenues of greatest impact for philanthropic and civil society efforts.

[72] "JETP, for Indonesia, was announced in November 2022 during the G20 Leaders' Summit in Bali, under Indonesia's presidency. Indonesia garnered commitment from US, Japan, Canada, Denmark, the EU, France, Germany, Italy, Norway and the UK, plus seven member banks of the Glasgow Financial Alliance for Net Zero (GFANZ) to mobilise an initial US$20 billion in public and private financing for its energy transition over a three- to five-year period." Selvaraju et al., 2025

We evaluate the main assumptions underlying the theory of change and rate our certainty in each as **low**, **medium**, or **high**.[73] Our assessment is based on both primary and secondary evidence, as well as our general impression of the assumption's plausibility.

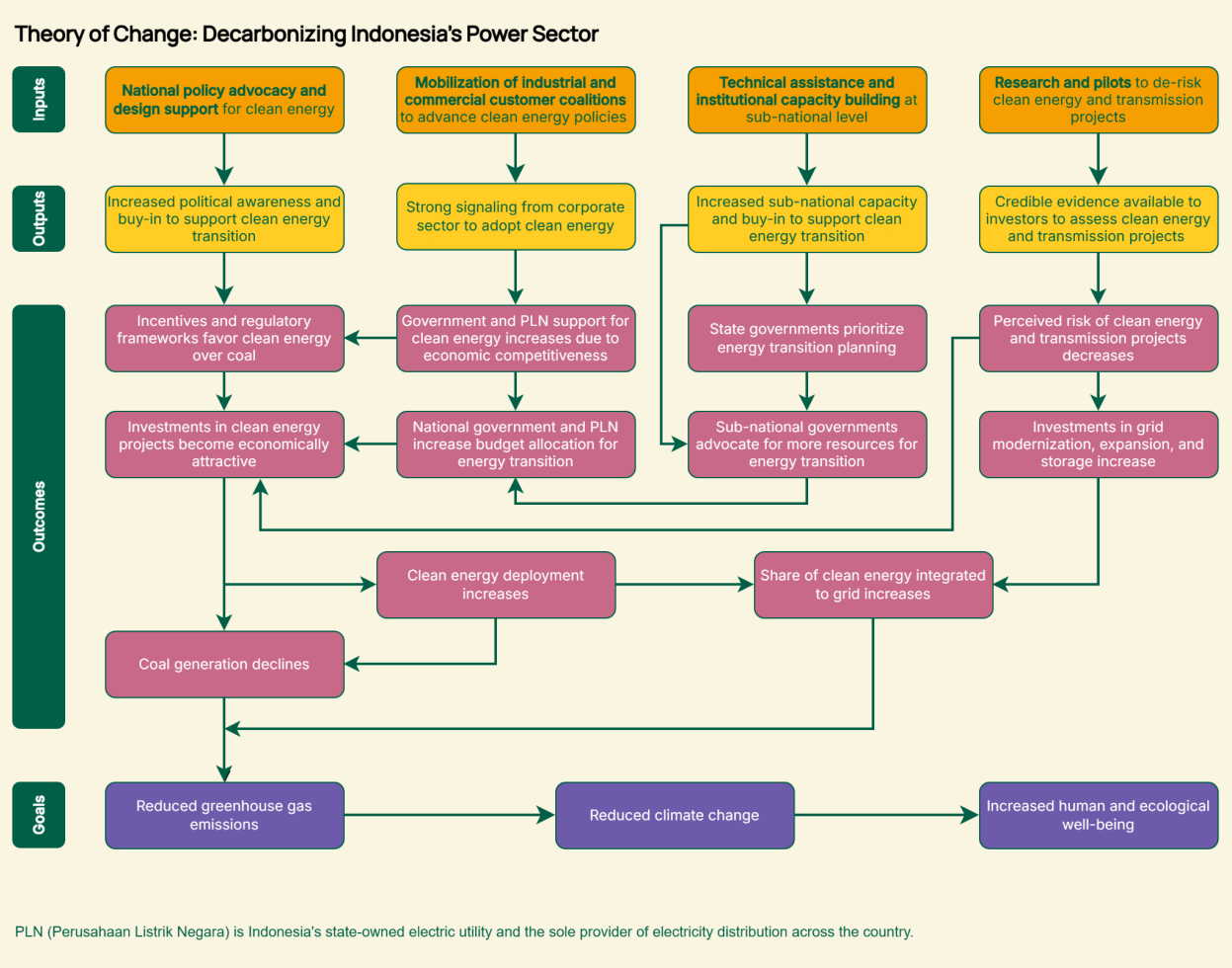


Figure 3: Theory of change diagram for Indonesia's power sector decarbonization

Evaluating Key Assumptions

1. Policy advocacy efforts are politically tractable and can strengthen decision-makers' support for clean energy deployment (medium certainty)

