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Political-Economy Landscape for Advancing Indonesia-China Energy Transition Agenda

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PRASETIYA MULYA

Table of Contents

1	Introduction	5
2	China's Energy Transition Landscape	7
2.1	China's Energy Transition Development	7
2.1.1	China's Energy Transition Action Plans	9
2.1.2	China's Renewable Energy Law	10
2.1.3	China's Renewable Energy Progress.....	12
2.1.4	Challenges in China's Energy Transition.....	15
2.2	China's Power Market.....	17
2.2.1	Key Players in China's Electricity Sector	18
2.2.2	Energy Transition Challenges.....	21
2.3	China's Expansive Outward RE Investment.....	23
2.3.1	Economic Opportunity Driven by Chinese Government Subsidies	23
2.3.2	Strategic Shift to China's Domestic Market.....	24
2.3.3	Overcapacity in China's Renewable Energy Sector	25
2.3.4	China's Market Expansion to Developing Countries.....	27
2.3.5	China's Geopolitical Strategy for Dominance in Global South	28
2.3.6	China Dominating Global Supply Chains of Green Technology	29
3	Indonesia's Energy Transition Landscape	30
3.1	Indonesia's Energy Transition Policy and Development	31
3.1.1	Indonesia's Energy Transition Policy.....	31
3.1.2	Indonesia's Renewable Energy Development	33
3.2	Indonesia's Power Market.....	35
3.2.1	PLN, the Main Actor in Indonesia's Power Market.....	35
3.2.2	Electricity Surplus in Java-Bali Network.....	37
3.3	Indonesia's Policy on EV and Its Supply Chain	39
3.3.1	Boosting EV Production and Adoption	39
3.3.2	Developing EV Battery	40
3.3.3	Boosting Nickel Downstream Industry.....	41
4	China's Clout in Indonesia's Energy Transition	43
4.1	China's Clout in Electricity and Renewable Energy.....	45
4.1.1	China's Dominance in Coal-fired Power Plants	45
4.1.2	China's Debut into Renewable energy.....	49
4.2	China's Dominance in Indonesia's EV Industry	55
4.3	China's Dominance in Nickel Downstream Industry	59
4.4	Challenges of China's Rising Investment in Indonesia.....	62
4.4.1	Illegal Workers, Perceived Discrimination Against Local Workers	63
4.4.2	Weak Health, Safety, Environmental (HSE) Standards.....	63

4.4.3	Displacing Local Communities.....	64
4.4.4	Triggering Deforestation	64
4.4.5	Contributing to Carbon Emissions	65
4.4.6	All Chinese Technology.....	66
4.4.7	Below-par Infrastructure to Support Renewable Energy	67
5	Political-Economy Landscape on Advancing China- Indonesia Energy Transition Agenda	68
5.1	Key Sectors for Advancing Indonesia-China Energy Transition Cooperation	69
	Electricity Infrastructure and Renewable Energy	70
5.1.1	Super Grid and Smart Grid	70
5.1.2	Renewable Energy.....	72
5.1.3	EV Manufacturing.....	77
5.2	Business players who can advance energy transition	80
5.2.1	Renewable Energy Players	80
5.2.2	Electric Vehicle Players	85
5.3	Advancing Energy Transition via Indonesia-China Bilateral and Multilateral Channels.....	88
5.3.1	Bilateral Cooperation Channels	88
5.3.2	Multilateral Cooperation Channels.....	91
5.4	Challenges of Advancing Indonesia’s Energy Transition.....	94
5.4.1	Amendment of Coal and Mineral Mining Law	96
5.4.2	Revision of 2025-2029 National Energy Policy (KEN)	97
6	Recommendation	98
6.1	Aligning Energy Transition with Long-Term Electricity Targets.....	99
6.2	Drawing lessons from China to reform power market.....	100
6.3	Boosting Demand for Renewable Energy.....	101
6.4	Boosting Domestic Adoption of EVs	102
6.5	Partnership with China via Bilateral, Multilateral Channels	103
6.6	Creating a focal point for Chinese investors	105

Table of Figures

Figure 1. Energy consumption per capita and CO2 emission, China	8
Figure 2. China’s energy transition action plans	10
Figure 3. Renewable electricity generation capacity in China from 2013 to 2023 (in Gigawatts)	12
Figure 4. Cumulative Renewable Energy Capacity in China by Source 2014-2024 (Gigawatts)	13
Figure 5. Share of installed power plants by source in China's renewable electricity mix 2014-2024.....	14
Figure 6. National energy mix in 2023.....	34
Figure 7. New and renewable energy mix 2023.....	34
Figure 8. Power plant capacity (MW)	34
Figure 9. Target and realized renewable energy in the national energy mix.....	35
Figure 10. Assumption of Indonesia’s economic growth, RUPTL 2015-2024	38
Figure 11. Realized electricity sales in Indonesia (GWh)	38
Figure 12. Chinese investment and financing into Indonesia’s on-grid CFPPs.....	46
Figure 13. Chinese investment in Indonesia’s captive CFPPs	48
Figure 14. Chinese investment and financing in Indonesia’s hydropower	50
Figure 15. Key players in hydro energy projects	51
Figure 16. Chinese investment and financing in Indonesia’s geothermal energy	52
Figure 17. Key players in geothermal projects	52
Figure 18. Key players in solar energy projects.....	53
Figure 19. Key players in Wind Energy	54
Figure 20. Chinese investment and financing in Indonesia’s solar energy.....	54
Figure 21. China investment and financing in Indonesia’s wind energy.....	55
Figure 22. Key players in EV Assembling.....	57
Figure 23. Key Players in EV Battery	58
Figure 24. China investment in Indonesia’s EV ecosystem	58
Figure 25. Chinese investment in Indonesia’s nickel downstream industry	60
Figure 26. Adoption of iron-based and nickel-based EV batteries in China, Europe, US	67

1 Introduction

Indonesia has demonstrated a strong commitment to addressing climate change through its Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR 2050), aiming to achieve net-zero emissions by 2060 or sooner if possible. This ambitious strategy is part of a global effort to mitigate climate impacts by reducing dependence on fossil fuels and transitioning to renewable energy sources. Despite this commitment, the energy transition path to clean energy is filled with challenges, particularly in terms of the significant investment and technological development required.

To overcome these challenges, Indonesia has actively sought foreign partnerships and financing mechanisms. One key initiative is the Just Energy Transition Partnership (JETP), signed at the G20 Leaders' Summit in Bali in 2022. The JETP mobilizes up to US\$21 billion in funding to support Indonesia's energy transition through cooperation between governments, the private sector, and civil society. However, despite JETP's ambitious goals, the disbursement of funds has been slow. Now, with U.S. President Donald Trump withdrawing from the Paris Agreement on Climate Change and stepping down as co-chair of JETP Indonesia, the future of JETP Indonesia has become even more uncertain, raising concerns about the effectiveness of Western-backed initiatives.

While Western-backed financial mechanisms face delays, China has emerged as a key partner in Indonesia's renewable energy ambitions. Through initiatives such as the Belt and Road Initiative (BRI) and the Asian Infrastructure Investment Bank (AIIB), China has heavily invested in renewable energy projects across Asia. In 2023, China financed 69 percent of Asia's renewable energy capacity growth, solidifying its role as a major player in the global energy transition. Furthermore, China has pledged US\$100 billion to developing countries, including Indonesia, to support their energy transitions, outpacing the scale and immediacy of Western initiatives like JETP. Already, last year, Indonesia's state-owned electricity company PT PLN signed memorandum of understanding with China's prominent financial institutions and corporations to invest a total US\$54 billion in Indonesia's electricity sector.

China, already one of the biggest investors in coal-fired power plants in Indonesia, is now expanding its investment into energy transition, especially in renewable energy and electric vehicles, as well as into the downstream industry of critical minerals, especially nickel, which is essential element to manufacture EV battery. However, this cooperation has also raised environmental concerns, particularly related to the nickel downstream industry. Nickel, a key component in electric vehicle (EV) batteries, is abundant in Indonesia, making it a focal point of China's investment strategy. Yet, the environmental costs of nickel processing are considerable, posing substantial challenges to sustainable development.

Chinese companies, such as Tsingshan Holding Group, have invested heavily in Indonesia's nickel industry, particularly in Sulawesi, where large-scale nickel smelters have been established. These smelters use high-pressure acid leaching (HPAL), a process that has significant environmental consequences, including toxic waste generation and water contamination. Nickel processing requires vast amounts of energy and produces large quantities of tailings—a toxic byproduct often disposed of in the sea, contributing to marine pollution.

The environmental risks associated with these investments have sparked growing concerns. Indonesia's nickel smelting operations, particularly those driven by Chinese investments, have been linked to deforestation, biodiversity loss, and freshwater contamination. In Morowali, Central Sulawesi, the rapid expansion of nickel processing facilities has led to severe air pollution and the degradation of marine ecosystems due to untreated waste discharge into the sea. Local communities are already feeling the effects, facing increased health risks and reduced livelihoods, especially in the fishing and agricultural sectors.

Beyond environmental concerns, there are increasing worries about the sustainability of Indonesia's economic dependence on Chinese investments. The focus on the nickel industry has raised questions about whether Indonesia is becoming overly reliant on raw material exports without securing long-term benefits such as technology transfers or value-added manufacturing. This issue reflects broader critiques of China's BRI, where developing countries often face unsustainable debt burdens from Chinese-funded infrastructure projects.

Given these dynamics, it is essential to analyze the economic and political landscape shaping Indonesia-China cooperation in energy transition. This analysis will provide critical insights into the factors influencing bilateral relations, the role of foreign investment, and the alignment of national interests in advancing Indonesia's energy transition. Moreover, understanding the competition between Western-led initiatives like JETP and China's expanding role in energy financing is crucial for navigating future partnerships.

The primary objectives of this study are to explore the economic and political dynamics affecting Indonesia-China cooperation in energy transition, identify key factors influencing the bilateral relationship, and provide recommendations to strengthen collaboration. By evaluating the opportunities and challenges within this partnership, the study will offer actionable strategies to enhance cooperation between Indonesia and China in energy transition.

The scope of this research includes an analysis of the political-economic landscape, key stakeholders mapping, and decision-making processes impacting energy collaboration, and an evaluation of the social and environmental standards associated with energy

transition projects. The study will also formulate policy recommendations to ensure that Indonesia-China relations in energy transition are both socially and economically beneficial and aligned with broader sustainable development goals. Through this analysis, the study aims to provide a comprehensive framework to improve diplomatic and economic ties between Indonesia and China, ensuring that both nations can effectively achieve their renewable energy goals while navigating future challenges and opportunities.

2 China's Energy Transition Landscape

China's energy transition is an envy for many countries. It has transformed not only its power market but also its power industry, especially the clean technology industries, especially renewable energy and electric vehicles (EV). Although China has continued to rely on coal energy to power its huge economy, its renewable energy and EV industries are dominating the world market. Initially China developed its renewable energy as part of its energy transition from fossil-based energy to renewables. Initially, it was driven by the big domestic market facilitated by the government policy. As its market became saturated, they have no other choice but to target export markets. When export destinations become more restrictive, especially the US and EU markets, China renewable energy industry once again target the domestic market. When domestic market becomes saturated, the Chinese government intervenes and pushes the industry to export their overcapacity to the Global South, including Indonesia. It eventually becomes part of China's geopolitical strategy to dominate the Global South, vis-à-vis the Western power.

The following sections discuss China's energy transition development as well as China's expansive outward investment in energy transition and EVs. The discussion on China energy transition development ranges from China's energy transition action plans, the adoption of renewable energy law that has driven up investment into renewable energy, as well as challenges in China's energy transition. The discussion on China's expansive outward investment on energy transition covers subjects on the economic opportunity driven by government subsidies, strategic shift to domestic market, the overcapacity in renewable energy, market expansion to the Global South and China's geopolitical strategy behind China's expansive outward investment in renewable energy and EVs.

2.1 China's Energy Transition Development

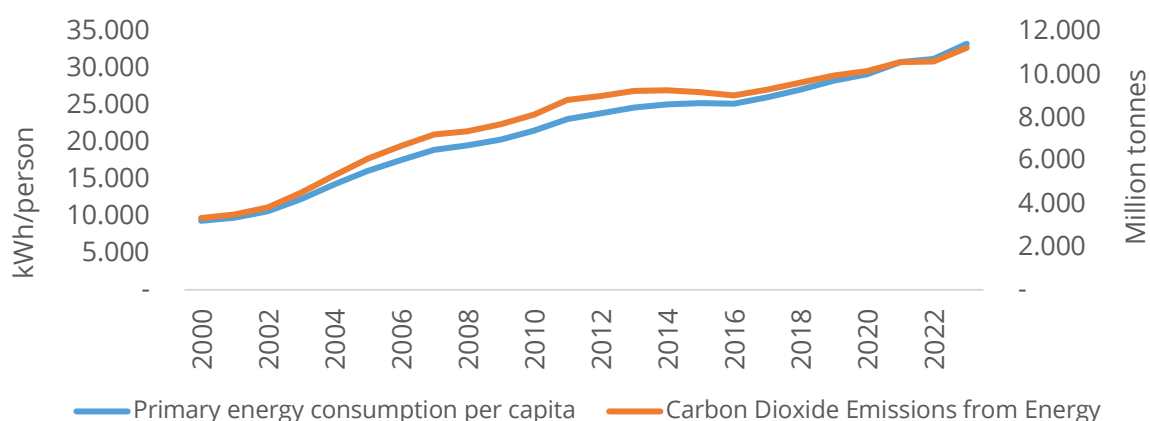
Over the past two decades, China has experienced extraordinary economic growth, largely driven by successful industrialization and a demographic dividend that provided an abundant labor force.¹ As the economy expanded, the shift from rural to urban areas intensified, leading to rapid urbanization, with nearly two-thirds of the population now

¹ Xing Meng, "The People's Republic of China's 40-Year Demographic Dividend and Labor Supply: The Quantity Myth", *Asian Development Review*, Vol. 40, No. 2, pp. 111-144, 2023.

living in cities. This economic and demographic transformation has fueled a surge in energy demand. In 2023, China's primary energy consumption grew by 6.5 percent, significantly higher than the 3.5 percent average growth over the previous decade.

However, this rapid industrial growth has come at a steep environmental cost. China has long been the world's largest emitter of greenhouse gases, primarily due to its dependence on coal, which accounts for about half of the energy consumption in the industrial sector. By 2006, China had surpassed the US to become the largest emitter of CO₂, and by 2023, it was responsible for 31.9 percent of global CO₂ emissions, compared to 13.2 percent for the US and 10.1 percent for Europe.² This sharp rise in emissions parallels the country's per capita energy consumption, which has increased 2.4 times, as shown in Figure 1 below.

Figure 1. Energy consumption per capita and CO₂ emission, China



Source: Our World in Data (2024), Energy Institute (2024)

The primary driver of China's high emissions is its heavy reliance on fossil energy, particularly coal. A decade ago, coal-fired power plants supplied 62 percent of the country's electricity, while hydropower contributed 22.7 percent. China's coal power plant capacity reached nearly 820 gigawatts—about three times that of the US—to meet the rapid growth in energy demand, which averaged a 3.62 percent increase per year from 2010 to 2023. However, as China's economic boom has started to slow, the country now faces new challenges, including rising labor costs and a declining birth rate, which are contributing to a demographic shift toward an aging population.³

China's over-reliance on coal and the multiple challenges facing its economy have prompted the government to pursue more sustainable economic strategies. These strategies include creating investment opportunities in cleaner technologies to mitigate the

² Energy Institute, "Statistical Review of World Energy 2024", 2024. <https://tinyurl.com/3krdc5r5>

³ Our World in Data, 2024. <https://tinyurl.com/3avuyzax>

negative environmental impacts of coal and contribute to global efforts to reduce emissions.

2.1.1 China's Energy Transition Action Plans

China has made significant strides in its energy transition, outlining action plans prior to its formal submission to the Paris Agreement in 2015. One of the initial milestones was the 2006 Renewable Energy Law, which laid the groundwork for future developments. This was followed by a pivotal commitment at the 2009 UN Climate Change Conference (COP15) in Copenhagen, where China pledged to reduce CO₂ emissions per unit of GDP by 40-45 percent by 2020 (from 2005 levels) and to increase non-fossil fuel energy consumption to 15 percent.⁴

In line with these commitments, the 12th Five-Year Plan (FYP) (2011-2015) established an energy efficiency action plan that included limits on energy consumption in heavy industries and promoted the use of renewable energy, particularly hydropower.⁵ This initiative was further supported by the Air Pollution Prevention and Control Action Plan (2013), which aimed to reduce coal consumption and transition to renewable energy sources, especially in key industrial regions.⁶

In 2014, China introduced the National Energy Strategy Action Plan (2014-2020), which aimed to limit annual energy consumption to 4.8 billion tons of coal by 2020, with coal usage capped at 4.2 billion tons. The plan sought to control coal consumption in major regions, including Beijing, the Yangtze River Delta, and the Pearl River Delta, while increasing the share of non-fossil fuels to 15 percent by 2020 and 20 percent by 2030.⁷

China's commitments became more concrete in 2015 when it submitted its first Nationally Determined Contribution (NDC) under the Paris Agreement. The country pledged to peak CO₂ emissions around 2030, reduce carbon intensity by 60-65 percent from 2005 levels, and increase non-fossil fuel consumption to 20 percent by 2030. These commitments were further solidified with the ratification of the Paris Agreement in 2016, underscoring China's intent to take a leading role in global climate efforts.⁸

Following the Paris Agreement, China has continued to implement new action plans aimed at achieving its energy transition goals. Notable initiatives include:

⁴ Schuman, Sara. Et. al., "China's Renewable Energy Law and its impact on renewable power in China: Progress, challenges and recommendations for improving implementation", *Energy Policy Vol. 51*, 2012, <https://tinyurl.com/ycxvyneh>

⁵ Asia Pacific Energy, "CHINA: 12th Five-Year Plan (2011-2015) for National Economic and Social Development", 2011, <https://tinyurl.com/39yhzmdb>

⁶ Asia Pacific Energy, "CHINA: Air Pollution Prevention and Control Action Plan", 2013, <https://tinyurl.com/yc5p93c8>

⁷ Climate Change Laws of the World, "Energy Development Strategy Action Plan (2014-2020)", 2014, <https://tinyurl.com/8w9s2r8c>

⁸ The Guardian, "China ratifies Paris climate change agreement ahead of G20", Sep. 3, 2016, <https://tinyurl.com/2sm37an5>

Figure 2. China’s energy transition action plans

Year	Action Plan	Content of Action Plan	Progress/Milestones
2020	Carbon Neutrality Pledge	Xi Jinping pledged to peak carbon emissions by 2030 and achieve carbon neutrality by 2060.	Launched the 1+N Policy Framework (2021) to support decarbonization efforts ⁹
2021	1+N Policy Framework	Roadmap to peak emissions by 2030, focusing on reducing carbon emissions in key industries like metallurgy and chemicals	<ul style="list-style-type: none"> • Establishment of CPCN Leading Groups at various levels • Energy consumption per GDP fell by 8.1 percent in 2022; CO2 emissions dropped by 14.1 percent • Installation of renewable power capacity reached 1.2 billion kW • Share of clean energy rose to 25 percent • Proposing Climate Change Law to support carbon trading under China's ETS
2022	14th Five-Year Plan (FYP) for a Modern Energy System	The goals are to have non-fossil fuels account for 39 percent of power generation and 20 percent of consumption by 2025.	<ul style="list-style-type: none"> • Plan to build 455 GW of solar and wind capacity, with 200 GW by 2025 • Installation of nuclear power capacity reached 54.65 GW • Approval of three new nuclear projects
2024	State Council Action Plan for Energy Conservation and Carbon Reduction (2024-2025)	The goals are to improve energy efficiency and reduce energy use per unit of GDP by 13.5 percent by 2025.	<ul style="list-style-type: none"> • In August 2024, China introduced a 33-point guideline for a green transition • By 2030, target for 25 percent of energy from non-fossil fuels

2.1.2 China’s Renewable Energy Law

Before implementing its comprehensive action plans, China laid the groundwork with the Renewable Energy Law of 2006, which established a framework for expanding renewable energy across various sources, including wind, solar, biomass, geothermal, hydropower, and ocean energy. The law also set mid- and long-term targets and created a special fund for renewable energy development. Financial institutions were also permitted to offer

⁹ Climate Policy Lab, “Accelerating the Green Transition: China’s 1+N Policy Framework, Two Sessions, and Beyond”, Mar. 22, 2023, <https://tinyurl.com/4xape7vm>

preferential loans with interest subsidies for projects aligned with the national development guidance catalogue.¹⁰

The 2009 amendment significantly expanded the scope and impact of the law to accelerate China's renewable energy transition.¹¹ Key provisions included:

- **Mandatory Grid Connection:** Power grid operators were required to prioritize renewable energy by purchasing all available renewable energy generated within their networks. This guaranteed market access for renewable energy producers and incentivized investment in new projects.
- **Feed-in Tariffs (FIT):** A pricing system was introduced to ensure that renewable energy producers received premium pricing for the electricity they generated, making renewable energy projects more economically viable and attractive to investors.
- **Renewable Energy Development Fund:** The law established a special fund to provide subsidies and financial incentives to renewable energy developers, helping them cover infrastructure and technology costs.
- **Planning and Target Setting:** The government was tasked with setting national and regional renewable energy targets and ensuring their implementation across various levels of governance.
- **Penalties for non-Compliance:** Penalties were introduced for grid operators and other entities that failed to comply with the mandatory grid connection or other obligations under the law, enforcing adherence to renewable energy priorities.
- **Promotion of Technological Development:** The amendment emphasized research and development (R&D) in renewable energy technologies, promoting advancements in wind, solar, and other renewable energy sources.
- **Public and Private Sector Collaboration:** The law encouraged collaboration between the public and private sectors, mobilizing both domestic and foreign investment to support renewable energy projects.

Following the 2009 amendment, China's renewable energy sector experienced significant growth, supported by substantial government subsidies. These subsidies increased from 4.37 billion yuan in 2008 to 7.54 billion yuan in 2017, reflecting advancements in renewable energy technologies and the government's growing support.¹² By 2022, China's dominance in the global renewable energy industry was largely fueled by industrial subsidies that were three to four times larger than those in OECD countries, with some estimates indicating

¹⁰ Asia Pacific Energy, "CHINA: Renewable Energy Law No. 33 of 2006", 2006. <https://tinyurl.com/zvaat98s>

¹¹ Library of Congress, "China: Renewable Energy Law Amended", Dec. 31, 2009. <https://tinyurl.com/25wjy9vc>

¹² Martin, Nik, "From solar to EVs: How China is overproducing green tech". Apr. 10, 2024. <https://tinyurl.com/282eyj4t>

they were as much as nine times higher.¹³ These subsidies were strategically utilized to promote key technologies, ensuring their market competitiveness.

In addition to subsidies, the government offered preferential access to raw materials, facilitated technology transfers from foreign investors, and implemented favorable public procurement and administrative processes. This comprehensive support has allowed Chinese companies to excel in the renewable energy sector, both domestically and internationally. A notable example is Tongwei Group, the world's largest producer of solar cells, which received US\$125 million in subsidies during the first nine months of 2023—a 240 percent increase from 2022. This financial backing, along with tax incentives, has contributed to the emergence of large conglomerates that now dominate the sustainable energy industries. However, this rapid growth has also resulted in overproduction, as manufacturers are producing solar panels, wind turbines, and electric vehicles at a rate that exceeds domestic demand.¹⁴

2.1.3 China's Renewable Energy Progress

Despite its continued reliance on coal, China has made remarkable strides in renewable energy development, becoming the world's largest installer of renewable energy. As of 2023, China's total installed renewable energy capacity reached 1,454.7 GW, accounting for 55 percent of global renewable capacity additions, reinforcing its leadership in the global clean energy sector.