We think policy advocacy is the most high-leverage approach to generating buy-in with key decision-makers in Indonesia's national government and ministries. Given the high

[73] We describe our certainty as low/medium/high to increase readability and avoid false precision. Since these terms can be interpreted differently, we use rough heuristics to define them as percentage likelihoods the assumption is, on average, correct. Low = 0-60%, medium = 60-80%, high = 80-100%

concentration of power among a small number of stakeholders within the national government, policy advocacy efforts must be well-targeted and carefully approached. Confrontational advocacy, in particular, tends to be poorly received, as such approaches fail to account for legitimate concerns around energy security, industrial growth, and national development goals, as well as the entrenched political interests in coal businesses.[74]

For policy advocacy to be successful, it has to be designed and implemented by trusted nonprofit partners who understand the motivations of decision-makers and can apply an economic and national-interest framing to make the case for energy transition.

We view partner selection as the primary risk mitigation lever, prioritizing nonprofits that demonstrate established relationships, a track record of sustained advisory engagement, and technoeconomic expertise. While such an approach does not guarantee that all advocacy efforts will translate into policy reforms, it improves the likelihood of success.

2. Indonesia's corporate sector has an incentive to advocate for clean energy policies (medium certainty)

We think the corporate sector has structural incentives to advocate for clean energy policies, driven by compliance pressures, supply chain exposure, and competitiveness concerns.

Multinational companies with parent entities or buyers in the EU and U.S. face Scope 3 accountability requirements that extend to their Indonesian operations. Over 120 members of RE100—a global initiative where companies pledge to use 100% renewable electricity by 2050—operate in Indonesia, with a combined electricity demand of 2.1 TWh committed to 100% renewable electricity by 2050. These commitments give them a direct stake in the availability of credible clean energy procurement options.[75] Similarly, domestic companies face steadily growing regulatory, investor, and customer pressures to progress on ESG, with a growing interest in clean energy procurement.[76]

This exposure is most acute for Indonesia's nickel industry, which is expected to be a primary driver of industrial growth as transport electrification increases demand for electric vehicle (EV) batteries. For nickel producers seeking to embed themselves in global EV and battery supply chains, access to clean electricity will become increasingly important for sustainable operations. The inadequate sustainability performance of

[74] "Since Indonesia became a democracy, business elites have increasingly moved into formal political office, transforming state-business relations from hierarchical patronage to a more fused configuration of public authority and private capital. Entrepreneurs and corporate actors now occupy key governmental positions and enjoy direct access to state resources, reflecting the evolution of Indonesia's patrimonial order into a trimonial oligarchic state." Apriliyanti et al., 2026

[75] RE100 represents over 430 large global businesses, including 121 companies operating in Indonesia. The Climate Group, 2024

[76] "In recent years, ESG considerations have gained significant momentum in Indonesia. This growth has been fueled by stronger investor attention, regulatory developments, and increasing public awareness of sustainability issues." A survey of 150 organizations shows that 72.5% have established a dedicated ESG or sustainability budget. RSM, 2025

Indonesia's nickel value chain is already presenting challenges in attracting international capital and diversifying trade partners, with European mineral companies pulling out of nickel refinery investments in Indonesia due to concerns with its environmental and labor standards.[77] The creation of Indonesia's National Nickel Industry Decarbonization Roadmap is a direct response to this problem and signifies growing momentum for decarbonization efforts.[78]

Hence, incentives to support clean electricity exist across stakeholder groups within Indonesia's corporate sector, reinforcing the potential for corporate advocacy. However, we acknowledge that these incentives may vary significantly across the corporate landscape—often absent among smaller domestic firms—constraining the full potential of corporate advocacy for clean energy policies.

3. Corporate sector advocacy efforts can influence the national government and PLN (medium certainty)

We think corporate sector advocacy represents one of the more tractable pathways to near-term progress on clean energy deployment in Indonesia's constrained policy environment. The negotiating power of the corporate sector stems from the Indonesian government's interest in attracting foreign direct investment (FDI) and signaling competitiveness relative to other Southeast Asian economies, as well as PLN's commercial relationship with large industrial customers.