Figure 3. Renewable electricity generation capacity in China from 2013 to 2023 (in Gigawatts)



Source: Statista (2024)

¹³ Qi, Xiaoyan, Et. Al., "Do subsidies and R&D investment boost energy transition performance? Evidence from Chinese renewable energy firms", *Energy Policy Vol. 164*, 2022, <https://tinyurl.com/2j6trtvn>

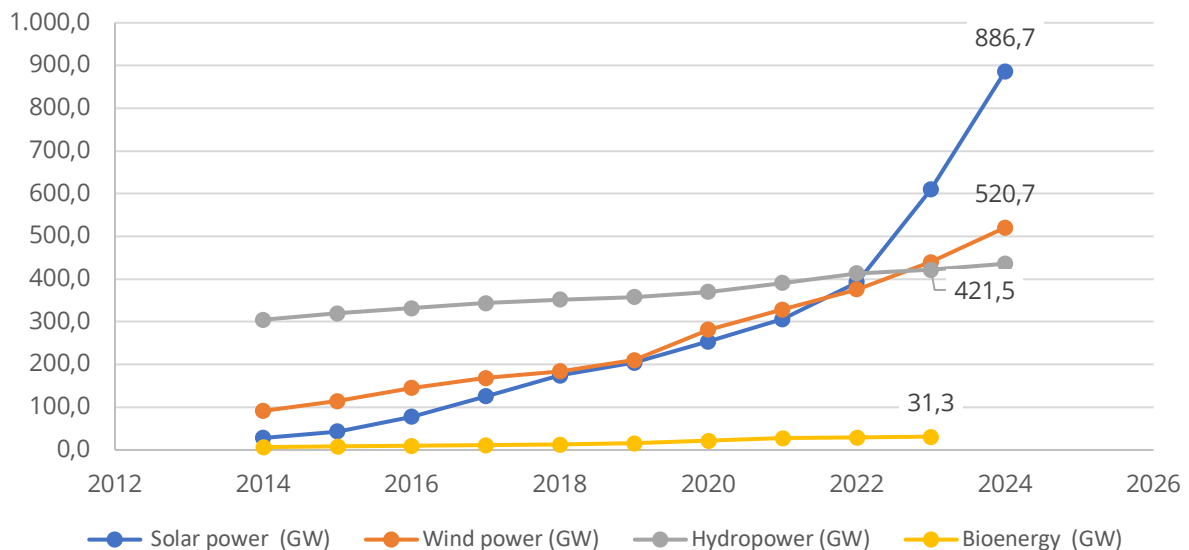
¹⁴ The Washington Post, "China is all in on green tech. The U.S. and Europe fear unfair competition", Mar. 29, 2024, <https://tinyurl.com/2puk5xen>

In 2024 alone, China installed a record-breaking 357 GW of wind and solar power, significantly surpassing previous years and achieving its 2030 renewable energy target six years ahead of schedule.¹⁵ This unprecedented expansion has placed China at the forefront of the global clean energy transition, contributing to a gradual shift away from fossil fuels.

China remains the largest consumer of coal, but its share in electricity generation declined from 76.86% in 2010 to 60.7% in 2023. While this reduction reflects efforts to integrate more renewables, coal still accounted for 60.85% of China’s power generation in 2023. While China has significantly expanded its renewable capacity, coal-fired power remains a critical component of its energy strategy, especially during peak demand periods and to ensure grid stability.

Despite its ambitious renewable energy goals, China continues to expand its coal fleet. In 2024, the country initiated construction on 94.5 GW of new coal-fired power plants, marking the largest increase since 2015.¹⁶ This surge in coal capacity is primarily driven by concerns over energy security, industrial demand, and the need for a stable power supply. The contradiction between rapid renewable expansion and continued coal investments highlights the complex challenge China faces in balancing economic growth and environmental commitments.

Figure 4. Cumulative Renewable Energy Capacity in China by Source 2014-2024 (Gigawatts)



Source: Statista (2024)

¹⁵ Apnews. “China built out record amount of wind and solar power in 2024”, Jan 29, 2025. <https://tinyurl.com/yc7h5b8p>

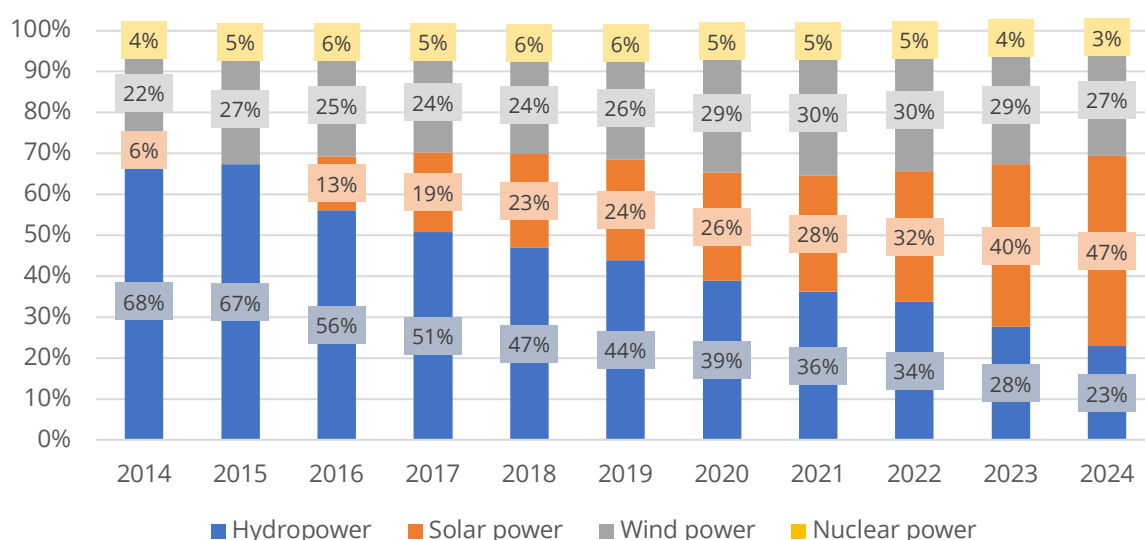
¹⁶ Reuters. “China's 2024 coal power construction hits 10-year high, researchers say”, Feb 13, 2025. <https://tinyurl.com/y75skjy2>

China has solidified its status as the global leader in solar energy, with solar PV capacity reaching 886.7 GW in 2024, a 277 GW increase from the previous year.¹⁷ This accounted for 58% of global solar PV additions, demonstrating China's dominance in the global solar market. This rapid expansion has been fueled by substantial government support, declining production costs, and advancements in photovoltaic (PV) technology, making solar energy one of the most competitive sources of electricity in the country. Large-scale solar farms, particularly in desert regions, have further accelerated capacity growth, allowing China to maintain its leadership in solar energy deployment worldwide.

China is also at the forefront of global wind energy development, with its installed wind power capacity reaching 520.7 GW in 2024, contributing 28% to its total renewable energy capacity. In March 2024, China generated over 100 TWh of wind electricity, surpassing the combined output of Europe and North America.¹⁸ The country's wind energy expansion has been driven by large-scale onshore and offshore projects, particularly in Inner Mongolia, Xinjiang, and along the eastern coastline.

Technological advancements in wind turbines have significantly improved energy efficiency, reducing intermittency issues and making wind energy a reliable alternative to fossil fuels. Additionally, improvements in grid infrastructure have facilitated better integration of wind power into the national electricity system, further strengthening China's position as the world's largest wind energy producer.

Figure 5. Share of installed power plants by source in China's renewable electricity mix 2014-2024



Source: Statista (2024)

¹⁷ Statista. "Renewable energy in China 2024: Statistics report on the renewable energy industry in China", 2024. <https://tinyurl.com/mtnkvm6a>

¹⁸ See Footnote 15

While hydropower has historically been the backbone of China's renewable energy sector, its role has diminished over the years. In 2014, hydropower accounted for 68% of China's total renewable capacity, but by 2024, its share had declined to 23%. Despite this decline, China still possesses the world's largest installed hydropower capacity, reaching 435.95 GW in 2024. However, several factors have contributed to the slowdown in hydropower development, including environmental concerns, the displacement of communities, and the limited availability of viable new dam sites.

As solar and wind energy have expanded at a much faster rate, hydropower's dominance has gradually decreased. However, it remains a crucial energy source for grid stability and energy storage, especially in managing fluctuations in electricity demand. While new large-scale hydropower projects are becoming less common, China continues to invest in pumped-storage hydropower to support renewable energy integration.

China is actively diversifying its energy portfolio to enhance energy security and reduce dependence on fossil fuels. In addition to solar, wind, and hydropower, the country has significantly expanded its nuclear energy capacity, which contributed 4.6% of total power generation in 2023. Meanwhile, bioenergy has also seen steady growth, reaching 31.3 GW in 2023, though it still plays a relatively minor role in China's overall energy mix.

China has also made significant investments in battery storage and smart grid technologies, which are essential for integrating intermittent renewable energy sources like wind and solar. These technologies enable a more efficient and stable power system, ensuring that fluctuations in renewable energy generation do not disrupt electricity supply. By the end of 2023, the capacity of new-type energy storage systems had surged to 31.39 gigawatts (GW), marking an increase of over 260% compared to the previous year and nearly a tenfold rise since 2020.¹⁹ This growth has been driven by advancements in technologies such as lithium-ion batteries and significant investments exceeding 100 billion yuan (approximately US\$13.9 billion) in recent years.

2.1.4 Challenges in China's Energy Transition

In 2023, China ranked 17th out of 120 countries on the Energy Transition Index (ETI), underscoring its dual role as a major global energy producer and consumer. Despite China's ambitious decarbonization goals and its commitment to achieving Net Zero Emissions (NZE), coal remains the dominant energy source. In fact, coal consumption rose by 4.6 percent year-over-year in 2023, accounting for 56 percent of the country's total energy consumption, indicating that a significant portion of China's power supply is still heavily reliant on fossil fuels.

¹⁹ South China Morning Post. "China's energy storage capacity using new tech almost quadrupled in 2023, National Energy Administration says", Jan 26, 2024. <https://tinyurl.com/bp9wsryt>

China's dependence on coal is partly driven by concerns over energy security. Although President Xi Jinping pledged in 2021 to halt the construction of coal-fired power plants abroad, domestically, the approval of new coal plants continued in 2022. Coal production also surged, increasing from 220 million tons in 2021 to 300 million tons in 2022, as the country aimed to address energy shortages. This reliance on coal poses a significant challenge for China, as it seeks to balance the need for a stable energy supply with efforts to reduce its dependence on fossil fuels.²⁰

One of the most striking examples of this challenge occurred in 2021 when China faced one of its worst power shortages in recent history. Urban areas experienced rolling blackouts, and factories were forced to shut down due to a combination of soaring energy demand and reduced coal production, in line with policies aimed at lowering energy intensity. These events reinforced the government's focus on energy security, with coal remaining a crucial part of China's energy strategy.²¹

Although China is on track to meet its renewable energy targets for 2025 and 2030, coal-fired power plants continue to play a significant role in electricity production. Several factors, including hydropower shortfalls caused by low rainfall in southern China in 2022, have contributed to this ongoing reliance on coal. In response, the central government increased coal production, with coal-fired generators stockpiling fuel to compensate for the drought-induced energy deficit.²²

However, China's hydropower sector faces its own inefficiencies. In the summer of 2022, Sichuan province was forced to limit domestic power usage while continuing to export electricity under rigid contracts. The country's grid system remains too inflexible to effectively balance electricity supply and demand across regions. This rigidity has led to issues like excess capacity, with peak power demand in the summer of 2023 reaching 1,340 GW, while total generation capacity stood at 1,870 GW, including 1,390 GW of thermal power.²³

Rather than addressing these inefficiencies, China has turned to coal as a short-term solution. Despite pledges to reduce coal-fired power generation, the approval of new coal plants quadrupled between 2022 and 2023 compared to the period from 2016 to 2020. By the end of 2022, permits for 45,740 MW of new coal capacity had been granted. This

²⁰ Foreign Policy, "China Pledged to 'Strictly Control' Coal. The Opposite Happened", 2023, <https://tinyurl.com/3d4jp7fd>

²¹ The Oxford Institute for Energy Studies. "The 2021 Energy Crisis: Implications For China's Energy Market and Policies". Mar. 2022. <https://tinyurl.com/57ccdur8>

²² Reuters, "Drought-depleted hydropower drives China to turn to coal", 2023. <https://tinyurl.com/4ryavx4c>

²³ Global Energy Monitor, "The coal power boom will lead to overcapacity and complicate China's energy transition", 2024. <https://tinyurl.com/2wwwxstj>

expansion led to a 12 percent growth in coal-based power generation between 2020 and 2023, contributing 44 percent of the total increase in power generation.²⁴

The rapid growth of coal consumption, which surged by 0.5 percent during 2016-2020 to 3.8 percent in 2023, poses a major challenge to China's climate goals. The country also risks overcapacity in its coal sector, as its grid management remains outdated and unable to efficiently distribute electricity across provincial borders. While there have been attempts to regulate new coal power projects by limiting them to a "supporting" role, these efforts have largely failed. Instead, authorities have accelerated coal power development, viewing the 14th Five-Year Plan as a window of opportunity for coal projects rather than a period for strict regulation.

The environmental implications of this coal expansion are significant. The growth of coal-based power generation accelerated from 3.5 percent per year in 2016-2020 to 4 percent per year in 2021-2023, with total coal consumption (including non-power sector uses) increasing eightfold. This makes it increasingly difficult for China to meet its climate commitments. For example, while China pledged to reduce carbon intensity by 18 percent from 2020 to 2025, it had only achieved a 5 percent reduction by 2023.²⁵ As a result, CO₂ emissions grew by 6.1 percent in 2023, far exceeding the average annual growth of 2.1 percent over the past two decades.²⁶

Additionally, China's energy intensity increased for the first time since 2005, reaching a growth rate of 5.2 percent in 2023. This rise could hinder the country's target of reducing energy intensity by 13.5 percent by 2025, particularly if economic growth continues at 7 percent in the coming years. To address these challenges, China must dramatically accelerate the growth of renewable energy generation and consumption while simultaneously reducing its reliance on fossil fuels.²⁷

2.2 China's Power Market

China's electricity sector has historically operated under a centralized, state-dominated model in which the government exercises significant control over planning, pricing, generation, and distribution. This centralized structure has been instrumental in supporting China's rapid industrialization and economic growth. The sector is heavily dominated by state-owned enterprises (SOEs), and its governance is shaped by a top-down bureaucratic hierarchy involving regulators, grid operators, and power generators.

²⁴ Global Energy Monitor, "China risks missing multiple climate commitments as coal power approvals continue", 2024. <https://tinyurl.com/2wwuxstj>

²⁵ Global Energy Monitor, "China is off track to meet all of its key 2025 climate commitments", 2024. <https://tinyurl.com/2wwuxstj>

²⁶ Energy Institute, "Statistical Review of World Energy 2024", 2024. <https://tinyurl.com/3krdc5r5>

²⁷ Global Energy Monitor, "China is off track to meet all of its key 2025 climate commitments", 2024. <https://tinyurl.com/2wwuxstj>

However, recognizing the need for greater efficiency, reliability, and investment in cleaner energy, the Chinese government initiated a major reform of its power sector in 2002, and then in 2022—each responding to different structural and developmental challenges. The 2002 electricity reform, announced under “Document No. 5/ 2002 by the State Council, marked a turning point from a vertically integrated, monopolistic system dominated by the State Power Corporation of China (SPCC) toward a more decentralized and competitive framework.²⁸ The primary goals were to:

- Improve operational efficiency in the electricity sector,
- Introduce competition in electricity generation and sales,
- Attract private and diversified investments,
- Strengthen market-oriented pricing mechanisms, and
- Accelerate the shift toward cleaner energy sources.

The reform unbundled generation from transmission and created a new set of institutions to govern the system. However, while generation was partially liberalized, transmission and distribution remained under strong state control.

Two decades later, in 2022, the Chinese government initiated a second wave of electricity sector restructuring to accelerate decarbonization and market integration to support China’s climate goals of peaking emissions by 2030 and achieving carbon neutrality by 2060. The objectives of the second wave of reform are as follows:

- Accelerate the construction of a unified national electricity market system by 2025,
- Enhance electricity spot markets and direct trading mechanisms,
- Promote inter-provincial electricity trading,
- Integrate new energy (wind, solar, storage) more effectively into the grid,
- Deepen decarbonization in line with the 2030 carbon peaking and 2060 carbon neutrality targets.

Together, these 2002 and 2022 reforms have shaped a hybrid model that integrates state planning with selective market mechanisms. The following sections examine the evolution of each aspect of China’s power sector in response to these reforms.

2.2.1 Key Players in China’s Electricity Sector

China’s electricity sector is characterized by a unique hybrid of centralized governance and gradual market liberalization. While the state retains firm control through major state-owned enterprises (SOEs), ongoing reforms—most notably the Electricity Reform 2022—aim to deepen market mechanisms, improve efficiency, and accelerate the integration of

²⁸ Berkeley.edu. “China’s Energy Transition Brief: How Power Market Reforms are Meeting Climate Goals”, March 2025. <https://tinyurl.com/3pak4dpz>

renewable energy sources. This reform builds on the earlier 2002 unbundling of generation and transmission but goes further in liberalizing electricity trading and improving dispatch mechanisms.

a. Regulatory and Policy-Making Institutions

The 2002 reform created a clearer institutional separation by forming the State Electricity Regulatory Commission (SERC) to supervise the power market. Though SERC was later merged into the National Energy Administration (NEA) in 2013, this reform marked the beginning of independent regulatory oversight, distinct from state-owned enterprises.

- **National Energy Administration (NEA):** Established in 2008, NEA becomes the key agency responsible for energy long-term policy planning and energy development regulation. The NEA plays a crucial role in ensuring that China's energy transition aligns with the country's broader economic and environmental policies. It took over many roles previously housed under SERC, including the oversight of renewable energy development.
- **National Development and Reform Commission (NDRC):** NDRC oversees electricity pricing, investment approvals, and macroeconomic coordination. NDRC plays a pivotal role in setting tariff structures that influence the profitability of power generation companies, including incentives for renewable energy adoption.

The 2022 reform emphasized enhancing the role of market mechanisms under the oversight of NEA and NDRC. The responsibilities of both agencies include:

- Coordinate cross-regional energy trading,
- Develop national electricity markets and trading platforms,
- Implement carbon pricing and green certificate mechanisms.

These changes reflect a shift toward more dynamic regulation while retaining centralized authority over system planning and energy security.

b. Grid Operators: The Backbone of China's Electricity Transmission

Under the 2002 reform, the State Power Corporation's monopoly over transmission and distribution was dismantled, and its transmission and distribution functions were split into two monopoly grid operators:

- **State Grid Corporation of China (SGCC):** Manages the majority of China's high-voltage transmission infrastructure. SGCC is a critical player in developing Ultra High Voltage (UHV) transmission and Smart Grid technologies. The 2022 reform mandated SGCC to enhance grid openness, allowing more independent generators and renewables to access the grid.

- **China Southern Power Grid (CSG):** Covers five southern provinces. CSG has been more flexible than SGCC in experimenting with regional spot markets and power trading reforms. It is also involved in cross-border electricity trading with Southeast Asian countries.

Both grid operators retained vertically integrated control over transmission and distribution, with limited room for competition. The 2022 reform maintained this structure but placed new expectations on grid companies to facilitate energy transition. Key mandates include:

- Expand Ultra-High Voltage (UHV) transmission to transport renewable energy from western regions to eastern load centers.
- Accelerate investments in smart grids, digital infrastructure, and interoperability to accommodate distributed energy resources.
- Enable cross-provincial electricity trading and grid flexibility services such as storage and demand response.

Despite these advances, SGCC and CSG still operate as natural monopolies, albeit with increasing pressure to enable market access and green energy integration.

c. Power Generators

The 2002 reform unbundled generation from grid operation and created the “Big Five” state-owned generation companies:

- China Huaneng Group
- China Datang Corporation
- China Huadian Corporation
- China Energy Investment Corporation (China Energy)
- State Power Investment Corporation (SPIC)

These firms are vertically integrated SOEs involved in coal, hydro, nuclear, wind, and solar generation. Together, they account for the majority of China’s installed capacity, though Independent Power Producers (IPPs) have grown rapidly in the renewable sector.

Electricity Reform 2022 accelerated the shift toward direct power purchase agreements (PPAs) and spot market participation, especially for renewables. Power generators, including the Big Five and IPPs, now have expanded channels to sell electricity directly to industrial users via provincial trading platforms.

- SOEs are being encouraged to separate generation and retail arms, creating competition.

- The reform also strengthens the mandate to participate in green electricity trading platforms, which allocate carbon intensity scores to energy generation.

These developments are especially critical for expanding renewable energy, where IPPs now play a growing role in solar, wind, and battery storage deployment.

2.2.2 Energy Transition Challenges

a. Market Reform and Challenges

The 2002 electricity reform provided an essential structural foundation for market liberalization but stopped short of establishing the full set of market institutions necessary for dynamic electricity pricing and competition. Critical components such as grid access protocols, flexible dispatch mechanisms, and independent trading platforms remained under administrative control. As a result, while the unbundling of generation and transmission allowed for greater institutional separation, actual market competition was limited—especially for non-state actors and renewable developers.

Recognizing these shortcomings, the 2022 reform introduced a more systemic and future-oriented approach to electricity market design. It proposed the establishment of a national unified electricity market by 2025, with clear implementation milestones for provincial and inter-provincial market integration. At the core of this reform is the expansion of electricity spot markets, direct trading platforms for large users to contract electricity directly from generators, and capacity and ancillary services markets, which are critical for ensuring system reliability in a context of rising renewable penetration and variable supply.

Despite this progress, several persistent structural and institutional barriers continue to limit reform effectiveness:

- **Infrastructure gaps** remain a challenge. In many regions, the lack of advanced metering infrastructure, real-time data systems, and cross-provincial market connectivity inhibits price transparency and dynamic trading.
- **Institutional inertia** and slow adaptations, particularly within large state-owned enterprises (SOEs). SOEs often have limited incentives to embrace market risks or cede control over dispatch.
- **Price regulation** continues to distort market behavior. Although reforms encourage time-of-use tariffs and market-based bidding, certain consumer categories—such as residential and agricultural users—still benefit from heavily subsidized and regulated tariffs, limiting cost-reflective pricing signals and hampering demand-side responsiveness.

Additionally, fragmentation across provinces hinders the creation of a seamless national market. Many provincial authorities retain discretion over dispatch rules,

pricing approvals, and renewable integration strategies, resulting in uneven market maturity across China's vast geography.

b. Infrastructure Development Challenges

A defining feature of the 2022 reform is its explicit alignment with China's long-term climate goals—peaking carbon emissions by 2030 and achieving carbon neutrality by 2060. Unlike the 2002 reform, which prioritized structural efficiency, the new wave of reforms directly integrates decarbonization objectives into market operations and infrastructure investment.

Key elements include:

- **Promotion of flexible resources such as Battery Energy Storage Systems (BESS)**, pumped hydro, and hydrogen fuel. These technologies are increasingly recognized as vital tools to address renewable energy intermittency and maintain grid stability.
- **High investment in Ultra High Voltage (UHV) transmission lines** to support inter-provincial electricity trading, particularly from renewable-rich western provinces to demand-heavy eastern industrial centers. This is also supported by the scaling of digital dispatch systems.
- **Grid modernization initiatives**, including the deployment of smart grid architecture, advanced forecasting, and energy management systems, are being accelerated—though adoption varies significantly between regions.

China's "1+N" policy framework, introduced in 2021, offers the overarching policy foundation for this transition. Under this framework, specific implementation plans ("N" documents) for each sector—including power—detail targets for emissions reduction, energy efficiency, and non-fossil energy development. This gives reform momentum a clear climate alignment, making power market transformation central to achieving national decarbonization.

As of 2023, the National Energy Administration (NEA) reported that China's installed renewable energy capacity exceeded 1,450 GW,²⁹ with solar and wind accounting for over 800 GW combined. This cements China's global leadership in renewables, both in capacity and scale. However, the integration of this capacity into the national grid remains uneven, often constrained by grid bottlenecks, curtailment risks, and insufficient storage or demand-side flexibility.

Moreover, while large-scale renewables continue to expand, distributed generation, such as rooftop solar and community-level microgrids, faces regulatory and commercial

²⁹ The State Council The People's Republic of China. "China drives world renewables capacity addition in 2023", Jan 13, 2024. <https://tinyurl.com/bp9jntde>

barriers, including complex permitting, limited financing, and lack of standardized compensation mechanisms.

Going forward, China's ability to realize the full benefits of its green energy transformation depends not only on technological expansion but also on institutional innovation—particularly the deepening of power market reform, the de-risking of clean energy investment, and the activation of flexible demand and storage solutions to stabilize a renewable-dominated grid.

2.3 China's Expansive Outward RE Investment

China's rapid emergence as a global leader in green energy is fueled by a combination of economic, political, and strategic factors. Over the past two decades, the country has concentrated on transforming its domestic energy landscape through investments in wind, solar, and EV technologies while also pursuing outward investments in clean energy, particularly in developing countries. These investments allow China to expand its global influence, secure markets for excess production, and enhance its geopolitical leverage.

Several key motivations underlie China's outward investment strategy, including the desire to address domestic overcapacity, secure economic opportunities, and dominate global green energy markets. By leveraging government subsidies and focusing on global expansion, China has positioned itself as a leader in the green energy revolution. The following sections discuss the economic opportunities, domestic challenges, and geopolitical ambitions that drive this expansion.