Many multinationals operating in Indonesia need to address their Scope 3 emissions to comply with their parent companies' or buyers' regulatory requirements in the EU and U.S. Export-oriented companies are also at risk of exposure to the Carbon Border Adjustment Mechanism. RE100 has been actively advocating for Indonesian policymakers to strengthen renewable energy procurement mechanisms since its formal launch in 2024, among other activities including closed-door meetings with senior officials and engagement with PLN.[79] An operational example of corporate engagement shaping

[77] "The US designation of Indonesia's nickel industry as using forced labour, and the EU's Battery Passport scheme which monitors environmental sustainability, further complicate matters. Lax governance supporting rapid expansion of the industry at the expense of environmental and labour standards is now an impediment to diversification of Indonesia's economic partners. For example, Eramet and BASF, two major European mineral companies, pulled out of their nickel–cobalt refinery investments in Maluku. Concerns over inadequate environmental and human rights standards were strongly suspected of driving this decision." Lowy Institute, 2025

[78] "In June 2025, the Ministry of National Development Planning (Bappenas) and WRI Indonesia launched the National Nickel Industry Decarbonization Roadmap, outlining a path toward an 81% reduction in emissions by 2045. The strategy includes shifting 100 billion kilowatt-hour (kWh) of industrial electricity demand toward 47.3 GW renewables." CREA, 2026

[79] "Some 430 large global businesses have strongly encouraged Indonesia to increase its ambition on renewable electricity and unlock greater investment in the country's energy transition. In a letter to President Joko Widodo of Indonesia, penned by CEO Helen Clarkson of Climate Group on behalf of RE100's 430+ member companies, the letter warns that failing to do so will influence corporate investment in Indonesia [...] This letter encourages Indonesia to focus on renewables in the redraft of its National Energy Plan and other upcoming policies." The Climate Group, 2024; "In November 2025, RE100 and Indonesia's state energy utility, PLN, and representatives from the Indonesia Energy Transition Implementation Joint Office (Rumah PATEN) met in Amsterdam and London to

market mechanisms is the Clean Energy Investment Accelerator (CEIA), a coalition of 30 corporate buyers, which provided technical assistance to PLN, contributing to the launch of PLN's Renewable Energy Certificate (REC) product. While REC purchases alone are not transformative, the approach illustrates the potential of coordinated corporate engagement to enable policy reforms.[80]

As the sole electricity distributor, PLN depends on large industrial and commercial customers for a significant share of its revenue.[81] Engaging with these customers and being responsive to their needs is important to its commercial and reputational standing. Hence, corporate buyers have meaningful leverage to push for expanded clean energy deployments, procurement mechanisms, and enabling policies.

Experts we consulted confirmed that Indonesian industry and trade associations are effective intermediaries in this context, as they signal aggregated demand from multiple large buyers rather than individual preferences, making the pressure more difficult to dismiss. These associations are well positioned to bring corporate needs into policy conversations by providing a strong platform for structured dialogue with the government.

4. Subnational capacity-building efforts can influence the national government and enable progress on energy transition (medium certainty)

We think subnational advocacy efforts from provincial governments can nudge the national government to allocate more resources to energy transition and, as a result, advance power sector decarbonization.

Provinces like East Kalimantan, Central Sulawesi, and West Java contribute a significant share of the country's GDP and are centers of future industrial growth.[82] While energy policy is constitutionally a national domain and Indonesia's fiscal structure is highly

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discuss strengthening the renewable energy certificates system and other corporate procurement options in Indonesia through alignment with RE100's Technical Criteria." The Climate Group, 2026

[80] "In Indonesia, CEIA collaborated with Indonesia's national electric utility, PLN, to design and launch a Renewable Energy Certificate (REC) program to facilitate cleaner energy transactions and offer new, innovative green energy products for industrial companies. Launched in November 2020, this is the country's first nationally recognized REC and a major milestone for renewable energy development in the country." P4G Partnerships, accessed June 2026; "CEIA also provided policy inputs to the Indonesian Ministry of Energy and Mineral Resources, resulting in a revised regulation that improves the economics of rooftop solar projects by lowering the capacity charge for industrial users to one-eighth of its previous level." CEIA, 2021

[81] In 2024, industrial & commercial customers accounted for 92 TWh [30.6%] and 58 TWh [19.3%] of electricity consumption out of 300 TWh of total electricity consumption in Indonesia. Sipet, 2025

[82] "West Java is Indonesia's manufacturing powerhouse, with the sector contributing 42.9% to the province's GDP in 2023. The province experienced 5.0% GDP growth in 2023 and received $8.3 billion in FDI, the highest in Indonesia. Central Sulawesi has benefited significantly from investments in nickel mining and manufacturing. The province recorded 11.9% GDP growth in 2023, making it Indonesia's second-fastest growing province. From 2021 to 2023, the province's GDP grew by an average of 12.9%. In 2023, Central Sulawesi received $7.2 billion in FDI. East Kalimantan recorded 6.2% GDP growth in 2023. The province's economy is bolstered by its rich natural resources, particularly in mining and manufacturing." Business Indonesia, 2024

centralized, economically significant provinces retain meaningful informal leverage as national economic goals rely on industrial growth and investment attracted by these provinces. In recent years, centralization has made it harder for provincial governments to procure the resources needed for subnational energy transition activities.[83] Technical assistance can help provincial governments fill these gaps by supporting energy transition planning and roadmapping. Such support is critical to equip provincial governments with estimations on resource and investment requirements to advocate for their needs and put meaningful pressure on the national government to address energy transition planning gaps.

Given the highly constrained policy environment, advocacy by powerful subnational actors is a tractable approach to make progress on clean energy deployment in the near term. We think nonprofits with established relationships at both national and subnational levels, a track record of sustained advisory engagement, and technoeconomic expertise are best placed to navigate the uncertainty inherent in these efforts. While this approach does not guarantee that all advocacy translates into policy change, we think subnational capacity building is critical to lay the groundwork for sustained advocacy with impact materializing in the longer term.

5. Evidence generation can build investor confidence to support renewable energy projects and transmission projects (medium certainty)

We think evidence generation can build investor confidence and is a complementary strategy to policy advocacy in advancing clean energy deployment. While policy reform remains the central challenge to power sector decarbonization, reducing risk perception can help build early momentum and set the stage for scaling renewables when the policy environment becomes more conducive.

For clean energy projects, technoeconomic analysis and pilots across deployment models—including rooftop, community, and floating solar—can demonstrate viability and returns. Such evidence can build investor confidence to diversify investments beyond utility-scale solar, where most private capital is currently concentrated, and support a broader range of business models and project developers.

For transmission financing, while structures like InvITs, PPPs, and ring-fenced subholdings have demonstrated success in other countries, these models have not yet

[83] "Provinces are being made responsible for the transition without reliable funding. Spending is fragmented and mostly preliminary, provinces often fund studies mapping, training, or small off grid solar for underserved communities rather than scalable generation, storage, or system-level solutions. [...] Central transfers to regions are being reduced, the 2026 State Budget allocates IDR 649.99 trillion [$35 billion] in regional transfers, about 30% below the IDR 919.87 trillion [$51 billion] in the 2025 State Budget. With tighter fiscal space and rising basic-service obligations, renewable energy becomes discretionary and therefore vulnerable. The national government is assigning responsibility for the energy transition while retaining control of the money. Without protected transition-oriented transfers, results-based grants, or new provincial revenue tools, "provincial leadership" will remain procedural, not transformative." IESR, 2026

been adopted in Indonesia.[84] Research, modeling, and pilots offer an evidence-driven approach to designing financing structures suitable for PLN's institutional and regulatory context. Further, we think active engagement with PLN will be crucial to identify and address the legal and constitutional considerations associated with potential financing and restructuring models, helping establish a long-term pathway for enabling transmission investments.

While the impact of these efforts will likely materialize over the longer term, we think they are critical to ensure that investor and institutional readiness keeps pace with the evolving policy environment.

Cost-Effectiveness of Decarbonizing Indonesia's Power Sector

As a rough plausibility check, we developed a cost-effectiveness analysis (CEA) to estimate the cost per metric ton of CO_2-equivalent (CO_2e) mitigated by targeting emissions reductions in Indonesia's power sector (in terms of dollars per metric ton of CO_2e removed or avoided). As a proxy for these efforts, we estimated the effect of advancing a policy package for renewable energy zones (REZs) on emissions reductions.[85] Focusing this CEA on one sub-strategy—advancing policy and regulatory reforms that accelerate clean energy deployment—means this CEA is likely not generalizable to assess the overall cost-effectiveness of decarbonizing Indonesia's power sector. Instead, it serves as a high-level sense-check of whether decarbonization efforts might be highly cost-effective. We chose to develop a more specific CEA because we think a CEA of decarbonizing Indonesia's power sector overall would include too many highly subjective guess parameters for us to have any confidence in its results.

The CEA estimates the emissions impact of funding policy design, stakeholder advocacy, and technical assistance to develop, pilot, and implement REZs linked to Indonesia's special economic zones (SEZs).[86] In a business-as-usual scenario, industrial users in

[84] CPI assessed a number of these financing models in the section "Annex 1. Benchmarking of countries' transmission finance models." CPI, 2026

[85] "Renewable Energy Zones (REZ) provide a practical delivery model by aligning clean generation, transmission corridors, and industrial demand within pre-approved areas that can move quickly from planning to construction." INDEF and Systemiq, 2026

[86] Indonesia's SEZs and industrial estates host much of its new industrial activity, such as nickel processing and manufacturing. Industrial users in these regions build their own captive coal plants because grid supply is unavailable or unreliable. Linking a REZ to an SEZ and industrial estates gives these users a reliable clean alternative. ". Linking initial REZs to SEZs couples fiscal incentives for industry with accelerated clean power project development, creating clearer offtake signals and stronger investor confidence. Using SEZs as an initial point to embed key REZ