2.3.1 Economic Opportunity Driven by Chinese Government Subsidies

China's ascent as a world leader in green energy—particularly in solar, wind, and EV technologies—has been largely fueled by government subsidies and strategic policy decisions. Initially, China's focus on clean energy technologies was export-oriented, driven by high demand from markets like Germany in the 1990s. The Chinese government played a pivotal role by offering tax incentives and financial credits to attract investors while sourcing key components, such as machinery and polysilicon, from global markets. This strategy created a vertically integrated supply chain within China, enabling the country to produce solar panels at lower costs and boosting its international competitiveness.³⁰

China has since surpassed early leaders such as Europe in the production and export of solar panels, wind turbines, and EV technologies. The cornerstone of China's clean energy revolution can be traced back to the 2006 Renewable Energy Law, which was significantly strengthened by a 2009 amendment. This amendment established a robust legal framework that empowered the government to provide substantial support for the

³⁰ Fairbank Center for Chinese Studies, "How China is Winning the Race for Clean Energy Technology", Oct. 22, 2022. <https://tinyurl.com/2mjnn99v>

accelerated development of renewable energy resources, including wind, solar, hydropower and biomass.³¹

The 2009 amendment was particularly transformative, as it enhanced financial incentives for renewable energy development by emphasizing key mechanisms such as feed-in tariffs, grid access, and funding to support renewable energy projects. These measures enabled China to prioritize the large-scale deployment of renewable energy and attract investments from both domestic and foreign entities. Consequently, the country rapidly expanded its renewable energy capacity, establishing itself as a global leader in clean energy technology.

However, in 2014, the landscape shifted when the US and the European Union imposed tariffs on Chinese solar panels and clean energy products, citing dumping practices and unfair government subsidies. In response, China pivoted toward developing its domestic market, leveraging substantial government subsidies to sustain the growth of its industry. This strategic shift ensured continued expansion despite international trade restrictions.³²

By 2022, China's dominance in the renewable energy sector was significantly bolstered by industrial subsidies that were three to four times larger than those in OECD countries; some estimates suggested these subsidies were nine times higher. In 2019, Chinese industrial subsidies reached €221 billion (US\$237 billion), equivalent to about 1.73 percent of GDP. These subsidies supported companies like BYD, which received €2.1 billion in 2022, a substantial increase from €220 million two years earlier. Similarly, Mingyang's subsidies grew from €20 million in 2020 to €52 million in 2022.³³ These large-scale subsidies enabled Chinese companies to produce and export clean technologies at lower costs, allowing them to maintain competitiveness in global markets despite external tariffs.

2.3.2 Strategic Shift to China's Domestic Market

China's rise as a global leader in renewable energy can also be attributed to its strategic shift toward domestic market expansion, particularly after encountering trade barriers from the US and the European Union. While China's renewable energy industry was initially export-driven—especially in the solar sector—its focus shifted dramatically with the imposition of US and EU tariffs on Chinese green technology. This transition not only helped China protect its industry but also allowed it to sustain growth and competitiveness in the global clean energy sector.

After trade barriers hindered export opportunities, China heavily focused on expanding its domestic renewable energy market. The Chinese government, through the National Energy

³¹ Schuman, S. Alvin Lin, "China's Renewable Energy Law and Its Impact on Renewable Power in China: Progress, challenges and recommendations for improving implementation", *Energy Policy* 51. Pg.89-109. 2012. <https://tinyurl.com/mpfvjmkx>

³² Shu Liu, Chung. Et al., "How the European Union's and the United States' anti-dumping duties affect Taiwan's PV industry: A policy simulation", *Renewable and Sustainable Energy Reviews Vol.53*, 2016. <https://tinyurl.com/mue36skx>

³³ IfwKiel, "China's Massive Subsidies for Green Technologies", April 10, 2024. <https://tinyurl.com/s4pn3ucp>

Administration (NEA), implemented policies that encouraged state-owned enterprises to rapidly construct solar plants, wind farms, and related infrastructure. By 2022, China had installed over 392 GW of solar capacity, making it the largest solar market in the world.³⁴ This internal focus was crucial for maintaining momentum in clean energy production and ensuring economies of scale, which helped keep production costs low.

China's internal push also resulted in large-scale renewable energy projects being integrated into its National Development Plans. Through the framework of its Five-Year Plans (FYPs), particularly the 14th FYP (2021-2025), China aims to increase renewable energy production by 50 percent, from 2.2 trillion kWh in 2020 to 3.3 trillion kWh by 2025, with at least 50 percent of new energy consumption coming from renewable sources.³⁵

This sustained focus on scaling up renewable energy capacity has enabled China to achieve a total installed capacity of 1,454.7 GW by 2023, making it the world's largest market for both solar and wind power.³⁶ Additionally, China has established renewable energy megabases in regions such as Xinjiang and the Hexi Corridor, which are expected to contribute approximately 70 percent of new capacity additions. The integration of distributed solar PV systems in rural areas, through initiatives like the Whole County PV project, further enhances China's capacity to meet its clean energy goals. This internal capacity not only addresses the country's energy needs but also positions it as a significant leader in the global renewable energy industry.

2.3.3 Overcapacity in China's Renewable Energy Sector

One of the main drivers behind China's push for outward investment in the clean energy sector, especially in developing countries, is the need to address overcapacity in its domestic renewable energy industry. The rapid expansion of China's solar and wind energy infrastructure resulted in significant overproduction of solar panels and wind turbines. This overproduction was primarily fueled by China's reliance on external demand, particularly from international markets like Europe, and the lack of sufficient domestic capacity to absorb this growth. However, production soon outstripped domestic demand, leading to an oversupply that threatened the profitability and efficiency of China's renewable energy sectors.

The origins of this overcapacity issue can be traced back to the early 2010s, when China's PV industry saw rapid growth due to strong international demand, particularly from Europe. In 2011, China's PV industry had an annual output of over 300 billion RMB, with

³⁴ Reuters.com, "China's solar capacity expected to hit 1,000 GW by 2026, Rystad Energy says", Sep. 12, 2023. <https://tinyurl.com/4y6mtbbc>

³⁵ Spglobal.com, "China's renewables 14th Five-Year Plan: Official targets to be remarkably outpaced?", July 20, 2022. <https://tinyurl.com/2uukv4yx>

³⁶ The State Council The People's Republic Of China, "China drives world renewables capacity addition in 2023", Jan. 13, 2024. <https://tinyurl.com/5989kztk>

142 billion RMB in imports and exports, and employed over 300,000 people. This growth was largely export-driven, with 90 percent of production serving markets abroad. However, events such as the US financial crisis and the European debt crisis led to a sharp drop in global demand for PV products, leaving China's PV industry grappling with a severe oversupply problem. Consequently, Chinese manufacturers were left with vast inventories of solar products, including silicon, polycrystalline silicon, solar cells, and PV modules, far exceeding what the domestic market could absorb.³⁷

In response to the sudden drop in international demand, China hoped its domestic market would absorb the excess production. However, the domestic market lagged behind the rapid increase in production capacity, a situation worsened by insufficient planning and uncoordinated incentive systems. Many Chinese PV manufacturers focused on low-end production, and the lack of innovation further exacerbated the issue, resulting in a mismatch between production and market demand. Driven by short-term profits, numerous manufacturers heavily invested in expanding production capacity without adequately advancing technology. This resulted in a glut of low-cost products, which further depressed prices in both domestic and international markets. Additionally, inadequate planning and low admittance standards allowed many manufacturers to enter the market without considering the long-term sustainability of their operations.³⁸

The government's incentive system was a key contributor to the overproduction crisis. While subsidies and tax credits spurred rapid expansion, they were not effectively aligned with market demand. As a result, production continued to grow even as demand declined, leading to a supply glut that negatively impacted both profitability and sector stability. As the domestic market struggled to absorb the excess production, Chinese manufacturers faced shrinking margins and declining profits, particularly as global demand weakened. This overcapacity posed a risk to the financial stability of China's renewable energy sector, as producers grappled with reduced profitability due to the oversupply.³⁹

To address these challenges, China shifted its focus to outward investment, particularly targeting developing countries to offload its excess capacity. Through initiatives like the BRI, China began exporting surplus solar panels and wind turbines, easing pressure on its domestic market while simultaneously expanding its geopolitical influence. This strategy not only helped resolve some of the structural imbalances in China's renewable energy sector but also positioned the country to play a larger role in shaping global energy policies.

³⁷ Wang, Yong-hua, et.al., "Why is there overcapacity in China's PV industry in its early growth stage?". *Renewable Energy* Vol.72, 2014, <https://tinyurl.com/mrx788xt>

³⁸ Reuters, "Drought-depleted hydropower drives China to turn to coal", 2023. <https://tinyurl.com/4ryavx4c>

³⁹ *Environmentenergyleader.com*, "China's Solar Overcapacity Sparks International Concerns", May 29, 2024. <https://tinyurl.com/47mbhpkz>

2.3.4 China's Market Expansion to Developing Countries

China's overcapacity in the renewable energy sector initially posed a domestic challenge but also served as a catalyst for the country's expansion into global markets. As the production of solar panels and wind turbines outpaced internal demand, China sought to offload its excess capacity through outward investment, particularly in developing countries. This strategic approach not only alleviated the issue of overproduction but also strengthened China's position as a global leader in renewable energy.

China's market leadership has been further amplified by its strategic pivot towards developing countries. As trade barriers and protectionist policies in the US and EU increased,⁴⁰ particularly following accusations of dumping and government subsidies—China turned to new markets in Africa, Latin America, and Southeast Asia, where demand for affordable renewable technologies was rapidly increasing. This strategic shift was crucial in absorbing China's overproduction, helping to prevent further losses for its manufacturers and ensuring continued growth in the renewable energy sector.

In Southeast Asia, China has emerged as a leading investor in the renewable energy transition. By 2022, 31 percent of China's overseas power-generating projects were located in the region, with a strong emphasis on expanding solar and wind capacities.⁴¹ In Indonesia, Chinese investments have played a key role in advancing the renewable energy sector. In 2023, Indonesia secured eleven agreements worth US\$12.6 billion, primarily focused on electric vehicle battery projects and clean energy development. This underscores China's significant contribution to fostering sustainable energy growth in the country.⁴²

By investing heavily in solar and wind projects in developing countries, China has not only created new markets for its technologies but also addressed its domestic overcapacity. The BRI has been a crucial vehicle for this outward investment, financing renewable energy projects in over 60 countries. Through the BRI, China has assisted developing nations such as Kenya, Pakistan, and Argentina in developing their solar and wind infrastructure. These investments serve a dual purpose: they open new markets for China's renewable energy technologies and establish long-term geopolitical leverage. As these countries become increasingly reliant on Chinese investments, they are also more inclined to align with

⁴⁰ Politico.eu, "US Tariff Smackdown on Chinese Evs leaves EU playing catch-up". May 14, 2024. <https://tinyurl.com/3wyau2x9>

⁴¹ Ecobusiness.com, "Analysis: China remains key to success of Southeast Asia's energy transition". Oct 10, 2023. <https://tinyurl.com/2vvzw3rr>

⁴² Aseanbriefing, "China's Investments in Indonesia: 2024 Outlook". June 5, 2024. <https://tinyurl.com/ynu2an7d>

China's global policies and initiatives, further enhancing China's influence in shaping global energy policies.⁴³

2.3.5 China's Geopolitical Strategy for Dominance in Global South

China's outward investment in green technologies, particularly in renewable energy and EVs, serves not only as an economic strategy but also as a critical geopolitical tool. This approach enables Beijing to expand its global influence, especially in developing countries, by shaping their energy infrastructures, securing access to vital resources, and challenging the dominance of Western powers like the US and the European Union. Several key aspects illustrate how this strategy aligns with China's broader geopolitical ambitions.

China's investment in renewable energy projects in Global South countries is pivotal in extending its geopolitical influence. Many developing nations lack the financial and technological resources needed to modernize their energy sectors, and China steps in as a vital provider through BRI projects. By financing large-scale renewable projects, such as solar and wind farms in Pakistan, Kenya, and Argentina, China ensures that these countries become dependent on its technology and financial support. This dependence grants China significant leverage over their political and economic policies.⁴⁴

As the US and European Union struggle to maintain their leadership roles in energy financing and infrastructure development—especially through initiatives like the JETP, which have fallen short of their funding commitments in countries such as South Africa and Indonesia—China has rapidly filled the vacuum in the clean energy sector. It has aggressively expanded state-backed investments, leveraging programs like the BRI to provide affordable renewable technology to developing nations. For instance, while G7 countries pledged \$8.5 billion to South Africa's energy transition, much of the funding remains largely unutilized, allowing China to step in with more accessible financing options. Chinese companies, such as Powerchina, have invested in several renewable energy projects in South Africa, including the 100 MW Redstone Concentrated Solar Power Plant and the 123 MW Damlaagte PV Project, both crucial to the country's local energy transition efforts.⁴⁵ Similarly, Indonesia's JETP initiative has yet to demonstrate tangible progress, further enabling China to increase its influence by financing renewable energy projects and EV infrastructure.⁴⁶ This approach gives China unmatched geopolitical leverage in regions

⁴³ World Economic Forum, "China's growing dominance in clean energy investments", Jan. 17, 2018. <https://tinyurl.com/5e52yaym>

⁴⁴ Saiia.org.za, "China's Climate and Energy Partnerships in the Global South. July 25, 2024. <https://tinyurl.com/4vw5d8fv>

⁴⁵ Chinaglobalsouth, "Chinese Company Expands Footprint in South Africa's Energy Sector With New Solar Project", Aug. 21, 2023. <https://tinyurl.com/3d5taccu>

⁴⁶ Internationalaffairs.org.au, "Can China Replace JET-P Energy Financing in Indonesia?", Apr. 9, 2024. <https://tinyurl.com/5xsj47c8>

that depend on Chinese-backed infrastructure and technology, solidifying its leadership in the global energy transition.

China's expansion in renewable energy markets also directly challenges Western dominance in global trade and energy politics. As China increasingly dominates the supply of green technologies, Western countries, including the United States and the European Union, have imposed tariffs and trade barriers on Chinese products, citing unfair subsidies and market practices. By outcompeting the West with cheaper and more accessible renewable energy solutions, China is not only displacing Western companies but also shifting the geopolitical balance of power in key regions.

2.3.6 China Dominating Global Supply Chains of Green Technology

China's domination of global supply chains in green technologies, particularly in lithium-ion batteries and solar panels, is a central element of its broader geopolitical strategy. This control spans all stages of the supply chain, from the extraction of raw materials such as lithium and cobalt to the large-scale production of solar panels and battery components. By controlling these critical sectors, China gains significant leverage over global renewable energy markets and the countries that rely on its technologies for their clean energy transitions.

China's strategy to dominate global supply chains begins with securing access to raw materials essential for green technologies. Through investments in resource-rich countries such as Chile, Argentina, and Indonesia, China has established a strong foothold in the lithium mining sector. For instance, Indonesia possesses some of the world's largest nickel reserves, positioning it as a key player in the global supply chain for nickel-cobalt-manganese (NCM) batteries, which are vital for EVs. To gain control over this critical segment of the supply chain, Chinese companies have invested approximately \$30 billion in downstream nickel processing projects in Indonesia.⁴⁷ Through these substantial investments, China not only secures access to essential raw materials for EV production but also enhances its geopolitical position in Southeast Asia. By establishing a strong downstream nickel processing capacity in Indonesia, China reinforces its dominance in the global EV supply chain, further solidifying its leadership in the green energy transition.

In addition, China's dominance in manufacturing is fueled by its cost advantages and massive production capacity, particularly in sectors like solar panel production. Chinese firms can produce solar panels at significantly lower costs than their competitors in Europe or the United States. This capability enables China not only to dominate global exports but also to make renewable energy technology more accessible to developing countries. For instance, Chinese companies manufacture over 80 percent of the world's solar panels, and

⁴⁷ Asiatimes.com, "The true cost of China's hold on Indonesia's nickel", Aug. 12, 2024. <https://tinyurl.com/34sykd6u>

despite tariffs and investigations into subsidies by the US and the EU, China has maintained its market leadership.⁴⁸

Through its outward investment, China is positioning itself to set global standards for renewable energy technologies. By becoming the dominant supplier of solar panels, wind turbines, and EV batteries, China is influencing the technical standards and regulatory frameworks adopted by countries that import its technology. This not only provides China with economic benefits but also grants it normative power to shape the future of renewable energy adoption worldwide. For example, in Latin America, Chinese companies are significantly involved in renewable energy projects in countries like Brazil and Chile, shaping how these nations deploy solar and wind technologies. China's ability to establish standards in these projects creates long-term dependencies on its technology, ensuring that developing countries continue to rely on Chinese expertise and equipment for their energy transitions.

3 Indonesia's Energy Transition Landscape

As parts of its commitment to decarbonization under Paris Agreement, Indonesia has committed to energy transition from reliance on fossil-based energy to new and renewable energy. And the focus of the energy transition has been on the electricity sector as it is the biggest contributor to CO₂ emissions in Indonesia. Implementation of energy transition, however, is always influenced by many competing factors and actors, especially the powerful lobby groups of coal businesspeople who continue to sway implementation of energy transition commitment. Therefore, Indonesia has always been behind its target in energy transition.

In addition, Indonesia's energy transition is very much influenced by the power market dominated by one company, state-owned electricity company PT PLN. Therefore, discussing energy transition in Indonesia needs to consider the role and power of PT PLN. Because of its monopolistic nature, PT PLN influences implementation of policy on energy transition. Experience shows that If PLN does not move to implement a policy, such a policy would never become effective. Also, PLN becomes a decisive factor in attracting private investment into renewable energy because almost all investments into electricity would need its consent.

Asides from electricity, Indonesia adopts electrification of the transportation sector by attracting investment into the electric vehicles and EV battery industries to achieve its energy transition targets. The policy toward EV is driven by the fact that Indonesia holds the world's biggest reserves of nickel, the critical mineral that becomes key component of

⁴⁸ Chadly, Assia, et.al., "State of global solar energy market: Overview, China's role, Challenges, and Opportunities", *Sustainable Horizons Vol.11*, Sep. 2024. <https://tinyurl.com/4twa36xx>

EV battery. Indonesia has facilitated massive investment, mainly from China, into nickel downstream industry which has transformed Indonesia's mining industry as well as EV industry. China emerges as the dominant player not only in the nickel downstream and EV industry, but also in energy transition in the electricity sector.

The following sections discuss Indonesia's energy transition development, beginning with the energy transition development, the power market and Indonesia's venture into nickel downstream and EV industries.

3.1 Indonesia's Energy Transition Policy and Development

The focus of Indonesia's energy transition has been on the energy sector, especially the electricity sector, because according to the official data, power plant activities produce the largest CO₂ emissions. Out of total CO₂ emissions of 651 million tonnes in 2022, power plant activities contribute 45.5%, followed by industry with 24.6%, transportation with 22.5%, residential with 3.9%, and others with 3.5%.⁴⁹ The power sector, however, has been stubborn in consuming fossil energy, mostly coal, to produce electricity because of various factors, including the lobby of coal businesspeople and the attitude of PT PLN in preferring coal as the cheapest source of energy.

This section will discuss the energy transition policy, the laggard in achieving the target of renewable energy in Indonesia's energy mix, and the challenges in achieving Indonesia's energy transition.

3.1.1 Indonesia's Energy Transition Policy

The country's commitment and energy transition policies are guided by the National Energy Policy (KEN) and the National General Energy Plan (RUEN). KEN, based on Government Regulation, is an energy management policy aimed at achieving national energy security and independence. The government and the House of Representatives approved in February 2025 a draft government regulation to replace Government Regulation No. 79/2014 on KEN. Though Indonesia is committed to global decarbonization efforts, the revised draft regulation introduces greater flexibility in implementing the energy transition. Article 7e explicitly states that the transition to reach net-zero emissions (NZE) by 2060 must not compromise energy security and self-sufficiency, effectively allowing room for policy adjustments if decarbonization efforts are deemed to hinder the Prabowo administration's energy security agenda.

The latest version of the draft KEN regulation stipulates a more relaxed pace of renewable energy expansion, pushing back the goalpost for 23 percent renewables in the national

⁴⁹ IEA. How much CO₂ does Indonesia emit? <https://www.iea.org/countries/indonesia/emissions#how-much-co2-does-indonesia-emit>

energy mix from 2025 to 2030, and gradually increasing to 72 percent by 2060. Biomass is expected to lead renewables in the energy mix by 2030 at 9 percent, followed by biofuel (5 percent), geothermal energy (4 percent), hydropower (2.3 percent) and solar (1.6 percent). This reflects the government's preference for dispatchable renewable sources that can ensure stable power generation, such as biomass and geothermal energy, over intermittent sources like solar and wind.

Despite the incremental push for renewables, coal will continue to dominate Indonesia's energy sector in the coming years. According to the draft KEN policy, electricity generation from coal will increase from 39.48 percent in 2024 to 40.7 percent in 2030 toward a gradual decline to 7.8 percent by 2060, while oil is expected to dip from 29.9 percent last year to 22.4 percent in 2030, before declining to 4.7 percent by 2060. The continued reliance on coal reflects a reluctance to phase out fossil fuels too quickly, with the government citing affordability, availability and energy security as related concerns. To reconcile this with Indonesia's decarbonization commitment, the government plans to use low-carbon technologies at coal-fired power plants to allow for a gradual transition while minimizing economic disruptions.

While the country is awaiting the new KEN, the government, through the Ministry of Energy and Mineral Resources (ESDM), surprised many by issuing Ministerial Regulation No. the National Electricity Master Plan (RUKN) 2024-2060, without consulting with the House of Representatives. The RUKN was issued on November 29, 2024 on the same day when the Constitutional Court issued its verdict that upholds the articles of the 2009 electricity law that requires the government consult with the House in issuing the RUKN. Replacing the 2019-2038 RUKN, the RUKN 2024-2060 contains national electricity policies, the state of national electricity supply, projections of national electricity demand and supply up to 2060, and plans for the development of the national electricity supply system, all aligned with the country's net zero emission (NZE) target of 2060.

The 2024-2060 RUKN⁵⁰ projects that electricity demands would increase almost 4 times to 1,813 terawatts hour (TWh) in 2060 from 482 TWh in 2024. In terms of per capita, electricity consumption would increase to over 5,000 kilowatts hour (kWh) per capita from 1,713 kWh per capita in 2024.

To meet the demand, the RUKN sets new targets for the development of more new and renewable power plants to align with NZE 2060. Thus, the new energy mix by 2060 would comprise 73.6% new energy and renewable energy, 26.4% from fossil energy and carbon capture and storage (CCS). The new and renewable energy in 2060 would comprise 24.1% new energy, 49.5% renewable energy, 20.7% variable renewable energy, and 28.8%

⁵⁰ Ministry of Energy and Mineral Resources Minister Regulation No. 314.K/TL.01/MEM.L/2024

dispatchable renewable energy. The portion of new and renewable energy would surpass fossil energy in 2044 when new and renewable energy would reach 52 percent. To achieve that, the government would accelerate replacing diesel-powered power plants with renewables, gasification of power plants, deploying wind power and solar power, including rooftop and floating solar power, as well as building more hydro and geothermal power plants. The new RUKN especially mentions building hydropower plants in Papua, solar power plants in East Nusa Tenggara and a nuclear power plant in West Kalimantan.

To achieve all those targets, the new RUKN mandates the construction of transmission networks inside four main islands: Sumatra (especially connecting the northern part of Sumatra with the southern part of Sumatra), Sulawesi (from north to south), Kalimantan (looping grid), and Papua (connecting Jayapura and Sorong). In addition, the RUKN also mandates the construction of inter-island interconnections linking Batam island with Sumatra in 2028, Java-Bali connection in 2029, Sumatra-Java in 2031, Bali-Lombok-Sumbawa in 2035, Java-Kalimantan in 2040 and Sumbawa-Flores and Kalimantan-Sulawesi in 2041, and Sumba-Sumbawa-Sulawesi in 2045.

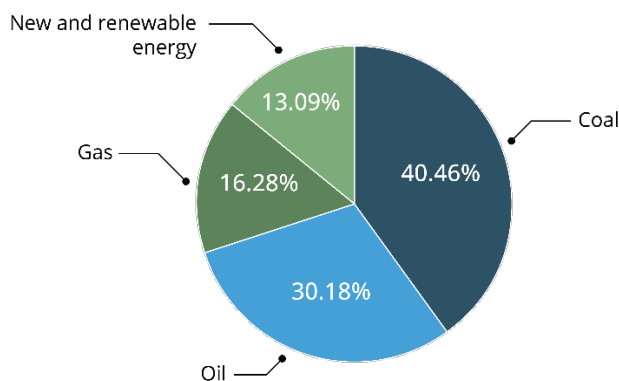
The 2024-2060 RUKN estimates that total investment needs for electricity generations, transmissions, and interconnections would be around US\$1.1 trillion or about US\$30 billion per year.