SEZs would meet a share of their new electricity demand from captive coal-fired power plants, which lock in emissions over their operating life. We assume that the work first leads to REZ pilots in one or two SEZs, and that a successful pilot may then lead to institutional adoption of REZs across more SEZs. In SEZs linked to REZs, renewable power substitutes for a share of new captive coal demand, avoiding the lifetime emissions of those plants.[87] For this CEA, we include the full cost of policy design, advocacy, coordination efforts, and technical assistance, but exclude the cost of renewable energy and transmission infrastructure, which developers, PLN, and other investors are expected to finance. In this analysis, we consider two scenarios, a high-impact and a low-impact, reflecting the range of uncertainty in REZ deployment and its effect on captive coal. In the high-impact scenario, we assume two pilot SEZs, institutional adoption across eight SEZs, renewable power displacing 80% of new captive coal demand in REZ-linked SEZs, and captive coal additions continuing through 2050. In the low-impact scenario, we assume one pilot SEZ, institutional adoption across two SEZs, renewable power displacing 20% of new captive coal demand, and captive coal additions continuing through 2040. We also vary the likelihood of pilot deployment and institutional adoption across scenarios. Costs vary slightly depending on the number of pilots and the duration of advocacy.

Our best guess is that the REZ advocacy work would avoid one tCO_2e for around $1.8 (range 15 cents to $86). We exclude the potential benefits of extending REZs to industrial estates outside SEZs, which the proposed policy package also intends to cover, and spillover benefits from additional renewable energy capacity serving other industrial loads. These benefits are difficult to quantify robustly. Including them would likely increase estimated emission reductions and improve cost-effectiveness, suggesting that our current estimates are conservative.

Despite the narrow focus of this CEA, it still includes highly subjective guess parameters and should not be taken literally. Overall, our analysis estimates that decarbonizing Indonesia's power sector can be cost-effective. We have low confidence in the ability of our CEA to estimate the general cost-effectiveness of this strategy, and focusing this analysis on one aspect of the strategy is unlikely to generalize to its overall cost-effectiveness, but we generally view it as a positive input to our overall assessment of this strategy's effectiveness. See the model for a high-level explanation as well as additional notes and citations.

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elements also provides practical feedback on permitting workflows, procurement design, and grid integration before scaling to larger industrial parks and estates." INDEF and Systemiq, 2026

[87] We assume the share of industrial electricity supplied by captive coal declines linearly from about 52% today to zero by the year new captive coal additions are expected to stop, regardless of REZs. We also account for uncertainty around pilot deployment and institutional adoption despite nonprofit support. Accordingly, we discount estimated emission reductions by the likelihood that nonprofit work leads to pilot deployment as well as institutional adoption.

Is There Room for More Funding?

Indonesia's power sector decarbonization is severely underfunded relative to the scale of the challenge. The 2022 update to Indonesia's Nationally Determined Contribution (NDC) estimated a financial requirement of $285 billion for the period 2022-2030, against which investment has fallen short by approximately 50%.[88] The 2025 SNDC update submitted to the UNFCCC raised this estimate considerably, to at least $473 billion between 2025 and 2030, equivalent to $95 billion annually, in order to meet near-term climate targets.[89]

For the power sector specifically, the Climate Policy Initiative (CPI) estimated a requirement of $246 billion between 2018 and 2030, or $19 billion annually, in clean energy investments to achieve Indonesia's 2030 climate goals. While the power sector attracted $38 billion between 2019 and 2023 (approximately $7.6 billion annually), only 23% ($1.8 billion annually) was directed toward renewable energy.[90] Within the renewable energy space, hydropower and geothermal attracted the majority of investment while investment in solar and wind remained negligible, a distribution consistent with Indonesia's limited progress on solar and wind deployment.

Within this landscape, philanthropic capital plays a small but catalytic role. Our estimates based on publicly available data suggest that Indonesia's power sector decarbonization attracted $8 million in annual philanthropic funding by foundations.[91] A substantial share of this funding likely supported coal phase-out, reflecting strong signals

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[88] Chart: Investment needed to achieve Indonesia's 2030 climate target. "Indonesia needs about $285 bn in climate-aligned investment to meet its Enhanced NDC, but the Government budget only covers $96.9 bn or about 34% of this. Indonesia's financial sector, comprising public development FIs and private commercial FIs, contributes 15% of total climate investment needs." CPI, 2023

[89] "Indonesia's Second NDC will require an estimated total investment of IDR 7,552.5 trillion ($472.6 billion) to achieve its climate targets. This financing need, allocated across four sector categories (energy, agriculture, FOLU, and waste), is likely underestimated, as it does not yet account for the industrial processes and product use sector." UNFCCC, 2025