3.1.2 Indonesia's Renewable Energy Development

According to the Ministry of Energy and Mineral Resources data, new and renewable energy only achieved 13% of the national energy mix, while coal remains the dominant source of energy at 40.5%, oil at 30.2%, and gas at 16.3%. Indonesia, blessed with natural gas resources, has been shifting the use of fossil energy from oil and coal to gas, arguing that gas produces less emissions, and therefore the portion of gas getting higher. According to the National Energy Council's (DEN) 2023 report, coal utilization declined from 42% to 40.46%, while oil decreased from 31% to 30.18%. In contrast, gas utilization increased from 14% to 16%.⁵¹

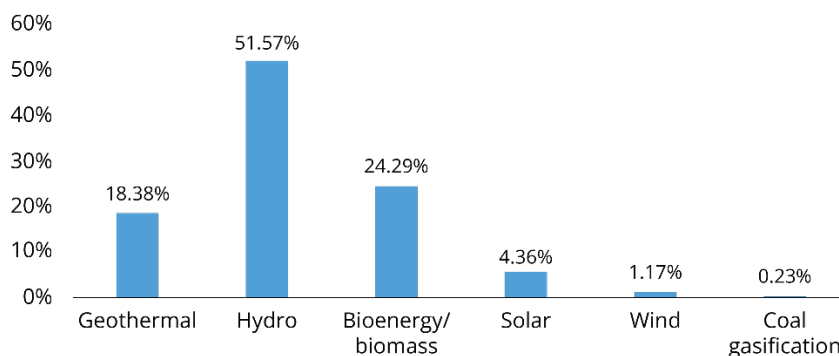
⁵¹ The National Energy Council General Secretary issues Indonesia's Energy Outlook 2023

Figure 6. National energy mix in 2023



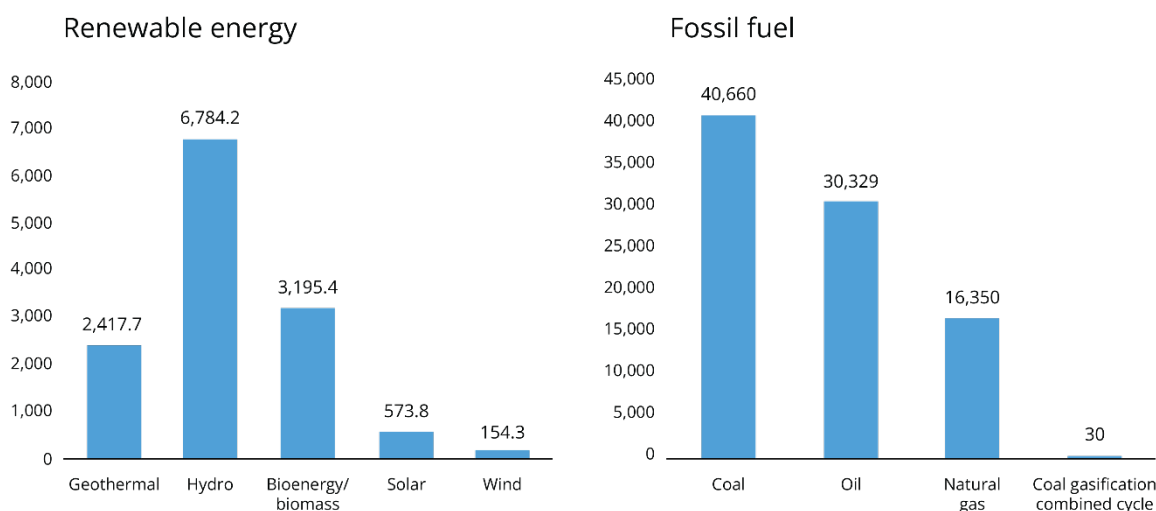
Source: Energy and Mineral Resources Ministry, 2024

Figure 7. New and renewable energy mix 2023



Source: Energy and Mineral Resources Ministry, 2024

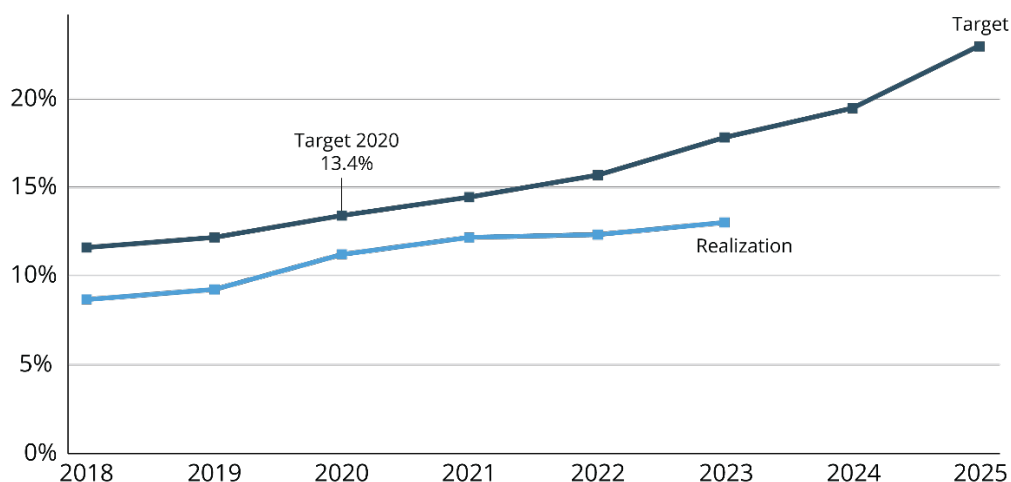
Figure 8. Power plant capacity (MW)



Source: Energy and Mineral Resources Ministry, 2024

However, the utilization of renewable energy remains below the targets set in the KEN and the National General Energy Plan (RUEN). The targets were 15.69 percent for 2022 and 17.25 percent for 2023. The use of renewable energy sources reached 12.3 percent in 2022 and rose to 13.09 percent in 2023, reflecting an improvement of more than 1.5 percent. Given these figures, the targets for 2024 (19.49 percent) and 2025 (25 percent) seem impossible to achieve.

Figure 9. Target and realized renewable energy in the national energy mix



Source: The Jakarta Post, 2024

The Ministry of Energy and Mineral Resources identifies several issues in the slow progress of renewable energy, including technical difficulties such as unavailability of transmissions, funding for the construction of renewable energy power plants, and slow demand for renewable energy, which is mostly more expensive.⁵² The government, nevertheless, is committed to increasing the portion of renewable energy in the future to achieve net zero emissions in 2060.

3.2 Indonesia’s Power Market

3.2.1 PLN, the Main Actor in Indonesia’s Power Market

State-owned Electricity Company PT PLN has been the central actor in Indonesia’s power market as the country’s sole energy provider. Power generation, transmission, distribution, and sales are all managed by PLN, which operates as a single vertically integrated organization. In most of Indonesia’s business areas, PLN serves as the primary energy service provider, overseeing nearly every aspect of the industry, from upstream to downstream.

⁵² Ministry of Energy and Mineral Resources, Press Release Number 55.Pers/04/SJI/2024, Jan. 18 2024

As PLN's financial capacity could not catch up with the rapid demand for electricity, the government began allowing private sector participation in electricity generation through the concept of independent power producers (IPPs), first introduced in 1992 through Presidential Decree No. 37 of 1992. Following the 1997–1998 monetary crisis, private participation was further encouraged by Law No. 20 of 2002 on electricity. This law divided the electricity industry into competitive and non-competitive segments and unbundled the sector into generation, transmission, distribution, and sales, ending PLN's monopoly on the electricity supply business. The 2002 electricity law, however, was killed by the Constitutional Court, which reinstated Law No. 15 of 1985 on electricity.

The government and the House of Representatives again tried to reform the electricity market by enacting Law No. 30 of 2009 on electricity. The concept of unbundling was reintroduced in Article 10(1), while Articles 10(2) and 11(1) encouraged private sector involvement. However, these articles were challenged again by the Constitutional Court which eventually revoked these provisions in 2016. Despite this, Articles 10(2) and 11(1) were reinstated under Government Regulation in Lieu of Law (Perppu) No. 2 of 2022 on Job Creation.

Although private sector participation is legally permitted, private enterprises face challenges in operating energy supply businesses due to licensing issues, as regulated by Energy and Mineral Resources Ministerial Regulation No. 28 of 2012 on Licensing Procedures for Electricity Supply. Many business areas are already serviced by PLN, further complicating private entry. New power generation licenses (IUPTLs) are granted only with an electricity sale and purchase agreement with PLN. Similarly, licenses for transmission and distribution require a network lease agreement with PLN, as stipulated by Energy and Mineral Resources Ministerial Regulation No. 35 of 2013. However, securing IUPTLs for transmission and distribution within PLN's service areas remains challenging. For areas outside PLN's coverage, licenses for distribution, sales, or integrated supply require approval from the Ministry of Energy and Mineral Resources.

PLN's monopoly is considered to meet public demand because electricity rates paid by the general population in Indonesia are comparatively low compared to other nations. However, this creates financial pressure on PLN to maintain facilities and enhance its services while keeping power costs affordable for customers. This financial strain also influences PLN's technological decisions; they tend to opt for low-capital projects, even if such projects result in higher operating costs. Also, PLN does not prioritize upgrading its transmission infrastructure, especially when it cannot secure affordable funding. This limits the development of variable renewable energy which often needs smart grids. As a result, PLN tends to sideline variable renewable energy such as solar and wind power because of its intermittency and prefers baseload renewable energy such as hydro and geothermal. The problem is hydro and geothermal need a huge investment and take a

longer time to develop, compared to variable renewable energy. Despite Indonesia's vast variable renewable energy potential — solar energy alone is projected to reach 3.294 GW — current utilization is only 314.8 MW.

Involving the private sector is essential if Indonesia aims to increase the share of renewable energy in its energy mix to 34% by 2030, 52% by 2044 and 73.6% by 2060. Therefore, the government needs to further reform the market to allow more private sector investment, including foreign investment from China, the global leader in renewable energy.

3.2.2 Electricity Surplus in Java-Bali Network

Java and Bali are Indonesia's two most developed islands, which account for around 60% of Indonesia's gross domestic products and consequently demands for electricity have been concentrated in these areas. Energy Investors and financiers, including those of renewable energy, have also been most interested in supplying electricity to these areas, and therefore they focus on finding opportunities here. The problem is that the Java-Bali network has suffered from electricity oversupply, which makes investment for new electricity projects, including renewables in this network not attractive for PLN.

Since COVID-19, the Java-Bali grid has experienced a sharp increase in electricity surplus. According to PLN, the addition of multiple new coal-fired power plants to the Java-Bali network, combined with demand not yet fully recovering, caused the reserve margin for the grid—which ideally should be at 30 percent—to spike to 40 percent in 2020. The reserve margin then slightly decreased to 37 percent in 2021 before surging further to 56 percent in 2022. Similarly, in the Sumatra-Bangka grid, the reserve margin rose significantly, reaching 41.2% in 2022 and is projected to climb to 48.4% in 2023. 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.

The electricity oversupply in the Java-Bali network is a result of the rosy projection of economic growth and electricity demand. The government forecast an average annual economic growth rate of 6.8 percent for Indonesia between 2015 and 2024. Based on this projected growth, electricity sales in 2024 are expected to reach 464 Terawatt-hours (TWh), reflecting an average annual growth rate of 8.7 percent from 2015 to 2024, with the peak load expected to hit 74.5 GW. To meet these projections, the government launched a new power plant development program of 70.4 GW for the 2015-2024 period, including the ambitious 35,000 MW development plan for 2015-2019.

Figure 10. Assumption of Indonesia’s economic growth, RUPTL 2015-2024

Region	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Indonesia	6.1%	6.4%	6.8%	7.0%	7.1%	7.0%	7.0%	7.0%	7.0%	7.0%
Java and Bali	6.2%	6.5%	6.9%	7.1%	7.3%	7.1%	7.1%	7.1%	7.1%	7.1%
Sumatra and East Indonesia	5.9%	6.2%	6.6%	6.8%	6.9%	6.8%	6.8%	6.8%	6.8%	6.8%

Figure 11. Realized electricity sales in Indonesia (GWh)

Breakdown	2015	2016	2017	2018	2019	2020**
Total	200,600	213,455	221,066	232,433	243,058	241,140
Growth	2.13%	6.41%	3.57%	5.14%	4.57%	-0.79%

The oversupply conditions in Java-Bali, nevertheless, present an opportunity for Indonesia's energy transition, particularly for the early retirement of coal-fired power plants.

As part of the government's energy transition commitment under the Just Energy Transition Partnership (JETP), Indonesia has planned to retire 16 coal-fired power plants (CFPP) in Java, totaling 5.5 GW of installed capacity by 2030. It is estimated that at least US\$4.2 billion will be needed to finance the early retirement of these plants. However, as outlined under financing risks, financial institutions within the Glasgow Financial Alliance for Net Zero (GFANZ) and advanced countries that have committed to funding Indonesia’s energy transition face challenges in raising funds for CFPP early retirements, as coal plant financing, including early retirements, is classified as "red" in the green finance taxonomy.⁵³

The issue of oversupply is further complicated by the Take or Pay (ToP) clause in the agreements PLN has with Independent Power Producers (IPPs). 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. However, PLN reported that it effectively reduced the ToP burden by approximately Rp 40 trillion in 2023, following multiple rounds of negotiations with IPP.⁵⁴

⁵³ Tenggara Strategics, "Risks and Challenges of the Just Energy Transition", <https://tinyurl.com/5ucvhn82>

⁵⁴ Detik finance, "PLN Pangkas Bebas 'Take or Pay' Rp 40 triliun, Apa itu?", Feb. 8, 2023, <https://tinyurl.com/f7uf2puf>

3.3 Indonesia's Policy on EV and Its Supply Chain

3.3.1 Boosting EV Production and Adoption

Just after the energy sector, transportation is the second biggest contributor to Indonesia's emissions. Therefore, as part of its efforts to decarbonize the transportation sector, the government has adopted a policy to shift the country's automotive industry from heavily reliance on internal combustion engine (ICE) vehicles to electric vehicles. The adoption of EV policies is therefore central to accelerating Indonesia's energy transition strategy from the demand side. By integrating EVs into its renewable energy framework, Indonesia aims to reduce its dependence on fossil fuels. By promoting the adoption of EVs, the government aims to increase the utilization of renewable energy in powering transportation, thereby reducing the sector's reliance on fossil fuels.

Indonesia's commitment to promoting EVs is evident in its regulatory measures, with the issuance of Presidential Regulation No. 55 of 2019 on Acceleration of Battery Electric Vehicle (BEV) Program. This regulation outlines key measures such as providing incentives, expanding public EV charging infrastructure, regulating electricity tariffs, and ensuring compliance with technical standards for BEV operations. In addition, the Indonesian government has introduced a variety of policies to enhance the development of the EV ecosystem, targeting both the supply and demand sides.

On the supply side, the Indonesian government has adopted policies to strengthen the EV ecosystem and attract investment. Industry Minister Regulation No. 6 of 2022 set technical requirements, created a roadmap for the national EV industry, and established Local Content Requirement (TKDN) guidelines to support domestic component manufacturers. Additionally, vehicle conversion policies have been expanded to cover more vehicle types beyond electric two-wheelers (E2Ws), offering opportunities for small and medium enterprises (SMEs) to engage in the EV ecosystem.

In parallel, Energy and Mineral Resources Minister Regulation No. 13 of 2020 was issued to standardize charging plug requirements and set electricity tariffs for public EV charging and battery replacement stations. These policies aim to create a conducive environment for EV manufacturers and ensure the development of a robust EV supply chain in Indonesia.

On the demand side, fiscal incentives have been implemented to reduce the price gap between EVs and internal combustion engine (ICE) vehicles, to foster wider adoption of EVs. Under Government Regulation (PP) No. 74 of 2021, EVs benefit from the luxury tax (PPnBM) exemptions. Additionally, Presidential Regulation No. 55 of 2019 on the Acceleration of the Battery Electric Vehicle Program for Road Transportation introduced an array of fiscal incentives aimed at attracting EV manufacturers and retailers to the domestic market. These incentives included tax reductions and import duty exemptions for EV components,

paired with non-fiscal measures such as expedited patent licensing processes to encourage innovation and market entry.

Moreover, the Financial Services Authority (OJK) has reduced the Risk Weighted Assets (RWA) for EV financing, making EVs more accessible through zero downpayment credit schemes. Additionally, administrative and certification costs for EVs have been significantly reduced. Under Finance Minister Regulation No. 138/PMK.02/2021, vehicle type testing and certification fees for EVs have been lowered to a fraction of those for ICEVs, further enhancing the affordability of EVs for consumers. Non-fiscal policies on the demand side include the adoption of EVs as official government vehicles, regulations that promote the safe and certified use of EVs, and efforts to boost demand by enhancing public confidence in technology.

The policy has born fruits with the entrance of global EV manufacturers, especially from China and South Korea, into Indonesia's EV industry by investing in EV assembling facilities. Hyundai of South Korea and Wuling of China are among the first to invest in the assembling facilities. What follows would be more EV manufacturers from China, including BYD, Sokon (DFSK), MG, Cherry, and Neta. Yadea, Chinese electric-two-wheeler producer, is also investing in Indonesia's assembling facility.

The government's incentives on the demand side have also boosted EV adoption. Total sales of EVs since 2021 till November 2024 reached 65,378 units, the biggest was recorded in 2024, according to data from the Association of Indonesian Automotive Manufacturers (Gaikindo). Sales of electric cars increased by 168 percent in the January-November 2024 period to 37,302 units, from 13,916 units in the same period of 2023. This sharp increase of EV sales happened in time when total automobile sales in the country dropped by 14.7 percent to 784,788 in January-November 2024, from 920,518 in the same period of 2023.

3.3.2 Developing EV Battery

A crucial element underpinning Indonesia's EV policy is the development of a robust domestic supply chain of EV components, particularly batteries. As the heart of EV technology, batteries not only determine the performance and range of EVs but also represent a significant portion, between 40 and 50% of EV production costs. As Indonesia holds the world's largest nickel reserves, Indonesia is boosting investment into nickel-based EV batteries.

With its abundant nickel reserves, Indonesia aims to be a key player in the global EV battery supply chain as demand for nickel-based lithium-ion batteries is rising. To further support this initiative, the government established the Indonesia Battery Corporation (IBC), a state-owned consortium comprising state-owned mining holding company MIND ID, state-owned mining company Aneka Tambang, state-owned oil and gas holding company

Pertamina, and PLN. The IBC aims to create an integrated ecosystem for battery production, covering the entire value chain—from nickel mining and processing to battery manufacturing. Additionally, the government introduced various incentives to attract foreign and domestic investments in the battery sector. These efforts have proven successful, with Indonesia securing significant investments, particularly from South Korea and China, solidifying its position as a key player in the global battery industry.

Former President Joko "Jokowi" Widodo launched in July 2024 the country's first nickel-based EV battery plant by South Korea's Hyundai Motor Group and LG Energy Solution. The US\$1.22 billion battery plant in Cikarang, West Java, belonging to PT Hyundai LG Indonesia Green Power (HLI Green Power), is the first for the country and the largest in Southeast Asia. The plant has an annual capacity of 10 Gigawatt hours (GWh) of battery cells, enough to power around 50,000 EVs. Most of the battery cells would be used to power the Hyundai Kona, a new variant that Hyundai is to introduce to Indonesia, in addition to the existing locally produced Hyundai Ioniq 5.⁵⁵ HLI Green Power has already committed to investing another \$2 billion to double the battery plant capacity to 10 GWh. The plant sits on a 31.9 hectare-plot in Cikarang, with enough space for future expansion. Hyundai and LG themselves have committed to invest up to \$9.8 billion in Indonesia to develop the EV supply chain to benefit from Indonesia's rich resources of nickel and copper, the main materials for lithium-ion battery.

In addition, the Indonesian government is planning a collaborative effort with China to establish a cutting-edge electric vehicle battery research and development center in Morowali, Central Sulawesi. The move will align Indonesia's EV industry closer with China, a global leader in EV manufacturing. Former Coordinating Maritime Affairs and Investment Minister Luhut Binsar Pandjaitan revealed the initiation of the EV battery research center during the International Battery Summit on Monday, Jul. 29, 2024. Luhut explained that by establishing an EV battery research center, the government aims to accelerate Indonesia's transition to a leading role in the burgeoning electric vehicle battery industry.⁵⁶ In addition to the new research center, Indonesia has established a battery recycling industry in Morowali and a research and development center operated by the National Battery Research Institute (NBRI).⁵⁷

3.3.3 Boosting Nickel Downstream Industry

Certain metals and minerals that facilitate the transition to greener energy sources are now classified as "critical." Among these essential minerals is nickel, a key component of electric

⁵⁵ Kumparan Oto, "Fakta-fakta Pabrik Sel Baterai Mobil Listrik yang Baru Diresmikan di Indonesia", July 7 2024. <https://tinyurl.com/2zvn5sk7>

⁵⁶ Bisnis.com, "Luhut Sebut RI Bakal Bangun Pusat Penelitian Baterai EV di Morowali," July 29, 2024. <https://tinyurl.com/3bbn54fw>

⁵⁷ Mandiri, "Press Release: Daily Economic and Market Review", July 31 2024. <https://tinyurl.com/ymp8w6k9>

vehicle batteries. Over the next 20 years, demand for battery metals is expected to increase by 60 to 70%.⁵⁸ Indonesia supplies more than 40% of the world's nickel needs, boasting over 14 operating mines. From 2020 to 2022, the country was the world's top nickel producer, accounting for 20.6% of global production. In 2023 and 2024, Indonesia is projected to produce close to two million tons annually.

Indonesia holds the world's biggest nickel reserves. The assessment of nickel resources and reserves is categorized into two types: ore and metal. Indonesia possesses a total of 17.3 billion tons of nickel ore deposits, according to government data in 2022. According to the United States Geological Survey (USGS), Indonesia has proven nickel reserves in metallic form totaling 21 billion tons, the largest globally, alongside Australia. Together, these two countries represent 21% of the world's nickel reserves. Indonesia's nickel supply is predominantly located in Sulawesi, which holds 54.7% of the nation's verified reserves. The Maluku Islands contain the second-largest nickel deposit, comprising 44.6% of the total.

The government recognizes that nickel reserves represent a valuable resource that can enhance the Indonesian economy through downstream policies. The government, through the Ministry of Energy and Mineral Resources Regulation No. 11 of 2019 concerning nickel downstream policy, bans exports of nickel ore beginning Jan. 1, 2020, forcing nickel miners to process the nickel ore domestically, to give more added value to the country. The ban has benefited dozens of smelters that mostly processed nickel into pig iron, ferro nickel, and nickel matter. Most of the smelters belong to by Chinese investors, and therefore, many critics said that the policy benefits China more than Indonesia as most of the products were then shipped to China to feed into China's hungry industries.

The government claimed that the implementation of downstream policies and the ban on nickel ore exports have had positive impacts on Indonesia's economy. This is reflected in the big increase in foreign investments, especially from China, into the downstream nickel processing industry, especially in Sulawesi and North Maluku, which boost economic growth in the area. It is also reflected in the export value of processed nickel products within the country. During the period from 2017 to 2018, Indonesia's export value from nickel was merely approximately US\$3.3 billion. However, following the enforcement of the nickel ore export ban in early 2020, Indonesia's export value of processed nickel products skyrocketed to US\$30 billion by 2022.⁵⁹

The key criticism of the downstream policy has primarily centered around its implementation and performance so far. When the downstream initiative was first pitched, the plan was for the domestic processing of nickel to eventually encompass all nickel

⁵⁸ United States Institute of Peace, "Indonesia's Nickel Bounty Sows Discord, Enables Chinese Control", Mar. 21, 2024, <https://tinyurl.com/3h7jpx6>

⁵⁹ Kompas.com, "Indonesia Tidak Mau Dlatur IMF, Hilirisasi Harga Mati," June 30, 2023. <https://tinyurl.com/bdewyms2>

derivatives and byproducts. However, as of 2024, nickel has only been processed domestically up to nickel pig iron, ferronickel, and nickel matte, which means that they still need to be exported to other countries to be further processed into other derivatives before being usable as the raw material for products such as EV batteries. With the operation of the country's first and largest nickel-based EV battery plant in Cikarang, a joint venture between Hyundai Motor and LG Energy Solution, the country's processed nickel would eventually be used to produce EV batteries, as the government has long aimed for.

4 China's Clout in Indonesia's Energy Transition

Chinese corporations have emerged as important players in the Indonesian energy transition providing the necessary financial, technology, and other resources to bolster Indonesia's capacity. China leads with 44 percent of the market share in Indonesia's renewable energy sector, followed by a group of European countries at 21 percent and the US at 15 percent. Countries from Other Asian countries and the Middle East contributed 18 percent of the share.⁶⁰ From the demand side, in the transportation sector, China has emerged as dominating Indonesia's electric vehicle (EV) market, with smaller contender from South Korea and European players. China's contribution to Indonesia's energy transition is expected to become more dominant because of its strength especially in renewable energy and electric vehicles (EV) and because of failure of other countries, especially Western countries, to capture the opportunities, as evident from the failure of Western-initiated Just Energy Transition Partnership (JETP) to generate enough investment into renewable energy.

The Western countries, led by the Group of Seven (G7) countries, opened the opportunity to invest in Indonesia's energy transition when they agreed with the Indonesian government during the G20 Leaders' Summit in Bali in November 2022 to form the JETP. It serves as a platform for mobilizing resources to support renewable energy transitions, with potential financing of up to US\$21.6 billion, including US\$11.6 billion in the form of public financing and another US\$10 billion from commercial financing from the Glasgow Financial Alliance for Net Zero (GFANZ). This platform involves various stakeholders, including the government, private sector, and civil society organizations, collaborating to support Indonesia's energy transition.⁶¹ Nevertheless, JETP faces several significant financial issues, including the absence of new public financing, the small proportion of grants within its total

⁶⁰ Kompas, "Kerja Sama dengan China, Indonesia Bisa Jadi Hub Energi Terbarukan", Sep. 25, 2024, <https://tinyurl.com/mvp4m63u>

⁶¹ Australian Institute of International Affairs, "Can China Replace JET-P Energy Financing in Indonesia", Apr. 9, 2024, <https://tinyurl.com/2h6jj5py>

financing commitment, and private financing from GFANZ not competitive to support renewable energy development.⁶²

To seek more alternatives to foreign funding other than JETP, the Indonesian government formed the National Energy Transition Task Force (Satgas TEN) to expedite the fulfillment of energy transition in Indonesia. This task force group is designated as the leader of Indonesia's energy transition governance, offering direction, policy, and supervision for initiatives intended to expedite the national energy transition in Indonesia. This includes, but is not restricted to, the JETP Secretariat and the Energy Transition Mechanism (ETM) Country Platform. Furthermore, to assist Satgas TEN, the government established the Satgas TEN Implementing Team (Rumah PaTEN), responsible for executing energy transition initiatives in Indonesia. In contrast to Satgas TEN, which functions at the policy and strategic level, the Implementing Team primarily serves as a clearinghouse and facilitates transactions for energy transformation projects in Indonesia.

The establishment of Satgas TEN and Rumah PaTEN has made it possible for Indonesia to seek energy transition funding supports from China, that has sought to establish itself as a global leader in renewable energy development. Moreover, Chinese enterprises have long invested in various energy initiatives in Indonesia, including in the development of coal-fired power plants and later in renewable energy projects such as solar panels and hydropower plants. Moreover, bilateral agreements between the two nations have enabled technology transfers and knowledge exchange in renewable energy research and development. This existing alliance establishes a robust basis for enhanced collaboration in this domain.

China's emergence as a major player in clean energy transition financing is viewed as a competitor to JETP, which is often perceived as a product of Western countries, particularly the US. While JETP continues to struggle with its commitments, China has demonstrated its dedication by offering up to US\$100 billion to developing countries to support their energy transition efforts.⁶³ Already, in October 2023 during the BRI forum in Beijing, several Chinese energy investors as well as financial institutions signed memorandum of understandings worth US\$54 billion with Indonesia's state-owned electricity company PT PLN to invest in Indonesia's electricity sector, including in renewable energy sector.⁶⁴

From the demand side, China has quickly taken the lead in dominating the electrification of Indonesia's transportation sector through significant investments in electric vehicles (EVs). When Indonesia launched its initiative to electrify its transport sector in 2019 with

⁶² CSIS Indonesia & Tenggara Strategics, "Risiko Tantangan Just Energy Transition Partnership (JETP) Indonesia", Jul. 2023, <https://tinyurl.com/3tt7uae7>

⁶³ Australian Institute of International Affairs, "Can China Replace JET-P Energy Financing in Indonesia", Apr. 9, 2024, <https://tinyurl.com/2h6jj5py>

⁶⁴ The Jakarta Post. "President Jokowi witnesses PLN's cooperation agreements with 9 companies at ICBF 2023," Oct. 18, 2024. <https://tinyurl.com/7uxsfvjf>

the introduction of its EV policy, China responded promptly. Several Chinese EV manufacturers began investing in assembly facilities in the country to take advantage of the government's tax incentives. Currently, six Chinese EV producers have established assembly facilities in Indonesia: Sokon (DFSK), Wuling, BYD, MD, Chery, and Neta. Additionally, Yadea has invested in a facility for assembling electric two-wheelers. By the end of 2024, these six EV producers dominated 90 percent of Indonesia's EV market.

Chinese companies have also moved swiftly to invest in Indonesia's nickel downstream industry to produce raw materials for EV batteries. Long before the government introduced its policy in 2019 to boost the nickel downstream industry by banning nickel ore exports starting in January 2020, Chinese investors had already been heavily involved in nickel mining and processing. When the policy was enacted, Chinese companies were well-positioned to expand further downstream, and they acted quickly.

Since Indonesia's nickel mining and reserves are concentrated in Sulawesi and North Maluku, Chinese companies flooded these regions with investments, effectively outcompeting other investors. Foreign companies like France's Eramet and Germany's BASF conceded and opted to collaborate with Chinese investors. Even Vale Indonesia, the first foreign investor in Indonesia's nickel mining industry, had no choice but to partner with Chinese companies to process its nickel ore. China's dominance in Indonesia's nickel downstream sector and its production of raw materials for EV batteries will continue unchallenged, solidifying its clout in Indonesia's energy transition program.

4.1 China's Clout in Electricity and Renewable Energy

4.1.1 China's Dominance in Coal-fired Power Plants

China is a late comer as an investor in Indonesia's energy sector, behind Japan and South Korea. And yet, it eventually surpasses Japan and South Korea to be the leading investor in Indonesia's energy sector, especially in the electricity sector, beginning with coal-fired power plants and later in renewable energy. Between 2013 and 2023, total Chinese investments in Indonesia's energy sector under the Belt and Road Initiative (BRI) amounted to approximately US\$15.6 billion. Of this amount, a striking 74 percent—equivalent to US\$11.5 billion—was allocated to coal-fired power plants, reflecting China's historical dependency on coal as a primary energy source.⁶⁵

China's involvement in Indonesia's coal sector has been largely carried out through Independent Power Producers (IPPs). Among the largest projects is the Bangko Tengah coal-fired power plant in Jambi Province, with an installed capacity of 2,480 MW. This project, funded by Huadian Power International Corp. Ltd, represents an investment of

⁶⁵ WRI. "China Overseas Finance Inventory (COFI) Database". Oct 10, 2024. <https://tinyurl.com/2pkzch5c>

US\$1.26 billion. The next biggest CFPP project is on Java Island, the 2,100 MW Jawa-7 CFPP in Serang, developed by Shenhua Holding Group Co. Ltd with an investment of US\$1.32 billion. Another major project is the 700 MW Sumsel-1 coal-fired power plant in Muara Enim, South Sumatra, developed by China Shenhua Energy Co. Ltd, with a total investment of US\$520 million.

The following table highlights some of the most significant coal-fired power plants, detailing the types of investments made, estimated amounts, key financiers, and their installed capacities.

Figure 12. Chinese investment and financing into Indonesia’s on-grid CFPPs

China Investor/ Bank	Type of Investment	Estimated Investment amount	Power Plant Name	Installed Capacity (MW)
China Datang Corporation Ltd.	Equity	US\$ 1.09 billion	CFPP Meulaboh - Aceh	400
			CFPP Sumsel (SS-5) – South Sumatra	350
			CFPP Kalteng-1 – Central Kalimantan	200
			CFPP Kendari-3 DSSA – Southeast Sulawesi	100
			CFPP Pindo Deli-II – West Java	50
Shenhua Holding Group Co Ltd	Equity	US\$ 2.05 billion	CFPP Jawa-7 - Banten	2,100
			CFPP Simpang Belimbing	300
			CFPP Sumsel-1	700
China Huadian Corporation Ltd.	Equity	US\$ 2.38 billion	CFPP Bangko Tengah (SS-8) - Jambi	1320
			CFPP Celukan Bawang – Bali	426
Power Construction Corporation of China	Equity	US\$ 360 million	CFPP Pulau Baai Bengkulu	300
State Development & Investment Corp Ltd	Equity	US\$ 990 million	CFPP Banten Serang - Banten	660
Export Import Bank of China	Debt	US\$ 2.9 billion	CFPP Pangkalan Susu – North Sumatra	440
			CFPP Parit Baru – West Kalimantan	110

			CFPP Takalar – South Sulawesi	200
			CFPP Pacitan – East Java	630
			CFPP Pelabuhan Ratu – West Java	945
			CFPP Paiton Baru – East Java	660
			CFPP Tanjung Kasam – Riau	945
			CFPP Teluk Naga – Banten	945
			CFPP Suralaya – Banten	625
			CFPP Labuhan Angin – North Sumatra	230
			CFPP Nangroe Aceh – Aceh	220
China Development Bank	Debt	US\$ 2.6 billion	CFPP Cilacap Sumber 4 – Central Java	1000
			CFPP Cilacap Sumber 3 – Central Java	660
			CFPP Adipala – Central Java	700
			CFPP Teluk Sirih – West Sumatra	224
			CFPP Indramayu – West Java	990
			CFPP Rembang – Central Java	632
Bank of China	Debt	US\$ 724 million	CFPP Tanjung Awar-Awar – East Java	700
			CFPP Jawa 9 & 10 – Banten	2000
			CFPP Indramayu – West Java	990
			CFPP Rembang – Central Java	632

Source: China Overseas Finance Inventory (COFI) Database (2024)

In addition to their investments as independent power producers (IPPs) connected to PT PLN’s national grid, Chinese companies have played a pivotal role in the expansion of captive coal-fired power plants (CFPPs) in Indonesia. These captive power plants are dedicated facilities designed to meet the electricity needs of specific industries, particularly energy-intensive nickel processing in Central Sulawesi, Southeast Sulawesi, and North Maluku. The growth of captive CFPPs in the three provinces has been significant, with installed capacity reaching 15.2 GW by mid-2024—nearly triple from 5.7 GW capacity recorded in 2019. By the end of 2024, this capacity is projected to increase further to 17.1 GW.

This rapid expansion of captive CFPPs is largely driven by rising energy demands from nickel processing industry, heavily supported by Indonesia’s national nickel downstream policy. The captive CFPPs are concentrated in six major industrial parks in Central Sulawesi, Southeast Sulawesi and North Maluku: the Indonesia Morowali Industrial Park (IMIP) and the SEI Industrial Park in Central Sulawesi, the Virtue Dragon Nickel Industrial Park (VDNIP) and the Indonesia Pomalaa Industrial Park (IPIP) in Southeast Sulawesi, as well as the Indonesia Weda Bay Industrial Park (IWIP) and the Obi Industrial Estate in North Maluku. Substantial Chinese investments in these industrial hubs have necessitated the development of captive power plants to sustain nickel processing operations.

The following table provides an overview of the key Chinese investors that have contributed to building captive power plants across six industrial parks of IMIP, SEI, IPIP, IWIP, VDNIP and Obi Industrial Estate.

Figure 13. Chinese investment in Indonesia’s captive CFPPs

Chinese investors	Affiliates	Power Plant Installed Capacity	Nickel Industrial Park	Location
Tsingshan Holding Group (THG)	Sulawesi Mining Investment	510 MW	Indonesia Morowali Industrial Park (IMIP)	Morowali, Central Sulawesi
	Tsingshan Steel Indonesia	130 MW		
	Indonesia Tsingshan Stainless Steel	1400 MW		
	Hua Chin Aluminium Indonesia	380 MW		
	Indonesia Guang Ching Nickel and Stainless Steel Industry	300 MW		
Jiangsu Delong Nickel Industry Co.Ltd	Gunbuster Nickel Industry (Delong Nickel Phase III power station)	2295 MW	PT Stardust Estate Investment (SEI)	North Morowali, Central Sulawesi
	PT Dexin Steel Indonesia	150 MW		
Huayou Holding Group	Huake Nickel Indonesia	250 MW	PT Indonesia Pomalaa Industrial Park (IPIP)	Kolaka, Southeast Sulawesi
	Huayou Nickel Cobalt	250 MW		
	Obsidian Stainless Steel	2220 MW		

Jiangsu Delong Nickel Industry Co.Ltd	Virtue Dragon Nickel Industry	530 MW	The Virtue Dragon Nickel Industrial Park (VDNIP)	Konawe, Southeast Sulawesi
Tsingshan Holding Group	Weda Bay Nickel	250 MW	Indonesia Weda Bay Industrial Park (IWIP)	Halmahera, North Maluku
	Angel Nickel Industry	760 MW		
Tsingshan Holding Group, Huayou Holding Group, Zhenshi Holding Group	Indonesia Weda Bay Industrial Park	1140 MW		
	Youshan Nickel Indonesia	250 MW		
Tsingshan Holding Group, Zhenshi Holding Group Co.,Ltd, Zhejiang Huajun Investment Co., Ltd.	Yashi Indonesia Investment	250 MW		
Lygend Resources & Technology Co,Ltd	Halmahera Jaya Feronikel	1074 MW	Obi Industrial Estate	Obi Island, North Maluku
	Obi Nickel Cobalt	1520 MW		

Source: CREA, CELIOS (2024)⁶⁶

China’s investment in coal-fired power plants in Indonesia has contributed to the growth of Indonesia’s power generation capacity. However, as the world shifts towards cleaner energy sources, China is also increasing its focus on investing in Indonesia’s renewable energy sector.

4.1.2 China’s Debut into Renewable energy

In recent years, China’s investments have been instrumental in Indonesia's renewable energy sector, although in smaller proportion compared to the coal-fired power plants. Chinese investors have been involved in the development of hydro and geothermal energy, and its investment significantly contributes to the country's nascent renewable energy. Chinese investors have started their big investment in the solar energy, especially in the manufacturing of solar panels and its supporting raw materials and begun to explore investment into wind energy. In the years to come, China’s investment in Indonesia’s renewable energy would become more evident when the country starts encouraging

⁶⁶ CREA & CELIOS. “Debunking the value-added myth in nickel downstream industry”. Feb 20, 2024. <https://tinyurl.com/yc79b77n>

investment in variable renewable energy (VRE), especially solar and wind as China is the world’s leader in both.

a. Hydro energy

For decades, China has been a reliable partner in financing and developing privately owned hydropower plants, which have become crucial to the country’s renewable energy landscape. Notable investments include the 450-MW Karama hydropower plant in Mamuju, West Sulawesi, with total investment of US\$2.19 billion; the 510-MW Batang Toru hydropower plant in South Tapanuli, North Sumatra, with total investment of \$1.67 billion; the 110-MW Jatigede hydropower plant in Sumedang, West Java, with total investment of \$470 million, and the 180-MW Asahan-I hydropower plant in Toba Samosir, North Sumatra, with total investment of \$300 million. The Asahan-1, Jatigede and Karama.

Another major hydropower project involving Chinese investors is the 900-MW Kayan hydropower plant in Bulungan Regency, North Kalimantan. The project was initiated in 2012 with investors involving PT Kayan Hydro Energy (KHE) and Power Construction Corporation of China (PowerChina). In 2022, PowerChina withdrew from the project because of communication and logistical challenges exacerbated by the COVID-19 pandemic. In the same year, KHE entered a partnership with Japan’s Sumitomo Corporation. Unfortunately, this partnership was dissolved in early 2024 due to differing commercial priorities and visions. Indonesian Energy and Mineral Resources Minister Bahlil Lahadalia presented the Kayan hydropower project to Chinese investors at the 7th Indonesia-China Energy Forum (ICEF) in September 2024.⁶⁷

Figure 14. Chinese investment and financing in Indonesia’s hydropower

Hydro Power Plant	Installed Capacity (MW)	Investment Type	Total Investment (US\$ million)	Investor
Kayan	9,000	NA	NA	Power Construction Corporation of China (PowerChina)
Sembakung	250	NA	NA	China Huadian Hongkong
Kusan	41	Equity	216	Guang Yin New Energy Indonesia
Asahan-I	180	Equity	300	China Huadian Corporation Ltd
Jatigede	110	Debt	470	The Export-Import Bank of China

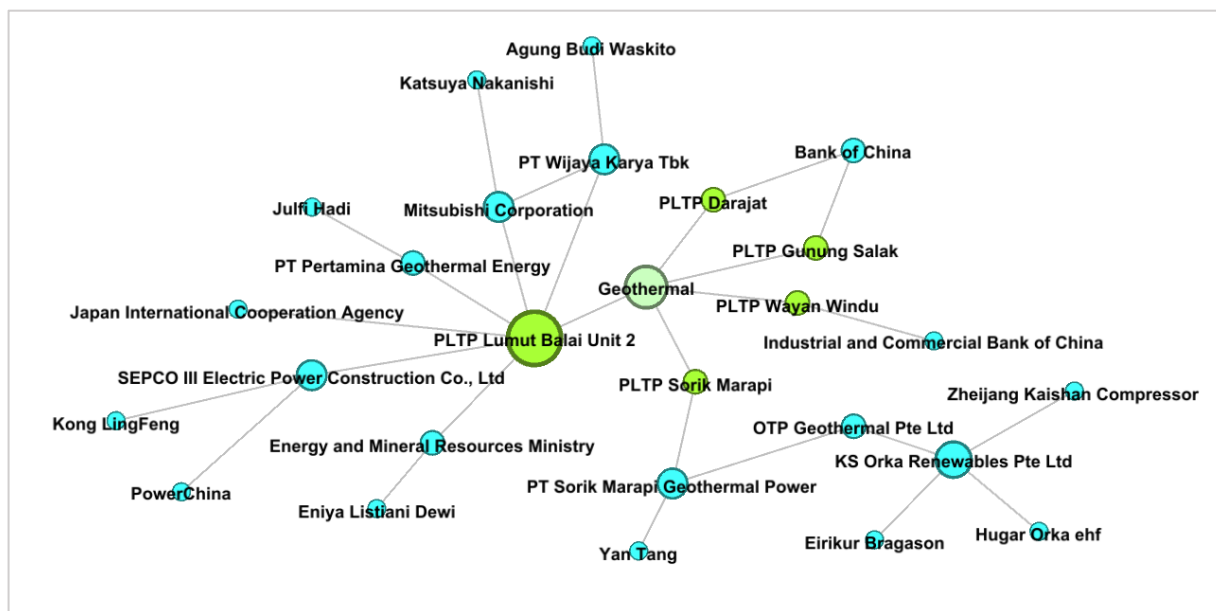
⁶⁷ Bisnis Indonesia, “Ditawarkan ke China, Proyek PLTA Kayan Mulai Lupakan Jepang?”, Sep. 18, 2024, <https://tinyurl.com/3y5sztt8>

Another geothermal project involving Chinese companies is the 55 MW Lumut Balai Unit 2 geothermal power plant in South Sumatra, which involved SEPCO III Electric Power Construction Co., Ltd. (China), a subsidiary of Power Construction Corporation of China (PowerChina), as the engineering, procurement, construction, and commissioning (EPCC) contractor. The Lumut Balai Unit II will have an installed capacity of 55 MW, the same with the Lumut Balai Unit I, making total capacity for Lumut Balai geothermal power plants to 110MW.

Figure 16. Chinese investment and financing in Indonesia’s geothermal energy

Geothermal Power Plant	Installed Capacity (MW)	Investment Type	Total Investment (US\$ million)	Investor
Lumut Balai Unit 2	51	Equity	NA	SEPCO III Electric Power Construction
Sorik Marapi	240	Equity	1,000	KS Orka Renewables Pte Ltd
Wayang Windu	227	Debt	18	Industrial and Commercial Bank of China
Gunung Salak	210	Debt	37	Bank of China
Darajat	270	Debt	41	Bank of China

Figure 17. Key players in geothermal projects

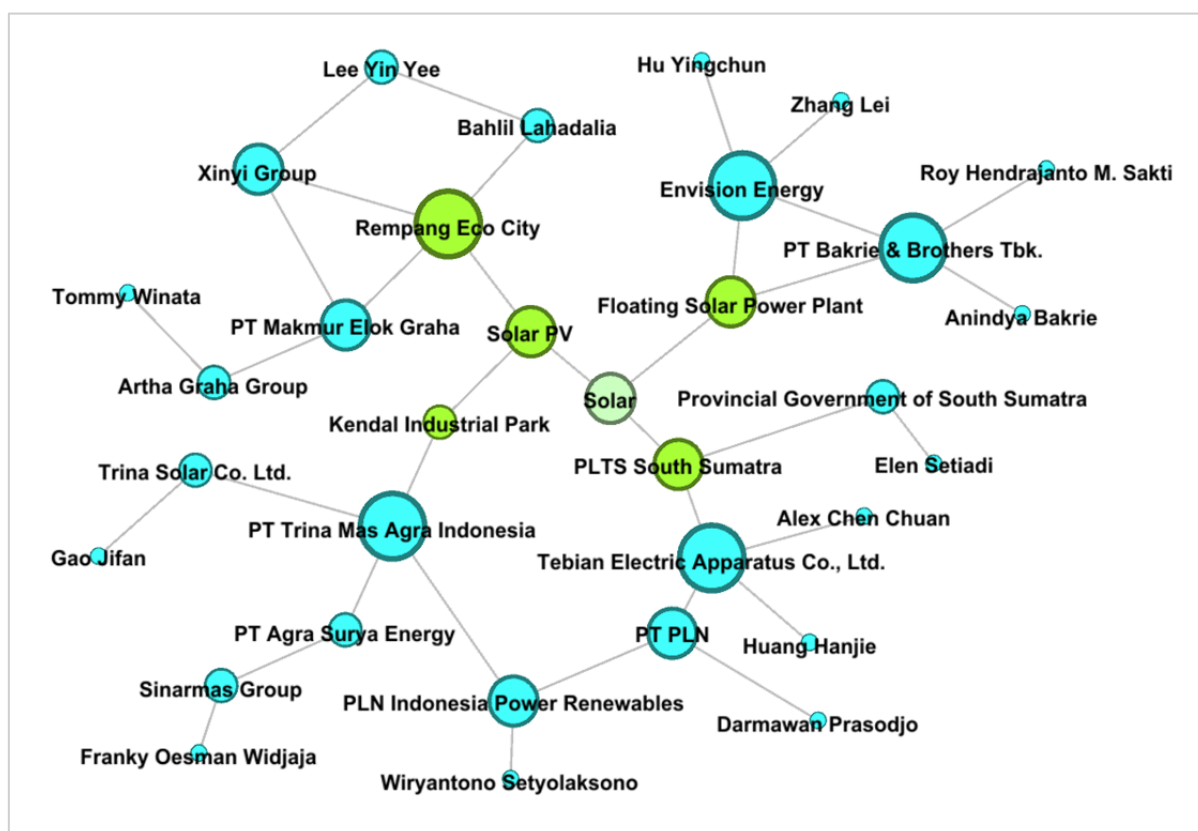


c. Solar and wind energy

Chinese investments in Indonesia's variable renewable energy (VRE), especially solar and wind energy, were limited before 2023. However, a significant shift occurred in 2023,

marked by substantial investments in solar energy. Solar energy investments are projected to reach US\$11.7 billion, spurred by initiatives like the September 2023 commitment from Xinyi Group, a Chinese glass manufacturer, which pledged US\$11.6 billion to develop an integrated solar glass manufacturing ecosystem on Rempang Island, Riau Islands. Another notable project is the collaboration between Trina Solar Co. Ltd. and Indonesia's Sinar Mas Group, which plans to establish a solar panel manufacturing facility in Kendal Industrial Park, Central Java, with an investment exceeding US\$100 million.