[90] Indonesia's power sector received only 9% of financing needed for decarbonization. "Indonesia's power sector requires a total investment of $246 billions or $19 bn annually to achieve 2030 climate target, according to Indonesia Third Biennial Update Report Under the United Nations Framework Convention on Climate Change (2021). In 2019–2023, total reported investment in Indonesia's power sector reached USD 38.02 billion [...] FF technologies retained the largest share of investment (62%), more than twice the investment in renewable energy (RE). Meanwhile, financing on RE totals to USD 8.85 billion, contributing 23% to the overall investment in the power sector within the same period [...] In RE, Geothermal and Hydropower dominated, accounting for 72% of the RE financing." CPI, 2025

[91] Total foundation funding to the power sector was estimated to be $572 million annually between 2019 and 2023. Out of this funding, $7.9 million was directed annually to Indonesia's power sector. ClimateWorks Foundation, 2024

from the previous government on coal retirement, in particular PLN's 2023 moratorium on new CFPPs and the establishment of the JETP in 2022.

More broadly, funders including ClimateWorks Foundation, Bloomberg Philanthropies, Tara Foundation, and ViriyaENB actively support power sector decarbonization in Indonesia. Their annual reports indicate that funding is distributed across several priorities, including strengthening market and policy enablers for renewables, developing just transition strategies, advancing sustainable finance for clean energy deployment, engaging corporates and businesses to drive deployment, and supporting subnational action. Given the political economy challenges and limited political willingness, funders emphasize supporting more tractable near-term pathways, such as subnational action and corporate engagement, alongside continued investment in the more difficult but necessary long-term work of advancing policy reform.

We think that, relative to Indonesia's emissions profile, the philanthropic funding landscape represents a significant misallocation. Philanthropic support for climate mitigation in Indonesia stands at roughly 3 cents per tCO_2e, which is five to six times lower than levels in the U.S. and the EU at 19 cents per tCO_2e and 14 cents per tCO_2e, respectively.[92] Within Indonesia's power sector, the coal transition attracts a significant share of philanthropic funding, concentrated in economic diversification, regional pilots, and research on financing early coal retirements. Despite this focus, experts suggest a funding gap for sustained engagement with key decision-makers and for insider advocacy on regulatory reform.

Similarly, advocacy for policy and regulatory reform to expand renewables draws a comparable share of funding, but is not sufficiently directed toward building political will among decision-makers. The main constraint to funding such opportunities is the limited number of organizations that are currently positioned to sustain insider advocacy and garner support and attention of key decision-makers.

On the other hand, corporate engagement is better supported, reflecting its tractability and the growing private sector appetite for clean energy procurement. We think there is nonetheless scope for deeper engagement with industrial and commercial customers, especially with the boom in captive power generation for the nickel industry.

Research, modeling, and demonstration efforts are concentrated in one-off studies and pilots rather than the sustained engagements required to systematically derisk financing at scale. Similarly, funding support for subnational institutions remains limited, fragmented, and insufficient relative to energy transition planning requirements.[93]

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[92] Calculated based on emissions data from EDGAR and foundation giving data from ClimateWorks. Indonesia: 1.3 billion tCO_2e emissions, $42 million funding; United States: 5.9 billion tCO_2e emissions, $1.3 billion funding; European Union: 3.2 billion tCO_2e emissions, $447 million funding. Crippa et al., 2025; ClimateWorks Foundation, 2024

[93] We assert the high-level breakdown across different philanthropic approaches based on public announcements and annual reports of active funders in Indonesia as well as insights from expert interviews.

Against this backdrop, financial constraints to Indonesia's energy transition have intensified, with direct implications for power sector decarbonization. Indonesia's JETP, announced in November 2022 with $20 billion pledged by the International Partners Group and private financial institutions, aimed at financing coal retirement and renewable energy scale-up while enabling a just transition.[94] While JETP represented an unprecedented climate finance architecture for a middle-income country, much of the pledged funding is in the form of commercial loans, with only $281.6 million, or 1.4% of the total, available as grants.[95] The majority of these grants support short-lived capacity-building and technical assistance projects scheduled to conclude between 2026 and 2028, a timeframe too brief to overcome entrenched institutional barriers such as DMO, DPO, and rigid PPAs, or to build political support across election cycles.[96]

The implications of this gap are already evident. Indonesia's latest power plan, the RUPTL 2025-2034, is misaligned with JETP goals, with plans to add 6.2 GW of new coal capacity. Critics suggest that JETP failed to center Indonesia's development priorities—namely 7-8% annual economic and industrial growth aspirations—essential to establish the economic case for power sector decarbonization.[97] Without anchoring energy transition within Indonesia's growth objectives, JETP's donor-driven priority-setting approach was unable to generate the stakeholder buy-in necessary to overcome institutional and political resistance.