Figure 18. Key players in solar energy projects



In the wind energy sub-sector, no major projects have been initiated. Nevertheless, some exploratory efforts have initiated, signaling potential growth in this sub-sector. One of the initiatives was a 2022 signing of MoU between state-owned mining company coal mining Bukit Asam with China Huadian Overseas Investment Holding, to explore a possibility to build a wind power farm in South China Sea region, with capacity of up to 1.3 GW.⁶⁸ Another initiative is a plan by PT Envision Green Energy Indonesia, a subsidiary of Chinese multinational Envision Energy, to explore the possibility to build a 255 MW wind power plant in southern Pati, Central Java, with total investment of Rp 4.59 trillion. In addition, PT PLN Nusantara Power, a subsidiary of PT PLN, has cooperated with Shandong Electric

⁶⁸ Bisnis Indonesia, "PTBA Punya Proyek PLTB dengan Perusahaan China, Intip Progresnya", Mar. 14, 2024, <https://tinyurl.com/2kzawwsc>

Power Engineering Consulting Institute Corp., Ltd. (SDEPCI), a subsidiary of State Power Investment Corp., Ltd. (SPIC), a Fortune Global 500 company, to advance the development of wind power plants with a combined capacity of up to 1,000 MW across five strategic locations in Indonesia.⁶⁹

Figure 19. Key players in Wind Energy

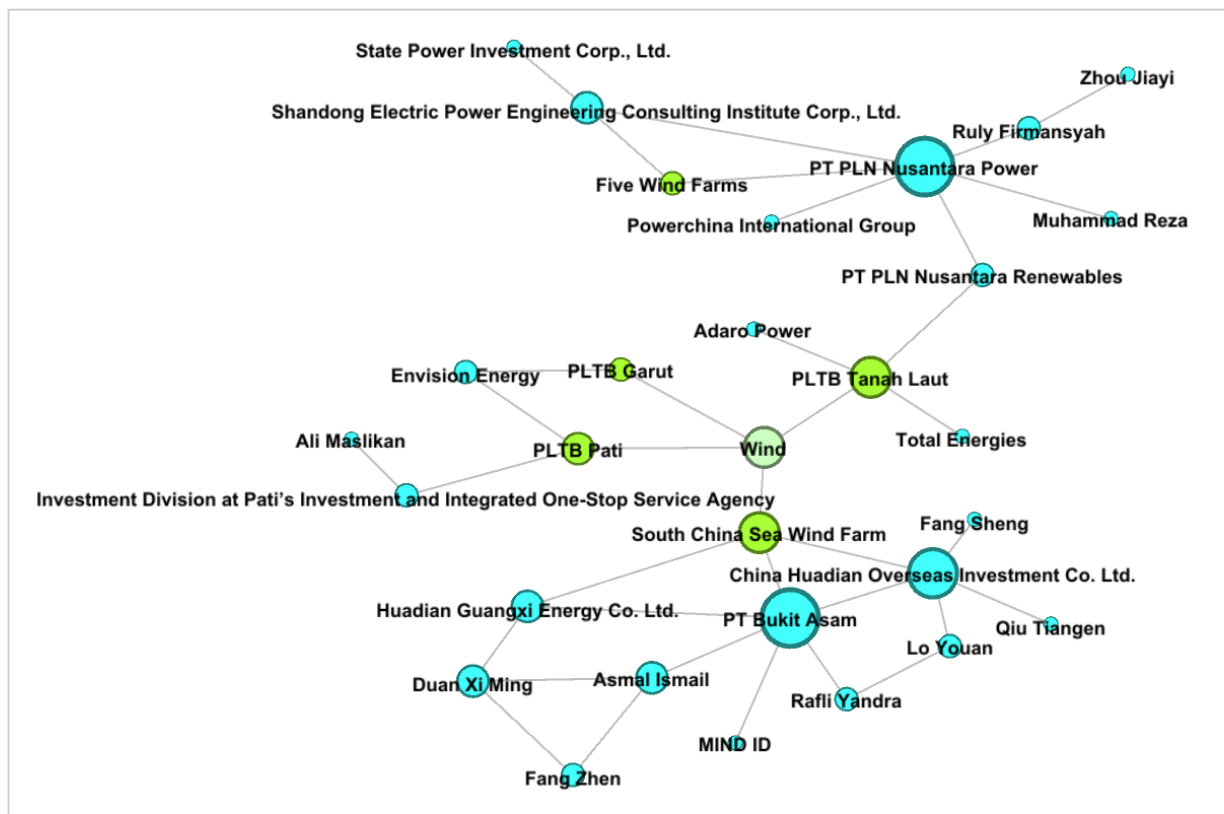


Figure 20. Chinese investment and financing in Indonesia's solar energy

Solar Power Plant	Installed Capacity (MW)	Investment Type	Total Investment (US\$ million)	Investor
Rempang Eco City	NA	Equity	11,600	Xinyi Group
Gunung Salak	1 GWp/year	Equity	100	Trina Solar
South Sumatra Solar Power Plant	300	Equity	NA	Tebian Electric Apparatus Co., Ltd. (TBEA)
Floating Solar Power Plant	200	Equity	NA	Envision Energy

⁶⁹ Kanal Satu, "Gandeng Perusahaan Asal Tiongkok, PLN Nusantara Power Serius Garap Pembangkit Listrik Tenaga Bayu", Sep. 7, 2024, <https://tinyurl.com/24yzvtux>

Figure 21. China investment and financing in Indonesia’s wind energy

Wind Power Plant	Installed Capacity (MW)	Investment Type	Total Investment (US\$ million)	Investor
Pati Wind Power Plant	255	Equity	283	Envision Energy
SCS Wind Farm	1,300	NA	NA	China Huadian Overseas Investment Co. Ltd. and Huadian Guangxi Energy Co. Ltd.
Five Wind Farms	1,000	NA	NA	Shandong Electric Power Engineering Consulting Institute Corp., Ltd. (SDEPCI) and PowerChina

4.2 China’s Dominance in Indonesia’s EV Industry

China’s investment clout in Indonesia’s energy transition encompasses not only power plants but also the EV industry. Chinese electric cars dominate the Indonesian automotive market, holding a market share of 90 percent out of 17,846 EV units sold from January to July 2024. Six Chinese four-wheeler EV companies are currently operating in the country: Wuling, Soko (DFSK), BYD, MG Motor, Cheery, and Neta. In addition, there is Yadea that produces electric two-wheelers. The significant influx of Chinese EVs prompted Industry Minister Agus Gumiwang to meet with several EV industry leaders, including Hozon Energy Automobile. This meeting resulted in a commitment from Chinese business leaders to establish Indonesia as their export production base.⁷⁰

China’s biggest player in the EV industry, BYD, which came later to the country, heavily contributed to the flooding of Chinese EVs on Indonesian roads. BYD’s EV sales were recorded starting from June 2024, yet two of its products top EV sales in the period of January to November 2024, namely BYD M6 (4,824 units, first position), BYD Seal (4,671 units, third position, while Wuling Binguo (4,720 units) and Air EV (3,760 units) in the second and fourth positions respectively.⁷¹

BYD has said that it plans to invest around US\$1,3 billion to build an electric car factory in Subang Smart City, West Java. BYD expects that its EV plant in Subang would start operation in January 2026, with production capacity of 150,000 EV units per year. With the opening of the Indonesian factory, BYD now has two production sites in Southeast Asia, the other

⁷⁰ Kompas, “Serbuan Mobil Listrik China”, Jun. 17, 2024, <https://tinyurl.com/47zz4x8n>

⁷¹ Kompas, “Analisis Penjualan Mobil Listrik Indonesia: Januari-November 2024,” Dec. 30, 2024. <https://tinyurl.com/2ssakhhs>

being the Thailand plant, which already start trial production. The Thailand plant also has production capacity of 150,000 EVs annually.⁷²

BYD's investment makes it the latest automaker from China to set up EV manufacturing operations in Indonesia. Wuling is one of the first Chinese EV manufacturers to establish an assembling facility in Indonesia. The company has invested US\$1 billion in this facility, which boasts an annual production capacity of 120,000 units.⁷³ This investment supports Wuling's strategy to tap into the growing EV market in Indonesia, where the company holds a significant market share, having sold over 150,000 vehicles, including EVs, since 2017. Wuling's commitment to local production and a robust supply chain, including partnerships with PLN for EV charging infrastructure, further strengthens its position in the Indonesian market. During a meeting with SAIC-GM-Wuling officials in Beijing, Industry Minister Agus Gumiwang Kartasasmita praised Wuling for its investment, noting that Indonesia is the only country outside China with a Wuling EV manufacturing facility.⁷⁴

In addition to Wuling and BYD, other Chinese EV manufacturers Sokon (DFSK), MG, Chery and Neta all have committed to investing in Indonesia's EV industry. Sokon (DFSK) is one of the first to invest in Indonesia manufacturing facility. It invested US\$150 million in its assembling facility in Cikande, Banten, to produce 50,000 units per annum.⁷⁵ MG Motor, a sister company of Wuling, has invested Rp 4 trillion (US\$258 million) to build its assembling facility in Cikarang, West Java, next to Wuling assembling facility. Chery, meanwhile, said that it had invested \$16 million in an assembly plant in Pondok Ungu, Bekasi, in collaboration with Handal Indonesia Motor, to cater to the initial orders of its EVs from Indonesian consumers. Chery said it would increase its investment when demand increases.⁷⁶ Neta Auto has also worked with Handal Indonesia Motor to build its assembling facility in Bekasi, West Java, with an initial annual production capacity of 10,000 units in 2025 and a local content level (TKDN) of percent for its vehicles.⁷⁷ Yadea, meanwhile, is investing US\$150 million to build electric two-wheeler manufacturing facility in Kerawang, West Java, with annual production capacity of 3 million electric two-wheelers.⁷⁸

Industry Minister Agus Gumiwang Kartasasmita said Neta, Wuling, Chery, and Sokon had agreed to use Indonesia as a hub for producing EVs for export purposes. He added that the government target that all EV manufacturers would be able to produce a total of 600,000 EV units per annum by 2030, including for exports to 54 countries.

⁷² CarNewsChina.com, "BYD Indonesia delivers the first batch of 1,000 cars", July 3, 2024, <https://tinyurl.com/efdmvk7d>

⁷³ Asia News Network, "Indonesia, Chinese firms combine to drive EV growth", Aug. 15, 2024, <https://tinyurl.com/2mh2trm2>

⁷⁴ Gentala Institute, "Wuling Will Increase Electric Vehicle Investment in Indonesia", Jul. 1, 2024, <https://tinyurl.com/2sey7sww>

⁷⁵ Kumparan.com, "Persaingan Ketat, Bos DFSK Indonesia Akui Bisnis Mereka Belum Untung," Dec. 15, 2024.

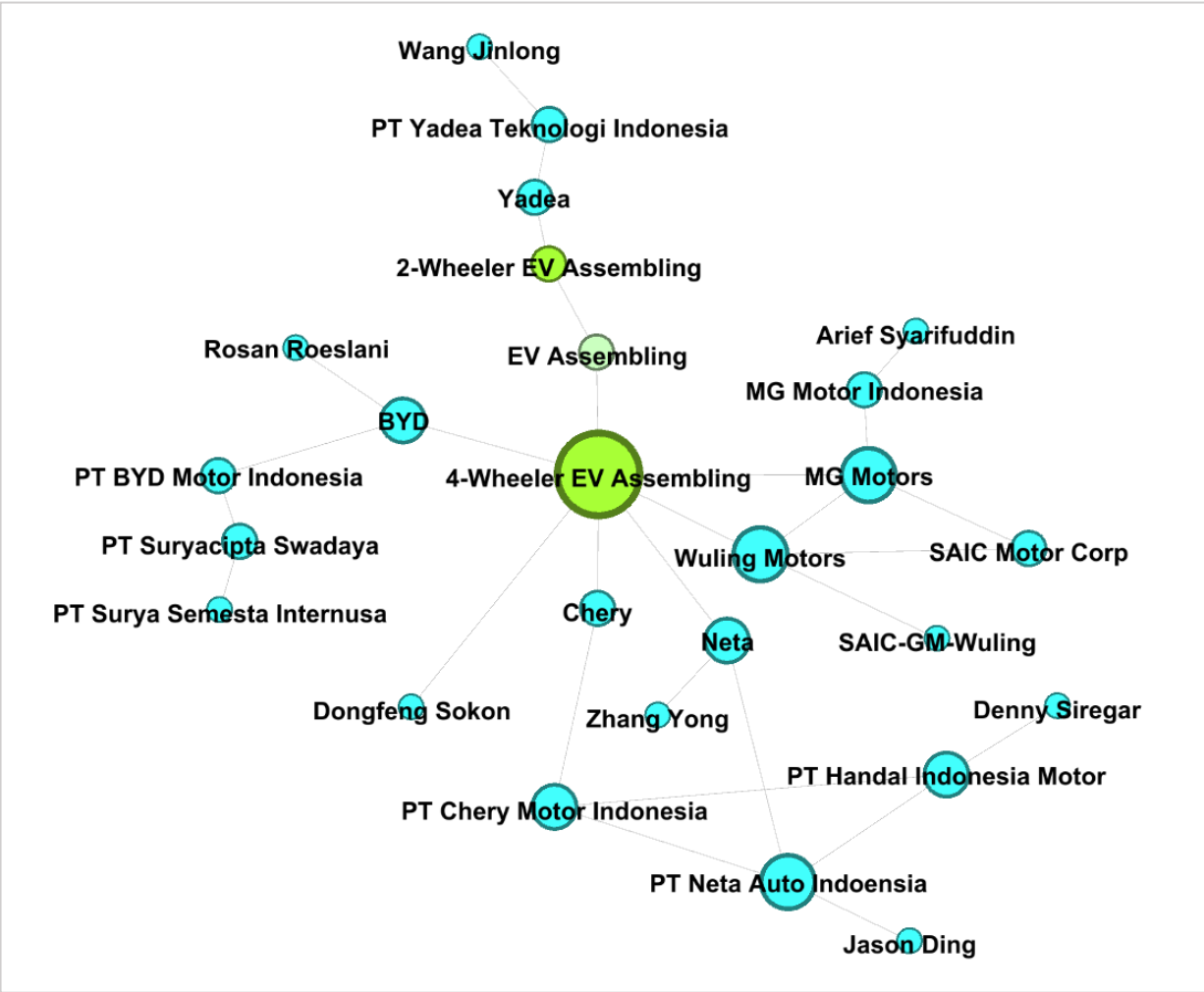
⁷⁶ Jakarta Globe, "Chery Invests \$16 Million in Shared EV Assembly Plant in Indonesia," Dec. 4, 2023.

⁷⁷ Liputan6. "Mulai 2024 Mobil Listrik Neta Diproduksi Lokal di Bekasi," Nov. 28, 2023.

⁷⁸ Yadea.com, "Yadea Holds Groundbreaking Ceremony in Indonesia for Its Eighth Factory," May 13, 2024.

The penetration of Chinese EVs into the Indonesian market aligns with their presence in the global EV market, where they account for 21.9 million out of 40.2 million EVs worldwide. While Tesla, based in the US, is considered the most valuable EV brand, holding 19.9 percent of the global market, several Chinese companies closely follow. Notable contenders include BYD (17.1 percent), GAC Aion (5.2 percent), SGMQ Wuling (4.9 percent), and MG (2.3 percent). Collectively, Chinese EV brands dominate the global market, representing 29.5 percent of the total.⁷⁹

Figure 22. Key players in EV Assembling



⁷⁹ Kompas, "Serbuan Mobil Listrik China", Jun. 17, 2024, <https://tinyurl.com/47zz4x8n>

Figure 23. Key Players in EV Battery

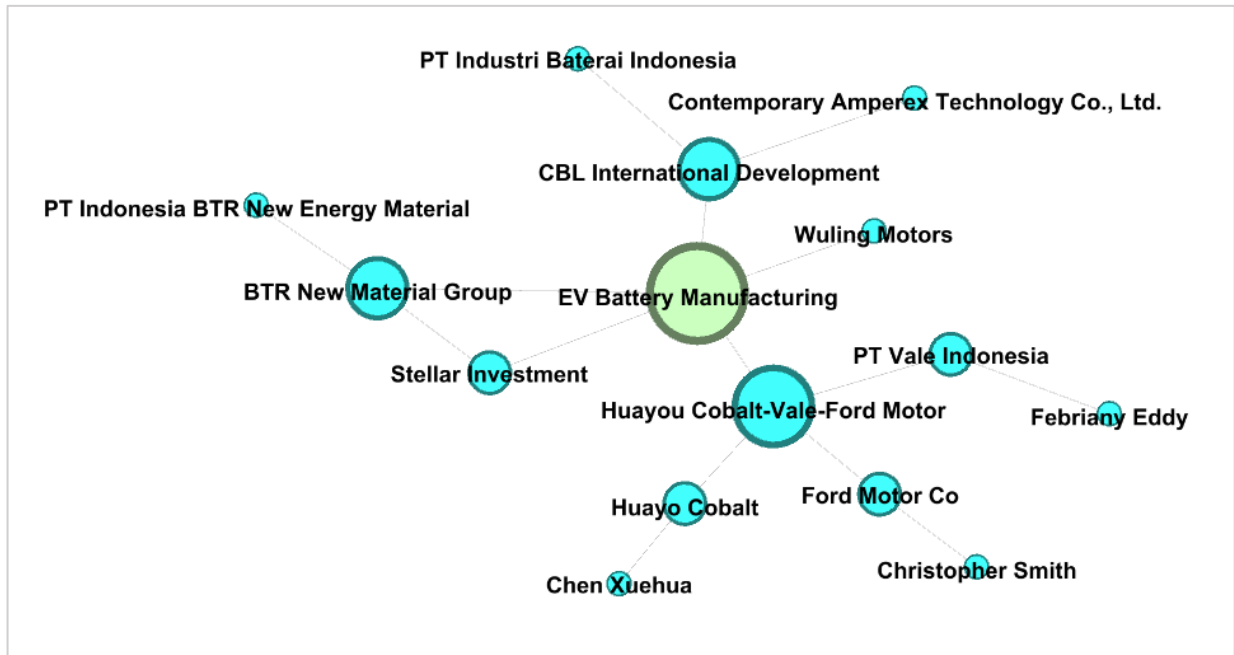


Figure 24. China investment in Indonesia’s EV ecosystem

EV Facilities	Production Capacity	Investment type	Total Investment (US\$ million)	Investor
EV Assembling	150,000/year	Equity	1,300	BYD
EV Assembling	120,000 units	Equity	1,000	Wuling
EV Assembling	50,000/year	Equity	150	Sokon
EV Assembling	NA	Equity	258	MG
EV Assembling	8,000/year	NA	16	Chery
EV Assembling	9,300/year	NA	NA	Neta
2W EV Assembling	3 million/year	Equity	150	Yadea
EV Battery Manufacturing	20,000 units/year	Equity	484	Wuling
High-Pressure Acid Leaching (HPAL)	120,000 tons of MHP/year	Equity	NA	Huayou Cobalt
EV Battery Cell Manufacturing	15 GWh/year	Equity	1,180	CATL
Anode Material Manufacturing	80,0000 metric tons/year	Equity	478	BTR

4.3 China's Dominance in Nickel Downstream Industry

China has invested in Indonesia's nickel mining and processing industry long before the government adopted the downstream policy for nickel to put the country into the global supply chain of EVs. When Indonesia adopted the EV policy in 2019 and then bans export of nickel in 2020 to force the development of nickel downstream industry, especially into EV nickel-based battery, Chinese investors in the nickel industry had already been well positioned to benefit from the policies. Their nickel mining and processing facilities have been well established in Sulawesi, which holds more than 50 percent of the country's nickel reserves. Chinese investors eventually also invest in North Maluku, an area that holds the next biggest reserves of nickel.

The direct sale of raw nickel ore restricts Indonesia's economic potentials, as critics have always warned. Before 2020, 90 percent of the extracted raw nickel ore was shipped directly to other countries, primarily China. This robust supply chain allowed China to enhance its economy by producing advanced technology and developing industrial infrastructure. With the export ban of nickel ore, Chinese consumers have no other choice but invest in Indonesia's nickel smelting industry. Chinese companies swiftly invested heavily in these facilities, committing approximately US\$30 billion to downstream nickel processing in Indonesia, driven by their urgent need for affordable Indonesian nickel. This way, China maintains direct access to Indonesian nickel despite the embargo.

In the beginning, all nickel processing facilities were concentrated in Sulawesi, mainly in Central and Southeast Sulawesi, mostly if not all built by Chinese investors. Later, Chinese investors also expanded to North Maluku. In Sulawesi, there are three big nickel industrial parks belonging to two Chinese stainless-steel giants. One of them is the Indonesia Morowali Industrial Park (IMIP) in Morowali, Central Sulawesi, which is controlled by the Tsingshan Group, and the other two are SEI Industrial Park in North Morowali, Central Sulawesi, and Virtue Dragon Nickel Industry (VDNI) in Morosi-Konawe, Southeast Sulawesi, belonging to Jiangsu Delong. North Maluku, meanwhile, houses two nickel industrial parks that are already operational: Harita Nickel on Obi Island, South Halmahera, and the Indonesia Weda Bay Industrial Park (IWIP), controlled by the Tsingshan Group, the Huayou Group, and the Zhenshi Group. Additionally, in Buli, East Halmahera, the government plans to establish an electric vehicle battery component park.

Among these large nickel-based industrial parks, IMIP is the largest. Tsingshan, in partnership with Indonesia's Bintang Delapan Group, started developing IMIP in 2013, long before the government adopted the downstream policy for nickel and other minerals. Completed only in five years, IMIP now has three industrial clusters of stainless steel, carbon steel and EV battery, hosts over 50 tenants, and employes over 80,000 people, over 90 percent of whom are Indonesians. Tenants include PT QMB New Energy Materials, a

joint venture between Chinese and Japanese companies that produces the material for EV batteries, and producers of stainless steel, carbon steel and raw materials for EV batteries.

Backed by strong capital, IMIP has its own supporting infrastructure, including 4,810 MW coal-fired power plant and supplementary 538.5 MW heat-powered power plant, two ports with combined loading and unloading capacity of 118 million metric tons, with export and exports from the two ports reaching 34 million metric tons per annum. In addition, IMIP has built its own airstrip, hotel, one hospital and two clinics, and housing complexes for its employees.

Another noteworthy Chinese nickel investment project is those belonging to China’s Jiangsu Delong Nickel Industry Co., one of China’s biggest stainless-steel producers. Jiangsu Delong operates its nickel smelters through PT Virtue Dragon Nickel Industry (VDNI) and PT Obsidian Stainless Steel in VDNI Industrial Park in Morosi-Konawe, Southeast Sulawesi, as well as PT Gunbuster Nickel Industry (GNI) in SEI Industrial Park, North Morowali, Central Sulawesi. Through the three smelting companies, Jiangsu Delong aims to build a total of 45 smelters and projected to be bigger than IMIP. However, in its development, Jiang Delong operations in these two locations face various problems, including with its own employees who burned one of its facilities in Morosi-Konawe in December 2020. Lately, its parent company Jiangsu Delong Nickel Industry Co. faces financial issues with one of its creditors filing to a Chinese court to restructure Jiangsu Delong debts.⁸⁰

Due to a stringent export prohibition and substantial Chinese investments, Indonesia's global share of nickel production has surged from 16 percent in 2019 to 42.9 percent in 2024. According to the government, Indonesia has effectively leveraged Chinese capital and technology to become a dominant force in the global nickel-based industry, especially the stainless-steel industry, while enhancing its domestic processing capabilities.⁸¹

Figure 25. Chinese investment in Indonesia’s nickel downstream industry

Industrial Park	China’s Investor	Partner	Investment Amount	Joint Venure
IMIP, Central Sulawesi	Tsingshan Holding Group	Bintang Delapan Group (Indonesia)	US\$20.93 billion (Rp 324.4 trillion)	PT IMIP
				PT Sulawesi Mining Investment
				PT QMB New Energy Materials

⁸⁰ Bloomberg Technoz, “Jiangsu Delong dibelit utang, smelter nikel di RI bisa terdampak,” July 31, 2024.

⁸¹ Asia Times, “The true cost of China’s hold on Indonesia’s nickel” Aug. 12, 2024, <https://tinyurl.com/3dp6vpew>

		Huafon Group Co., Ltd. (China)	US\$921.18 million (Rp13.82 trillion)	PT Hua Chin Aluminum Indonesia
		Guangdong Guangxin Holdings Group (China)	US\$1 billion (Rp15 trillion)	PT Indonesia Guang Ching Nickel and Stainless Steel Industry
IPIP, Southeast Sulawesi	Huayou Holding Group	PT Vale Indonesia (INCO)	US\$10 billion (Rp 162.9 trillion)	PT Indonesia Pomalaa Industrial Park (IPIP)
	Huayou Holding Group	China Molybdenum Co., Ltd. (China)	US\$1.28 billion (Rp 19.2 trillion)	PT Huayue Nickel Cobalt
		Tsingshan Holding Group (China)		
	Zhejiang Huayou Cobalt Co.	Tsingshan Holding Group (China)	US\$500 million (Rp 7.5 trillion)	PT Huake Nickel Indonesia
IWIP, North Maluku	Tsingshan Holding Group	Eramet (France)	US\$8.55 billion (Rp 128.25 trillion)	Strand Minerals
	Strand Minerals	PT Aneka Tambang (Indonesia)	US\$15 billion (Rp 225 trillion)	PT Weda Bay Nickel
	Tsingshan Holding Group	Huayou Holding (China)	US\$ 11 billion (Rp165 trillion)	PT Indonesia Weda Bay Industrial Park (IWIP)
		Zhenshi Holding Group (China)		
		Contemporary Amperex Technology (China)		
	Tsingshan Holding Group	Huayou Holding (China)	US\$406.79 million (Rp 6.1 trillion)	Youshan Nickel Indonesia
	Zhenshi Holding Group			
	Tsingshan Holding Group	Zhenshi Holding Group Co., Ltd.		Yashi Indonesia Investment

	Zhejiang Huajun Investment Co., Ltd.			
Obi Industrial Estate, North Maluku	Lygend Resources & Technology Co, Ltd	Harita Group (Indonesia)	US\$ 594 million (Rp 9.63 trillion)	Halmahera Jaya Feronikel
	Lygend Resources & Technology Co, Ltd	Li Yuen (Singapore)	US\$ 140 million (Rp 2.27 trillion)	Obi Nickel Cobalt
		PT Trimegah Bangun Persada (Indonesia)		
Lygend Resources & Technology	Harita Group (Indonesia)	Rp 31 trillion (US\$1.91 billion)	PT Dharma Cipta Mulia	
IKIP, Southeast Sulawesi	Tsingshan Holding Group	PT Merdeka Battery Materials Tbk (MBMA) (Indonesia)	US\$5 billion (Rp 81.14 trillion)	PT IKIP
	Tsingshan Holding Group	PT Merdeka Battery Materials Tbk (MBMA) (Indonesia)	51% MBMA 49% Tsingshan	PT Sulawesi Cahaya Mineral
Virtue Dragon Nickel Industrial Park (VDNIP)	Jiangsu Delong Nickel Industry Co., Ltd	Xiamen Xiangyu Group (China)	US\$ 973.04 million (Rp15.77 trillion)	PT Obsidian Stainless Steel
	Jiangsu Delong Nickel Industry Co., Ltd		US\$ 1.4 billion (Rp 22.76 trillion)	PT Virtue Dragon Nickel Industry
SEI, Central Sulawesi	Jiangsu Delong Nickel Industry Co., Ltd.	PT Gunbuster Nickel Industry (GNI)	US\$2.6 billion (Rp42.9 trillion)	PT Stardust Estate Investment (SEI),
	Jiangsu Delong Nickel Industry Co., Ltd.	Shanghai Decent Investment Group (China)	US\$2.86 billion (Rp42.9 trillion)	PT Dexin Steel Indonesia

4.4 Challenges of China’s Rising Investment in Indonesia

While China’s investments in Indonesia’s energy transition, EV, nickel mining and downstream industry undoubtedly bring economic benefits to Indonesia, they carry some negative issues and challenges in several areas. There is growing evidence that Chinese investments have harmed Indonesian national interests, especially with regards to the local economy, local people, environmental sustainability, safety issues, absorption of local workers, and carbon emissions.

4.4.1 Illegal Workers, Perceived Discrimination Against Local Workers

Central Sulawesi's IMIP owned by the Tsingshan Holding Group, is often praised for its highly efficient in processing nickel, and employing over 80,000 people, with 90 percent Indonesian and 10 percent Chinese employees. The large number of expatriates often led to issues of illegal foreign workers, brought in by Chinese investors to meet demand for skilled workers. Due to a shortage of workers with the skills and expertise required for nickel processing in the Indonesian market, Chinese investors often need to bring in workers from China. The process is facilitated by Indonesia's visa-on-arrival policy for Chinese tourists, which was introduced to boost the country's tourism sector. However, monitoring by the Office of Manpower may be inadequate, as the nearest offices are often located hundreds of kilometers away from project sites.

The large number of foreign and local workers has also led to cultural tensions between the two groups. Despite Indonesians making up the majority of the workforce, Chinese workers dominate managerial and technical positions. Allegations of preferential treatment for Chinese employees are prevalent, reflected in disparities in pay and living conditions. The managerial practices of Chinese personnel further exacerbate these inequalities.

Problems with local employees also happened at Jiangsu Delong operation in the Virtue Dragon Nickel Industrial Park (VDNIP) in Morosi, Konawe, Southeast Sulawesi, which turned into rioting in 2020. Initially, workers demanded that those who already worked more than three years be recruited as permanent employees, but negotiations failed. The angry workers burned one of the smelting lines, and several facilities. Industry Minister Agus Gumiwang Kartasmita who visited the location told workers not to resort to violence and urged the company to abide by Indonesian rules and meet all workers' rights.

4.4.2 Weak Health, Safety, Environmental (HSE) Standards

Chinese FDI-funded projects are often characterized by their fast and cost-effective operations, but health, safety, and environmental (HSE) issues remain a significant concern. Paramadina Public Policy Institute compared the HSE practices of PT Vale Indonesia, IMIP, and VDNI and found PT Vale has the most robust safety procedures in place. In contrast, IMIP and VDNI require significant improvements in their HSE standards. IMIP does face issues related to accountability and hazardous working conditions, leading to numerous industrial fatalities. In 2023 alone, 34 workers lost their lives due to fires and explosions, while 39 others sustained severe burns, resulting in disabilities. Another fire accident was also reported at SEI industrial park in North Morowali, belonging to Jiangsu Delong in 2023 when a fire engulfed a smelter facility. No fatalities were reported.

Chinese investments in Indonesia's energy sector, including projects by IMIP, VDNI, and Batang Toru hydropower plant, have raised significant environmental concerns and caused distress among local communities. Coal-fired power plants and nickel mining operations have contributed to seawater pollution, disrupting the livelihoods of local fishermen, while freshwater sources have been contaminated with hazardous substances. Furthermore, developments like the Batang Toru hydropower plant (belonging to China Gezhouba Group, have placed additional pressure on Indonesia's ecosystems, threatening indigenous orangutan habitats and affecting local water supplies.⁸²

4.4.3 Displacing Local Communities

The plan of China's Xinyi Group to invest US\$11.6 billion to develop an integrated solar glass manufacturing ecosystem on Rempang Island, Riau Islands, according to then Investment Minister Bahlil Lahadalia, would create 35,000 jobs. Ironically, the project would displace 7,500 local people, who have been living on the islands for generations. The relocation of locals on Rempang island by the Batam Authority in 2023 sparked violent protests that caused 17 people suffering injuries due to tear gas. The police arrested 43 protesting locals. Since then, a few clashes between locals and security personnels and workers of PT Makmur Elok Graha, the local partner of Xinyi, have occurred several times. The latest was recorded on Dec. 17, 2024.

Displacement of locals also happened in several nickel mining concessions. Indigenous farmers in Southeast Sulawesi have been gradually displaced from their land since 2022 to accommodate extraction and processing sites near the Sulawesi Cahaya Mineral mine, which is controlled by Merdeka Battery Materials (MBMA), that partners with Chinese investors. Numerous land seizures have occurred under the pretext of nickel extraction, often accompanied by meager one-time compensation.⁸³ Compounding the issue, many of those displaced locals have no legal recourse, as the Indonesian government does not recognize their land tenure. Local authorities have consistently raised concerns about human rights abuses with both the House of Representatives and the National Commission of Human Rights.

4.4.4 Triggering Deforestation

Several civil society organizations, including the Halmahera Study Forum (Foshal) of North Maluku, the North Maluku chapter of the Indonesian Forum for the Environment (Walhi), Trend Asia, and the Indonesian Legal Aid Foundation (YLBHI), have voiced concerns over

⁸² Australian Institute of International Affairs, "Can China Replace JET-P Energy Financing in Indonesia", Apr. 9, 2024, <https://tinyurl.com/2h6jj5py>

⁸³ United States Institute of Peace, "Indonesia's Nickel Bounty Sows Discord, Enables Chinese Control", Mar. 21, 2024, <https://tinyurl.com/3h7jjpx6>

the negative impacts of the nickel downstream industry in North Maluku, which has led to extensive deforestation.

Foshal North Maluku noted that the massive nickel concessions in North Maluku had triggered widespread nickel ore extraction, resulting in unregulated deforestation. Currently, approximately 213,960 hectares of forest in North Maluku are surrounded by nickel mining permits. In East Halmahera alone, 19 permits cover 101,047.21 hectares, while in Central Halmahera, 13 permits span a total area of 10,390 hectares. In South Halmahera, there are 15 permits covering a total concession area of 32,236 hectares. Additionally, there are nickel mining permits that span two administrative regions — East and Central Halmahera — with a total of four permits covering an aggregate area of 70,287 hectares. As a result, Foshal North Maluku observed that the loss of forest cover in North Maluku has predominantly occurred in areas where nickel ore mining takes place.

Spatial analysis data from Global Forest Watch further corroborates this trend. Between 2001 and 2022, Central Halmahera witnessed the loss of 26,100 hectares of tree cover, which accounts for a 12 percent reduction in forested land since 2000. This deforestation has contributed to the emission of 20.9 metric tons of carbon dioxide equivalent (MTCO_{2e}), highlighting the environmental consequences of the nickel mining operations in the region. In East Halmahera, a total of 56,300 hectares of tree cover were lost from 2001 to 2022, representing an 8.9 percent reduction since 2000, which led to the emission of 44.5 MTCO_{2e}. During the same period, South Halmahera experienced a loss of 79,000 hectares of tree cover, marking a 9.9 percent decrease from 2000 and contributing to emissions of 62.9 MTCO_{2e}.

4.4.5 Contributing to Carbon Emissions

Industrial complexes require a continuous and reliable power supply at volumes that far exceed typical grid capacities. Nickel smelting and processing, which are energy-intensive by nature, demand stable, 24/7 electricity to sustain operations. Given that these facilities are often located in remote and ecologically sensitive areas outside the PLN on-grid system, captive CFPPs become the de facto solution to their energy needs. This choice ensures operational continuity but locks these industries into coal dependency, with far-reaching environmental consequences.

China has been a pivotal financier in Indonesia's nickel industrial hubs through corporations like Tsingshan Holding Group, Huayou Cobalt, and Delong Nickel Industry. These companies have invested heavily in captive CFPPs in Morowali, Weda Bay, and Konawe to support the energy-intensive smelting operations essential for producing stainless steel and nickel for EV batteries. This strategy aligns with China's ambition to secure its global supply chain for renewable technologies. However, the reliance on coal,

one of the most polluting energy sources, contradicts the green objectives these investments claim to support.

Chinese corporations, such as Tsingshan Holding Group, Huayou Cobalt, and Delong Nickel Industry, have been pivotal in financing and developing captive CFPPs for Indonesia's nickel industry. Through investments in industrial hubs like Morowali, Weda Bay, and Konawe, these companies have facilitated the energy-intensive nickel smelting process essential for producing stainless steel and nickel for EV batteries. These projects are strategically vital for China's global supply chain in renewable technologies, yet their reliance on coal power starkly contrasts with the sustainability narrative of the green energy transition.

Captive CFPPs such as Morowali CFPPs (4,810 MW) and Weda Bay CFPPs (3,040 MW) emit significant quantities of CO₂. Each megawatt-hour (MWh) of energy generated by coal-fired plants releases approximately 820 kg of CO₂.⁸⁴ With the enormous energy demands of nickel smelting, these emissions accumulate rapidly, creating substantial carbon footprints. Furthermore, the clustering of captive CFPPs in regions like Sulawesi (e.g., Morowali, Konawe, and Morosi) intensifies localized pollution. These areas, already vulnerable due to their ecological sensitivity, now face compounded risks, including air and water contamination, deforestation, and biodiversity loss.

4.4.6 All Chinese Technology

One of the controversies involved in accepting Chinese investment is the "all China technology" requirement of many projects, leaving Indonesian vendors a very tiny piece of the cake. In the case of nickel downstream industry, because Indonesia continues to lag behind in smelter technology, Chinese investors must ship in all the technology from China. In the case of EV manufacturing, China's massive entrance into Indonesia's EV industry poses another challenge as most Chinese EV manufacturers prefer using lithium iron phosphate (LFP) batteries, the main competitor to nickel-based lithium batteries. While Indonesia possesses abundant nickel reserves, the shift toward LFP batteries could limit the full utilization of its resources in the growing global EV market.

The growing popularity of LFP batteries stems from their lower cost, increased safety and longer lifecycle compared to nickel-based batteries such as NCA or NMC. Additionally, China as the world's largest EV market and producer, continues to drive the adoption of LFP technology.⁸⁵ This further diminishes the potential market for nickel-derived materials.

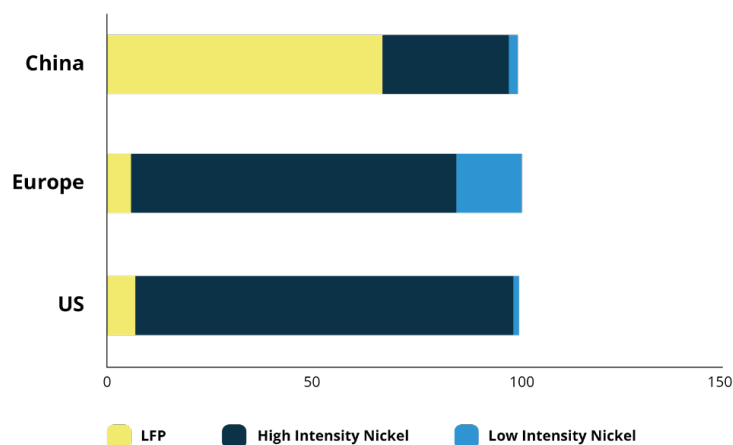
For Indonesia, which boasts some of the world's largest nickel reserves and has heavily invested in nickel downstream processing and smelting facilities, this shift towards LFP

⁸⁴ IPCC. "IPCC Working Group III – Mitigation of Climate Change, Annex III: Technology - specific cost and performance parameters". 2014. <https://tinyurl.com/u4dmn3wu>

⁸⁵ CNN Indonesia, "Mobil-mobil Listrik China di RI Tak Pakai Baterai Nikel, Gunakan LFP", Jan. 22, 2024, <https://tinyurl.com/4yhbu6js>

batteries presents a potential misalignment with market demand. While nickel remains a critical material for certain types of EV batteries, particularly those using NCM chemistries, the growing preference for LFP batteries could challenge Indonesia’s ability to fully capitalize on its vast nickel resources. This misalignment could hinder Indonesia's strategic efforts to position itself as a central player in the global EV battery production ecosystem, limiting the effectiveness of its investments in the nickel sector.

Figure 26. Adoption of iron-based and nickel-based EV batteries in China, Europe, US



4.4.7 Below-par Infrastructure to Support Renewable Energy

In renewable energy, the challenges mostly involve Indonesia’s unreadiness to facilitate Chinese investment. Indonesia’s unreadiness mostly relates to Indonesia’s below-par electricity infrastructure to support the massive development of renewable energy, and in the case of electric vehicles, the Indonesian market is not growing rapidly as expected by many Chinese EV investors.

On electricity infrastructure, Investment Minister Rosan Roeslani noted that Indonesia still lacks the essential infrastructure required to fully capitalize on the growing investments in renewable energy and to develop its potential in this sector.⁸⁶ Moreover, regulations concerning the local content requirement (TKDN) have become a bottleneck for potential foreign investments, including those from China. This is particularly evident in the development of Geothermal Power Plants (PLTP), which must align with Indonesia's domestic conditions.⁸⁷

Mismatch issues in Indonesia's green-powered energy connectivity could hinder the effectiveness of potential Chinese investments. PLN has noted that the locations of hydro

⁸⁶ Kumparan, "Investasi di Sektor Energi Terbarukan Dunia Melonjak, Tapi Belum Merata", Sep. 5, 2024, <https://tinyurl.com/yypzm558>

⁸⁷ CNBC Indonesia, "TKDN Jadi 'Bottleneck' Investasi Energi Terbarukan, Ini Kata ESDM", May 29, 2024, <https://tinyurl.com/5px3aj6j>

and geothermal power sources are often too distant from major electrical load centers. There is a significant need for feasibility studies and substantial energy connectivity projects to link green transmission from Sumatra to Java, Kalimantan to Java, East Nusa Tenggara to Java, and Kalimantan to Sulawesi. This lack of connectivity often discourages investment into renewable energy, which is often located far away from PLN's grids.⁸⁸

5 Political-Economy Landscape on Advancing China-Indonesia Energy Transition Agenda

As Indonesia advances its energy transition, both global and domestic conditions have become less favorable. The shifting geopolitical landscape has introduced new challenges, particularly in securing international funding for the country's energy transition goals. The United States' official withdrawal from the Paris Agreement in early 2025, under President Donald Trump's second term, has disrupted global climate finance initiatives, casting uncertainty over mechanisms such as the Just Energy Transition Partnership (JETP). With the future of U.S.-led climate financing now in doubt, Indonesia faces a potential shortfall in funding to accelerate its shift toward renewable energy.

The initial funding commitment under JETP Indonesia totaled US\$20 billion, with \$10 billion coming from government sources and the remaining \$10 billion from private financing through global banks under the Glasgow Financial Alliance for Net Zero (GFANZ). Of the total public funding, the U.S. had planned to contribute nearly \$2 billion—making it the largest donor among developed countries in the JETP's International Partner Group. However, earlier this year, the U.S. withdrew from its role as JETP Indonesia co-leader, a position it previously held alongside Japan, passing the leadership to Germany, according to the JETP Secretariat in Jakarta.⁸⁹ The U.S. withdrawal from both the Paris Agreement and JETP Indonesia leadership may further reduce financial commitments to climate change mitigation efforts globally and in Indonesia.

Indonesia has not yet issued an official response regarding the impact of the U.S. withdrawal from the Paris Agreement on its energy transition projects. However, the Ministry of Energy and Mineral Resources is currently assessing the potential consequences. According to the Director General of New, Renewable Energy, and Energy Conservation, the U.S. withdrawal is expected to affect funding for Indonesia's energy transition projects, underscoring the need for the government to diversify its financial sources rather than relying on a single major funding mechanism. Additionally, the Presidential Envoy for Climate and Energy has emphasized the broader implications of the

⁸⁸ PLN, "PLN Indonesia Power dan China Energy Sepakat Kaji Pengembangan Energi Hijau Skala Besar di Sulawesi", Mar. 25, 2024, <https://tinyurl.com/3bffc38a>

⁸⁹ The Jakarta Post. "US backs out from JETP leadership role," Feb. 1, 2025. <https://tinyurl.com/msaue63v>

U.S. decision, particularly concerning fairness in global climate change mitigation. Given these challenges, Indonesia is now exploring strategic responses to adapt to these evolving global dynamics.⁹⁰

In this context, China emerges as Indonesia's most viable and strategic partner in achieving its energy transition agenda. As the world's largest investor in renewable energy and a leader in clean energy technology, China possesses the capital, expertise, and industrial capacity to support Indonesia's transition away from fossil fuels. Strengthening collaboration with China across key sectors—including power infrastructure, hydropower, solar and wind energy, and electric vehicle (EV) manufacturing—offers a practical and strategic pathway to ensuring Indonesia's long-term energy security while positioning the country as a key player in the regional clean energy market.

The challenges in advancing China's role in Indonesia's energy transition primarily stem from the Indonesian side, particularly following President Prabowo Subianto's inauguration as Indonesia's 8th president in October 2024. On the international stage, President Prabowo has consistently reaffirmed Indonesia's commitment to achieving net-zero emissions (NZE) by 2060—or even earlier, by 2050. However, domestically, his focus leans more toward achieving energy self-sufficiency rather than prioritizing energy transition. Under his leadership, Indonesia is likely to adopt renewable energy only when it aligns with his broader goal of energy self-sufficiency.

Despite these challenges, we believe there are significant opportunities for cooperation between Indonesia and China that could support Indonesia's energy transition agenda. We will identify specific sectors, industries, and both bilateral and multilateral platforms that could enhance China's role in accelerating Indonesia's shift to clean energy.

5.1 Key Sectors for Advancing Indonesia-China Energy Transition Cooperation

China's strategic role in Indonesia's energy transition is becoming increasingly evident. With its extensive expertise in renewable energy technology, smart grid development, and electric vehicle (EV) manufacturing, China is well-positioned to support Indonesia's shift toward sustainable energy. By prioritizing investments in key sectors such as power infrastructure, renewable energy, and EV manufacturing, Indonesia's partnership with China will accelerate its progress toward renewable energy targets while creating new opportunities for economic growth and industrial development.

The following sections examine the key strategic sectors with the greatest potential to drive Indonesia's energy transition and enhance its partnership with China. These sectors are

⁹⁰ Hukum Online, "Amerika Keluar dari Paris Agreement, Utusan Presiden RI: Rasa Keadilannya Di Mana?", Feb. 2, 2025 <https://tinyurl.com/2ws7yz69>

the electricity infrastructure and renewable energy and the EV manufacturing. They are not only essential to Indonesia's energy strategy but also present valuable opportunities for Chinese companies to contribute their expertise and resources in a mutually beneficial collaboration.

Electricity Infrastructure and Renewable Energy

The key electricity sub-sectors identified in this chapter align with Indonesia's National Electricity Master Plan (RUKN) 2024–2060, which has been updated to reflect the country's commitment to achieving Net Zero Emissions (NZE) by 2060. The RUKN serves as a long-term roadmap for strengthening Indonesia's electricity sector, integrating more renewable energy sources, and ensuring grid reliability and energy security. These priority sectors will also be officially outlined in the Electricity Supply Business Plan (RUPTL) 2025–2034, which PT PLN is set to release in the near future. The RUPTL 2025–2034 will provide the key operational framework for expanding renewable energy investments, modernizing grid infrastructure, and promoting cleaner technologies within Indonesia's electricity sector.

5.1.1 Super Grid and Smart Grid

A significant portion of Indonesia's renewable energy resources is located outside Java, far from the country's main electricity consumption centers. This geographical mismatch necessitates the development of a more adaptive and efficient power system. However, existing power infrastructure remains a major bottleneck in achieving Indonesia's energy transition targets. Despite progress in expanding transmission and substation capacity, as outlined in the National Electricity Master Plan (RUKN) 2024–2060, the current grid system is still not flexible enough to integrate large-scale renewable energy—particularly intermittent sources like solar and wind.

As of 2023, Indonesia's transmission network spanned 71,834 circuit kilometers (kms), up from 69,107 kms the previous year, while substation capacity reached 175,139 MVA.⁹¹ While these improvements are positive steps, infrastructure distribution remains uneven. 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.

One of the primary challenges is the rigidity of Indonesia's conventional grid system, which is ill-equipped to handle the intermittent nature of renewable energy. Unlike coal-fired or geothermal power plants that provide consistent baseload electricity, solar and wind power fluctuate based on weather conditions and time of day. This underscores the urgent

⁹¹ ESDM. "Rencana Umum Ketenagalistrikan Nasional (RUKN) 2024-2060". 2024. <https://tinyurl.com/46mvaaym>

need to modernize the national electricity infrastructure through the development of smart grids and super grids.

Smart grids enable real-time monitoring and management of electricity flows, integrating digital technology and artificial intelligence to optimize energy distribution and improve reliability. Key components such as Advanced Metering Infrastructure (AMI) and Automatic Distribution Management Systems (ADMS) enhance grid efficiency, reduce outages, and enable dynamic supply-demand adjustments. Super grids, on the other hand, focus on high-capacity transmission, connecting renewable energy-rich regions with major consumption hubs. By adopting High Voltage Direct Current (HVDC) technology, these super grids can efficiently transmit electricity over long distances with minimal energy loss, ensuring that remote renewable energy sources are effectively utilized to meet urban demand.

According to the RUKN 2024–2060, Indonesia plans to develop both intra-island and inter-island transmission networks to bridge the gap between electricity demand and renewable energy potential. While demand is concentrated in Java and Bali, the most abundant renewable energy resources are located outside these regions. Key priorities include building transmission backbones within major islands—such as Sumatra, Sulawesi, Kalimantan, and Papua—and interconnecting islands to balance supply and demand across the archipelago. Some of the key projects planned include:

1. Intra-Island Interconnections:

- Sumatra (North Sumatra–South Sumatra)
- Sulawesi (North Sulawesi–South Sulawesi)
- Kalimantan (Kalimantan Looping)
- Papua (Jayapura–Sorong)

2. Inter-Island Interconnections:

- 2028: Sumatra–Batam
- 2029: Java–Bali Connection
- 2031: Sumatra–Java
- 2035: Bali–Lombok–Sumbawa
- 2040: Kalimantan–Java
- 2041: Sumbawa–Flores and Kalimantan–Sulawesi
- 2045: Sumba–Sumbawa–Sulawesi

Developing this infrastructure requires substantial investment. According to the RUKN, an estimated US\$104 billion will be needed to build transmission interconnections between provinces and islands by 2060. This significant financial demand presents a strategic opportunity for international partnerships, particularly with countries that have advanced expertise in grid modernization and renewable energy integration. China, with its extensive

experience in smart grid development and HVDC transmission, is well-positioned to play a pivotal role in supporting Indonesia's infrastructure expansion.

At the 2023 Indonesia-China Business Forum, PT PLN signed a memorandum of understanding with the State Grid Corporation of China (SGCC) and Trina Solar China to collaborate on smart grid development projects. Additionally, during the 1st China-ASEAN Clean Energy Week in Hainan, Indonesia's Ministry of Energy and Mineral Resources extended an open invitation to Chinese investors to participate in developing Indonesia's super grid infrastructure. These collaborations highlight China's growing role in addressing Indonesia's grid challenges and accelerating its energy transition.

Given the scale of infrastructure required, prioritizing Chinese investments in transmission and smart grid projects offers a practical solution to Indonesia's current energy challenges. Expanding these systems will not only enhance electricity reliability and efficiency but also facilitate greater integration of renewable energy, reducing dependence on fossil fuels. As Indonesia moves forward with its renewable energy targets, transmission and smart grid infrastructure must remain a key focus in its energy cooperation with China, ensuring a sustainable and resilient energy future.