We have taken a nuanced approach in designing our five sub-strategies to build near-term as well as long-term momentum for Indonesia's power sector decarbonization. Specifically, our focus on tractable approaches—such as mobilizing the corporate sector, strengthening provincial government capacity, and generating evidence to unlock financing—offers a workaround to Indonesia's highly constraining policy and political landscape. In parallel, we emphasize systemic philanthropic levers such as policy advocacy for coal phase-down and renewable energy phase-in, grounded in an economic case for energy transition that aligns with Indonesia's growth aspirations. Together, these approaches help strengthen the foundations for long-term change in areas that remain relatively underfunded today.

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[94] International Partners Group includes donor countries of Canada, Denmark, the European Union, France, Germany, Italy, Japan, Norway, the United Kingdom, and the Netherlands. The IPG was established to help coal-dependent nations transition to renewable energy sources while protecting affected workers and local communities. Selvaraju et al., 2025

[95] "US$20 billion in pledged funding is largely commercial loans, while grants account for 1.4% (US$281.6 million) of the total package [...] To date, JETP pledges consist largely of standard development bank loans & private investments that expect market returns." RMI, 2025

[96] "As many of the projects are due to end between 2026 and 2028 there is a risk that the preparatory work undertaken will not result in completed investments, institutional change or sustained support for affected workers and communities. [...] the relatively short duration of many capacity-building projects risks creating gaps in continuity, particularly for institutional reforms that require sustained engagement beyond initial donor funding cycles." Selvaraju et al., 2025

[97] "But while the JETP succeeded in building institutional and financial architecture, it too often unfolded outside the broader context of Indonesia's development goals. The early narrative centered on emissions targets and coal retirement, without consistently linking these efforts to national priorities: job creation, industrial growth, and energy security. The result was a climate-first platform with limited domestic resonance." RMI, 2025

Are There Major Co-Benefits or Potential Risks?

Co-Benefits

- **Expanded energy access and local economic development:** Clean energy generation, especially distributed renewables, can extend electricity access to remote islands with limited grid connectivity and heavy dependence on biomass and diesel. Reliable electricity can, in turn, support higher economic productivity, better quality of life, and improved livelihoods.
- **Energy security:** Indonesia depends heavily on imported oil to meet national energy demand, leaving its economy exposed to volatile global prices and supply disruptions. Expanding domestic renewables will reduce reliance on diesel-based power generation in remote islands and strengthen long-term energy security.[98]
- **Air quality and public health benefits:** CFPPs are a major driver of air pollution and the associated public health burden, particularly cardiovascular disease. Under a business-as-usual scenario, premature deaths from air pollution and the economic losses tied to poor health are projected to cost $109 billion between 2026 and 2050.[99] Hence, a shift to clean energy sources will have a direct positive impact on air quality as well as public health outcomes.
- **Job creation:** In a net-zero scenario, the renewable energy sector is expected to generate substantial employment with roughly 1 million construction jobs and 1.8 million power generation jobs by 2050.[100] By contrast, the business-as-usual pathway is projected to cost 1.5 million jobs across agriculture, plantation, and fisheries, as environmental degradation from continued reliance on coal will severely impact these sectors.[101]

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[98] "Among these [17,000 Indonesian] islands, more than 2,000 are reliant on diesel for power or are entirely without electricity. This situation has resulted in energy poverty for >20-25 million people, highlighting a significant challenge in achieving energy access for all." GEAPP, 2024
[99] "Health impact calculations from Indonesia's 20 most toxic CFPPs, indicate at least 156,000 premature deaths and economic losses amounting to $109 billion between 2026 and 2050. [...] Health impacts linked to CFPPs pollution include stroke, lung cancer, ischemic heart disease, lower respiratory infections, chronic obstructive pulmonary disease, and diabetes." CREA, 2025
[100] "By 2050, augmenting RE capacity will add almost 1 million construction workers for RE technology deployment and 1.8 million power generation workers who would comprise the entire power generation workforce, but this investment shift also sees 51,300 displaced workers from fossil power plants who would require reskilling to adapt to evolving labor demands." WRI, 2025
[101] "An estimated 1.45 million jobs are lost due to operation of these plants, mostly in agriculture, plantation, & fisheries sectors, directly affected by environmental degradation." CREA, 2025

Potential Risks

- **Energy affordability:** Indonesia has historically prioritized affordable, accessible electricity. Subsidies for fossil-fuel generation, along with policies that keep coal artificially cheap, have played an important role in achieving this goal.[102] Without a phased reallocation of these subsidies, vulnerable communities risk bearing a disproportionate share of the transition costs.[103]
- **Social resistance:** Phasing down fossil fuels will disrupt livelihoods tied to coal value chains and risk rendering coal mining and generation assets obsolete.[104] A poorly managed transition could trigger concentrated job losses and stranded assets, generating social and political resistance that can slow progress toward a clean energy future.

Key Uncertainties and Open Questions

- **Ability to shift political willingness:** Political willingness remains one of the central barriers to Indonesia's energy transition.[105] Sustained lack of political support poses the greatest risk to power sector decarbonization. Hence, we prioritize a multipronged approach to influencing the national government and key decision-makers through direct advocacy via trusted partners as well as indirect advocacy via the corporate sector and provincial governments.
- **Development-decarbonization tradeoffs:** Shifts in the geopolitical landscape, such as the recent escalation in the Middle East, can further erode the limited political support for decarbonization if clean energy is perceived to conflict with

[102] "Cheap electricity in Indonesia can be partially explained by its fossil fuel subsidies of 2.6% of GDP—5.4 times the regional average." Wong et al., 2024
[103] "The removal of fossil fuel subsidies would be met with the greatest resistance as policymakers are concerned about potential economic shocks & social unrest. Experiences from other regions suggest a gradual removal is the prudent option. Moreover, the livelihood & cost of living of poorer households ought to be the primary focus. Savings from fossil fuel subsidies can be reallocated to energy saving programs or welfare support for poorer consumers." Wong et al., 2024
[104] "The energy transition may negatively impact on gross regional domestic product (GRDP) in coal-producing areas, deficit in the trade balance, and increased unemployment – further widening inequality. [...] Chapman and Okushima find that energy-poor households tend to have a negative attitude towards transition, causing a significant barrier to an inclusive transition." Rauch, 2024
[105] "But implementation requires specific actions: market reforms to level the playing field between renewables and fossil fuels; removing fossil fuel subsidies, accelerated grid infrastructure investment. [...]These recommendations appear repeatedly in government strategy documents. The obstacle is political will and bureaucratic coordination, not technical knowledge." IESR, 2026

affordability, industrial growth, or energy access.[106] We aim to mitigate this risk by prioritizing policy advocacy efforts that demonstrate the alignment between clean energy and Indonesia's energy security goals and economic and industrial growth aspirations, reducing the risk of perceived tradeoff.

- **Role of clean and firm energy technologies:** We are uncertain about the importance of nuclear and geothermal energy in Indonesia's power sector decarbonization. Indonesia lacks the operational experience, infrastructure, and regulatory readiness to deploy these technologies.[107] Hence, we prioritize supporting research, technoeconomic analysis, and development of enabling conditions for these technologies.

Bottom Line and Next Steps

Indonesia's power sector decarbonization represents a high-leverage opportunity in global climate philanthropy. The scale of potential impact, driven by Indonesia's large and growing emissions, continued reliance on coal, and high renewable resource potential, is matched by deep institutional and political economy barriers that philanthropy is well positioned to address.

Based on our research into relevant mitigation sub-strategies, we believe advocating for policy reforms to enable clean energy deployment and reduce incentives for coal-fired power generation, mobilizing the corporate sector for outside policy advocacy, supporting provinces with high electricity needs and industrial growth with energy transition planning, and advancing research and pilots to derisk clean energy and transmission projects could substantially reduce emissions. Due to the low level of funding this impact area has received and its projected share of future emissions, we plan to consider organizations working on these topics for our Top Climate Nonprofits and as potential grantees from the Giving Green Fund.

[106] "Since the escalation of the Middle East conflict and disruption to shipping through the Strait of Hormuz, the Indonesian government has positioned coal as a short-term energy security backstop, raising production quotas and prioritising coal availability for the power sector – to insulate domestic generation from oil and gas price volatility." Norton Rose Fulbright, 2026

[107] "Regions of Indonesia rich in conventional geothermal potential often contain environmentally or culturally sensitive areas and are home to communities with diverse and overlapping backgrounds." Project InnerSpace and IESR, 2025; "The Indonesian government has committed to building the country's first-ever nuclear power plant by 2032. However, they must deal with funding limitations, uranium procurement issues, location selection issues, and diplomatic challenges." Eurasia Review, 2026; "While nuclear may be favored for its dispatchability and inertia, it carries significant uncertainties given the absence of domestic experience & technological readiness." IESR, 2026

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Giving Green

Giving Green was founded to help donors cut through the complexity of climate philanthropy and direct their resources for maximum impact.

Our founder, Dan Stein, Ph.D., spent 15 years developing evidence-based strategies in global philanthropy. He saw people eager to fight climate change but paralyzed by its scale. In 2019, with support from IDinsight, he launched Giving Green to rigorously evaluate solutions and share clear guidance.

What began as a side project is now a team directing tens of millions of dollars to high-impact initiatives. Our success is shared—with donors ranging from kids donating allowances to retirees investing in a better future. We believe anyone can start small and still make a huge difference.

Thank you for joining us on the path to net zero. Together, we keep moving forward.