5.1.2 Renewable Energy

According to the 2024–2060 RUKN, Indonesia's total electricity generation capacity is projected to reach 443 gigawatts (GW) by 2060. Of this, 41% will come from variable renewable energy (VRE), supported by 34 GW of energy storage, while 38.3% will be generated from dispatchable renewable sources such as hydropower and geothermal. The remaining 20.7% will consist of fossil fuel-based power plants, primarily coal and natural gas, integrated with carbon capture and storage (CCS) technology to minimize emissions. Planned renewable energy capacity alone will reach 351.3 GW, with hydropower leading dispatchable renewables at 91.1 GW, followed by geothermal at 22.7 GW. Among variable renewables, solar power will dominate with a target capacity of 267 GW, followed by wind power at 73.2 GW.

Scaling up renewable energy capacity to 351.3 GW by 2060, along with 34 GW of energy storage, requires an estimated investment of US\$1 trillion—or approximately US\$28 billion annually.⁹² This enormous financial requirement underscores the critical need for international investment partnerships to support Indonesia's energy transition. In this context, China's role is becoming increasingly significant. As a global leader in renewable energy technology and financing, China is well-positioned to provide both the financial

⁹² Kementerian ESDM. "Bahan Presentasi Menteri Energi dan Sumber Daya Mineral dalam Rapat Kerja Rapat Kerja Komisi XII DPR RI dengan Menteri ESDM", Feb 3. 2025.

resources and technical expertise necessary to help Indonesia achieve its renewable energy goals.

China's extensive experience in hydropower, solar, and wind energy aligns well with Indonesia's energy transition priorities. Chinese companies such as PowerChina and Trina Solar have already demonstrated their ability to deliver large-scale renewable energy projects across Asia. With strong strategic alignment, China's involvement in developing Indonesia's hydro, solar, and wind power sectors could significantly accelerate the country's progress toward its 2060 renewable energy targets. Additionally, China's well-established supply chains and competitive pricing for solar panels and wind turbines could help reduce project costs, making renewable energy investments in Indonesia more viable and attractive.

Given the scale of investment required and the uncertain future of Western-backed climate finance initiatives, expanding China's role in Indonesia's renewable energy sector is both a practical solution and a strategic necessity. Prioritizing Chinese investments in hydropower, solar, and wind energy will be essential for Indonesia to bridge its energy gap, ensure sustainable growth, and meet its long-term energy transition goals.

a. Untapped hydropower potential

Indonesia has significant hydropower potential, estimated at approximately 95 GW, comprising 94.6 GW from run-of-river systems and 423 MW from reservoir-based plants. Despite this vast resource, as of late 2024, only 6.7 GW of installed capacity has been developed. Most hydropower plants are concentrated in West Java (2.1 GW) and North Sumatra (1.2 GW), while other regions with substantial untapped potential—such as Kalimantan and Papua—remain largely undeveloped.

Kalimantan holds 51% of Indonesia's total hydropower potential, with the majority concentrated in North Kalimantan (46% of Kalimantan's total potential), followed by Central Kalimantan (25%) and East Kalimantan (21%). Similarly, Papua accounts for 38% of the national hydropower potential, with most resources (92%) located in Papua Province. Recognizing this vast potential, the Indonesian government has set an ambitious target to expand hydropower capacity to 71 GW by 2060, requiring an estimated US\$188.8 billion in investment.⁹³

Among Indonesia's hydropower projects, the Kayan Cascade Hydropower Project in North Kalimantan stands out as a strategic opportunity for Chinese investment. Planned with a total capacity of 9,000 MW, this mega-project consists of five dams to be constructed in phases. The first phase, Kayan 1 Dam, is designed to generate 900 MW and was initially

⁹³ See Footnote 91, p.105

targeted for completion by 2026. However, due to delays caused by the COVID-19 pandemic and financial constraints, its timeline has been pushed back indefinitely.

Beyond the Kayan Cascade, several other hydropower projects across Indonesia present promising opportunities for Chinese investment and development, including:

- Tabang Hydropower Plant Project (101 MW) – A run-of-river hydropower plant located in Kutai Kartanegara Regency, East Kalimantan. The feasibility study was completed in 2023, and the project is currently managed by PLN’s subholding, PLN Indonesia Power, which is seeking funding from development and commercial banks.
- Tanjung Sakti Hydropower Plant Project (94 MW) – A dam-type plant utilizing the Manna River in Bengkulu Province, designed to be connected to the Sumatra grid system. Its commercial operation date (COD) is targeted for 2032.
- Jatiluhur Pumped Storage Hydropower Plant (760 MW) – Located in Purwakarta, West Java, this reservoir-type plant is a key component of the Java-Bali grid system. Led by PLN Indonesia Power, the project will either have PLN as the majority shareholder (51%) or involve PLN as a partner with a maximum 30% stake.

b. Potential of solar energy

Solar energy has the greatest potential among Indonesia’s renewable energy sources, with an estimated capacity of 3,315 GW spread across various regions. Sumatra alone accounts for 36% of the national solar potential, with significant resources concentrated in Riau, Jambi, and South Sumatra provinces. Another promising region is East Nusa Tenggara, which represents 11% of Indonesia’s total solar potential. Despite this vast resource, solar energy utilization remains minimal, with only 728 MW of installed capacity recorded by the end of 2024. Recognizing the need to harness this untapped potential, the Indonesian government has set a target to increase installed solar capacity to 109 GW by 2060, requiring an estimated investment of US\$140 billion.⁹⁴

Achieving this ambitious target presents significant opportunities for international collaboration, with China well-positioned to play a key role. As a global leader in solar energy technology and manufacturing, China controls more than 70% of the global solar photovoltaic (PV) supply chain, from polysilicon production to solar panel assembly. This vertical integration enables Chinese companies to provide cost-competitive, high-quality solar equipment, significantly reducing capital costs for solar projects in Indonesia. Additionally, China’s extensive experience in developing large-scale solar projects, including solar farms in desert regions and floating solar installations on lakes and

⁹⁴ See Footnote 94.

reservoirs, is highly relevant to Indonesia's geographic conditions. China's Anhui Floating Solar Farm (150 MW) serves as a successful example that could be replicated in Indonesia, where abundant lakes and reservoirs provide ideal locations for similar projects.⁹⁵

Several solar power projects in Indonesia are already in the pipeline and actively seeking foreign investors, creating opportunities for Chinese companies to expand their presence in the region. The growing solar sector offers numerous investment prospects, particularly in the development of utility-scale solar power plants. Some of the key projects currently open to foreign investors include:⁹⁶

- Paiton Solar PV Power Plant (Probolinggo, East Java): A ground-mounted photovoltaic power plant with a capacity of 50 MWac, expected to reach its commercial operation date (COD) in 2027. The plant will be connected to the 150 kV grid system, and its feasibility study was completed by PLN Nusantara Power in 2022.
- Batang Solar PV Power Plant (Batang, Central Java): A ground-mounted photovoltaic plant with a capacity of 50 MWac, also scheduled for COD in 2027 and connected to the 150 kV grid system.
- Sumenep 1 & 2 Solar PV Power Plants (Sumenep, East Java): These twin ground-mounted solar plants have a combined capacity of 2 x 50 MWac, with COD targeted for 2027.
- Pemalang Solar PV Power Plant (Probolinggo, East Java): With a planned capacity of 50 MWac, this plant will also be connected to the 150 kV grid system, with COD expected in 2027.

In addition to domestic projects, Indonesia plans to export up to 4 GW of low-carbon electricity to Singapore by 2035, creating further opportunities for large-scale solar power development. This initiative requires the construction of extensive solar power infrastructure, including solar farms and cross-border transmission systems, making it an attractive investment landscape for Chinese companies.

Furthermore, solar panel manufacturing and supply chain development in Indonesia present significant potential for long-term collaboration. Chinese companies have already begun investing in this sector, highlighting Indonesia's growing role in the global solar supply chain. Suntech Power Holding Co., Ltd., a leading Chinese solar panel manufacturer, has committed to building a 2 GW capacity manufacturing plant in Indonesia, with

⁹⁵ PVTech. "World's largest floating solar plant connected in China", March 20, 2019. <https://tinyurl.com/mryd4maa>

⁹⁶ PLN Nusantara Power, "Indonesian RE Projects Showcase", in 2024 Japan RE Invest Indonesi in Tokyo, Nov 27, 2024. <https://tinyurl.com/358epb4d>

operations expected to begin by the end of 2024. This facility will strengthen the local solar panel supply chain and create new opportunities for collaboration with Chinese raw material suppliers and component manufacturers.

Another major investment comes from SEG Solar Inc., which has initiated the construction of a solar panel manufacturing plant in the Batang Integrated Industrial Zone in Central Java. With a total investment of approximately US\$500 million, the facility is expected to create up to 2,000 jobs over the next five years, further solidifying Indonesia's position as a key player in the regional solar industry.⁹⁷

c. Opportunities in wind energy

Indonesia's wind energy sector holds vast untapped potential, estimated at 154.6 GW, consisting of 60.4 GW of onshore wind and 94.2 GW of offshore wind resources. The Maluku, Papua, and East Nusa Tenggara regions account for 40 percent of the country's total wind potential, while Java contributes approximately 26 percent. Despite this abundance, wind energy development in Indonesia remains limited, with only 152 MW of installed capacity recorded by 2024. To bridge this gap, the government has set an ambitious target of 73 GW of installed wind capacity by 2060, requiring an estimated investment of US\$58 billion.

One of Indonesia's pioneering wind energy projects is the Sidrap Wind Farm (PLTB Sidrap) in South Sulawesi, the country's first large-scale wind farm, with a capacity of 75 MW. Although few wind energy projects have been developed so far, wind power will play a crucial role in Indonesia's Variable Renewable Energy (VRE) strategy, which includes integrating battery energy storage systems (BESS) to enhance grid stability and ensure a reliable power supply.

China's technological leadership in wind energy development makes it an ideal partner to support Indonesia's wind energy ambitions. As the world's largest wind energy producer, China has more than 4,300 wind turbine facilities in operation or under development. Chinese companies such as Mingyang Smart Energy have pioneered advanced wind turbine technologies, including 20 MW offshore turbines capable of supplying power to 96,000 homes per unit per year. This expertise, combined with China's competitive manufacturing capacity, provides a strong foundation for collaboration on Indonesia's wind energy projects.

Several wind energy projects in Indonesia present attractive investment opportunities, particularly for Chinese companies looking to expand their presence in Southeast Asia:

⁹⁷ BKPM. "First US Solar Panel Manufacturer Breaks Ground in Batang Industrial Estate Valued at Rp 8 trillion", Oct 1, 2024. <https://tinyurl.com/7z6nt5wf>

- PT PLN Nusantara Power (PLN NP) is exploring the development of 1,000 MW of wind farms across five locations in collaboration with Shandong Electric Power Engineering Consulting Institute Corp., Ltd. (SDEPCI). This initiative presents significant opportunities for Chinese companies to invest in large-scale wind energy projects in Indonesia.
- PLN NP's subsidiary, PLN Nusantara Power Renewables, is partnering with Total Energies and Adaro Power to develop the Tanah Laut Wind Farm in South Kalimantan. With a planned capacity of 70 MW, the project will feature 11 turbines, each with a capacity of 6.6 MW, along with a 10 MW/10 MWh Battery Energy Storage System (BESS) to mitigate power intermittency. This hybrid wind power plant will be Indonesia's first of its kind, integrating battery storage with wind generation for enhanced reliability and efficiency.
- PT Bakrie & Brothers Tbk, in partnership with Envision Energy International Ltd., plans to develop a 200 MW wind farm combined with a 200 MW floating solar power plant. This hybrid energy system will provide clean, reliable electricity to eastern Indonesia, where energy demand continues to grow. By integrating wind and solar power, the project ensures stable energy output while reducing the impact of weather fluctuations, strengthening regional energy networks.

As demand for wind energy components increases, there is a growing opportunity for Chinese companies to establish wind turbine manufacturing facilities in Indonesia. Local production would reduce import costs, facilitate technology transfer, and create a robust supply chain for wind power projects. Leveraging its economies of scale, China's wind energy sector can produce turbines at lower costs, helping to reduce overall investment requirements for wind farm development in Indonesia.

5.1.3 EV Manufacturing

China plays a crucial role in Indonesia's efforts to electrify its transportation sector. This collaboration aligns with Indonesia's ambition to become a regional EV hub, leveraging China's global leadership in EV technology and production. Chinese manufacturers currently account for nearly 30 percent of the global EV market, making them key partners in accelerating Indonesia's EV adoption, fostering local industrial development, and driving demand for electrified transportation.

Chinese EV brands dominate Indonesia's EV market, holding over 80 percent of market share in the first half of 2024, with 17,800 units sold between January and July. Leading Chinese manufacturers such as Wuling, Sokon (DFSK), and Neta have established assembly

plants and supply chains in Indonesia, demonstrating their long-term commitment to the country.⁹⁸

BYD, a later entrant to the Indonesian market, is investing US\$1.3 billion to build an EV manufacturing plant in Subang Smart City, West Java. Set to begin operations in 2026, the plant will have an annual production capacity of 150,000 units and serve as a regional export hub for Southeast Asia. This investment will further strengthen the dominance of Chinese EV brands in Indonesia and reinforce the country's position as a key player in the region's expanding EV market.

Expanding China's role in Indonesia's EV sector will have a strategic impact beyond the automotive industry. Strengthening local EV production and integrating renewable energy into charging infrastructure will reduce Indonesia's reliance on fossil fuel imports, enhance energy security, and create thousands of new jobs. Additionally, developing smart charging stations powered by solar and wind energy will improve grid stability and lower peak electricity demand, further supporting the country's energy transition goals.

Positioning Indonesia as a regional EV export hub will not only boost foreign exchange earnings but also strengthen the country's industrial base. With China's technological expertise and Indonesia's abundant resources, the EV sector presents a unique opportunity for long-term growth and collaboration. Establishing a robust EV ecosystem—built on local manufacturing, renewable energy integration, and an expanded battery supply chain—will accelerate Indonesia's transition to a sustainable, low-carbon economy.

a. EV manufacturing, a catalyst for energy transition

The development of Indonesia's EV sector is a key component of the country's broader energy transition strategy. The transportation sector is one of the largest contributors to national greenhouse gas emissions, making the shift from internal combustion engine (ICE) vehicles to EVs a crucial step in reducing fossil fuel consumption. Expanding local EV manufacturing and adoption, supported by the transition to renewable energy, will create a ripple effect across the energy sector by promoting clean energy integration.

To accelerate EV adoption, the Indonesian government has introduced various incentives, including tax exemptions, luxury tax (PPnBM) reductions, and free vehicle registration fees for EVs.⁹⁹ However, sustaining demand growth will require the expansion of charging infrastructure. Chinese companies such as BYD and Wuling, in collaboration with PLN, are investing in smart charging stations to reduce range anxiety and encourage wider adoption. Strengthening local manufacturing capacity through partnerships with Chinese

⁹⁸ Jakarta Globe. "4 in 5 EVs Sold in Indonesia Are Chinese Brands: Association", August 17, 2024.
<https://tinyurl.com/4h77bh9w>

⁹⁹ Reuters. "Indonesia to give tax incentives for EV makers BYD, Citroen, GAC Aion", Dec 16, 2024.
<https://tinyurl.com/5339y2et>

manufacturers can also significantly lower production costs, making EVs more affordable for Indonesian consumers.

Localizing battery production and integrating supply chains will further narrow the price gap between EVs and conventional vehicles. Additionally, linking EV charging stations to renewable energy sources such as solar and wind power will enhance grid stability and reliability while promoting clean energy use. The implementation of vehicle-to-grid (V2G) technology can further optimize energy distribution, creating a more flexible and sustainable power system.

b. Building a robust battery supply chain

A critical aspect of Indonesia's EV strategy is the development of a comprehensive battery supply chain. Indonesia's vast nickel reserves, primarily located in Sulawesi and North Maluku, position the country as a key player in the global battery market. Since the nickel export ban in 2020, the Indonesian government has focused on transforming the country into a global hub for nickel-based battery (NMC—Nickel Manganese Cobalt) production. Significant investments from Chinese companies such as CATL and Tsingshan Group have expanded Indonesia's nickel refining and battery cell production capabilities.

However, the growing dominance of Lithium Iron Phosphate (LFP) batteries, which do not require nickel or cobalt, presents a strategic challenge. LFP batteries are preferred by many Chinese EV manufacturers, including BYD and Wuling, due to their lower cost. This shift could reduce demand for Indonesia's processed nickel products. Chinese dominance in Indonesia's EV market would create more demand for LFP batteries, creating a situation for Indonesia's trade balance in iron as Indonesia has become a net importer of iron since 2021. To address this mismatch, Indonesia should adopt a dual-track strategy, encouraging investments in both NMC and LFP battery production, but giving more incentives for nickel-based battery.

In addition to diversifying battery production, Indonesia must strengthen its battery supply chain. Collaborating with Chinese companies to expand local production of battery components, anode materials, and cathode materials will boost Indonesia's capacity for integrated battery manufacturing. Recent investments by BTR New Material Group in an anode material plant in Central Java are an example of the potential for deeper integration between Chinese and Indonesian companies in the battery ecosystem.

Furthermore, battery recycling and localized component production can enhance Indonesia's competitiveness and reduce reliance on imports, creating cost advantages for domestic EV manufacturers. As the EV market matures, solid-state batteries and nickel-based catalysts for hydrogen production could also become high-value areas for future development, offering even greater opportunities for diversification.

5.2 Business players who can advance energy transition

While the new administration has refocused energy planning back to coal and conventional sources, ongoing projects and key industry players remain vital in keeping Indonesia's energy transition agenda on track, offering hope for sustainable progress. President Prabowo Subianto remains committed to bringing Indonesia to net-zero emissions by 2060 and key business players from both Indonesia and China are essential in bringing that vision to fruition.

Although it now becomes more challenging to map how Indonesia can continue its energy transition agenda given recent government initiatives, investment commitments made by major companies like BYD, Wuling, Xinyi Group, Trina Solar, Envision Energy, among others, shows that energy transition remains a part of Indonesia's economic landscape. Their continued investments signal confidence in Indonesia's renewable energy potential and reinforce the notion that the transition is not only necessary but also inevitable. Despite policy shifts, these commitments demonstrate that the private sector remains a driving force in advancing clean energy solutions, ensuring that progress toward sustainability continues, even amid evolving political landscapes.

Aside from investment commitments made by Chinese companies, recent changes in the Indonesian conglomerate scene, namely the rising presence of business tycoon and Prabowo Subianto's brother Hashim Djojohadikusumo, presents an actor who Chinese investors can look to partner with in the new administration. Moreover, the appointment of Anindya Bakrie, Chairman of the Bakrie Group, as the head of the Indonesian Chamber of Commerce (KADIN), create a strategic entry point for Chinese firms looking to expand into the country's renewable energy sector.

The sub-chapters below will map these business players in greater detail to map Chinese business actors and companies are most likely to stay and aid Indonesia in continuing its energy transition agenda, regardless of the change in policy advancements. The mapping will divide key business players into renewable energy and electric vehicle sectors.

5.2.1 Renewable Energy Players

a. Singapore-Indonesia renewable energy export deal

Indonesia's domestic demand for solar energy remains limited, making large-scale renewable investments less attractive without guaranteed buyers. However, Singapore's goal of importing 4 gigawatts (GW) of low-carbon electricity by 2035 provides a crucial market, ensuring steady demand for clean energy. The Indonesia-Singapore agreement

signed in September 2023 solidifies this opportunity, offering investors long-term incentives despite shifting domestic policy priorities.¹⁰⁰

Singapore's Energy Market Authority (EMA) has granted conditional approval to import 2 GW of clean energy from Indonesia, with five projects currently in the pipeline. Companies involved in these projects include Pacific Medco Solar Pte Ltd, Adaro Solar International Pte Ltd, EDP Renewables APAC, Vanda RE Pte Ltd, and Keppel Energy.¹⁰¹

The EMA's initiative presents a valuable opportunity for Indonesia to establish itself as both a major producer and exporter of renewable energy. This project justifies new investments not only in renewable energy generation but also in the local manufacturing of solar panels and battery energy storage systems (BESS). Additionally, new subsea transmission infrastructure will be required to facilitate electricity exports to Singapore. These developments could serve as the foundation for Indonesia's future expansion of variable renewable energy and its supply chains—an opportunity too significant to overlook. The total investment for this renewable energy export initiative is estimated at US\$ 15 billion.

China is well-positioned to capitalize on this demand. With its extensive experience in solar power development and cost-efficient production, Chinese firms can provide the necessary infrastructure effectively. Their role is particularly critical given Indonesia's limited large-scale solar manufacturing capabilities. Moreover, China's push for outward investment in clean energy aligns with its broader strategy of leveraging excess capacity in its domestic renewable energy industry. By expanding into markets like Indonesia, Chinese firms can maintain high production levels while supporting regional energy transitions. This approach was previously championed by Luhut Pandjaitan, Indonesia's former Coordinating Minister of Maritime Affairs and Investment, who sought to attract Chinese solar manufacturers to establish production facilities in the country.¹⁰²

With President Prabowo taking office in October 2024, policies on renewable energy exports to Singapore have shifted. Minister of Energy and Natural Resources Bahlil Lahadalia has advocated for a more domestically focused energy strategy, while Prabowo's brother, Hashim Djojohadikusumo, has pushed for directing investment toward green data centers in Batam, Bintan, and Karimun. Instead of exporting renewable energy to meet Singapore's industrial needs, Hashim favors using low-carbon electricity to power Indonesia's own green data centers.¹⁰³

¹⁰⁰ Pinsent Masons. "Singapore conditionally approves electricity import from Indonesia". Oct 9 2023.

<http://tinyurl.com/vfphteuu>

¹⁰¹ EMA. "Singapore now 1 GW away from meeting target of importing 4GW of low-carbon electricity by 2035". Sep 8 2023.

<http://tinyurl.com/hypbdart>

¹⁰² Katadata, "Listrik EBT RI Dilirik Singapura, Luhut Ajak Cina Investasi PLTS", 14 Jun 2024, <https://tinyurl.com/4xj5w6xt>

¹⁰³ Kontan, "Menakar Untung Rugi Ekspor Listrik Indonesia ke Singapura", 15 Nov. 2024, <https://tinyurl.com/yycs6temn>

Despite these changing policy priorities, Chinese firms remain essential to Indonesia's renewable energy growth. Their ability to supply cost-effective solar infrastructure makes them valuable partners for both export-oriented and domestic renewable energy projects. By securing long-term stakes in Indonesia's renewable sector, Chinese investors can play a crucial role in sustaining momentum in the country's clean energy transition.

b. Trina Solar

The increasing demand for renewable energy exports, driven by Singapore's electricity import target, has created an incentive for solar energy production in Indonesia. While policy uncertainty remains, the presence of Chinese solar firms such as Trina Solar Co. Ltd. ensures continued development. Their continued expansion in Indonesia exemplifies this approach, as its new manufacturing facility will strengthen local solar panel production while supporting future large-scale projects that could supply both domestic and export markets.

Trina Solar has reinforced its commitment to Indonesia's energy transition with the launch of its integrated solar cell and module manufacturing facility under PT Trina Mas Agra Indonesia. Located in Kendal Industrial Park, Central Java, this \$100 million investment is a collaboration between Trina Solar, PT Dian Swasantika Sentosa Tbk. (DSSA) of the Sinarmas Group, PT PLN Indonesia Power Renewable, and PT Agra Surya Energy. The facility, which had its soft launch on October 30, 2024, represents a significant step toward strengthening Indonesia's renewable energy supply chain by localizing solar panel production.¹⁰⁴

Initially projected to produce 1 gigawatt peak annually, PT Trina Mas Agra Indonesia plans to triple its production capacity to 3 gigawatt peak within the next two to three years, placing Indonesia as a key manufacturing hub for solar technology in the region. This expansion aligns with the new Indonesian government's broader energy strategy, which emphasizes domestic manufacturing to reduce reliance on imports and foster local expertise.

Beyond its production capacity, PT Trina Mas Agra Indonesia's presence in Kendal Industrial Park strengthens the area's renewable energy ecosystem, complementing other industrial players in the sector. The industrial park's status as a Special Economic Zone (SEZ) also grants PT Trina Mas Agra Indonesia substantial incentives, including a 100% corporate income tax holiday for at least ten years, further reinforcing its long-term investment outlook.¹⁰⁵

The facility is also set to create significant employment opportunities, with a need for 600 workers to support its operations. PT Trina Mas Agra Indonesia is not only advancing

¹⁰⁴ Bisnis, "Perkuat Ekosistem EBT, Pabrik Panel Surya Masuk KIK", 31 Oct 2024, <https://tinyurl.com/225wkj76>

¹⁰⁵ See Footnote 101

Indonesia's clean energy ambitions but also contributing to local job creation and industrial development. As the company expands its production capabilities, its role in Indonesia's energy transition will become increasingly central, helping to drive the country toward greater solar energy adoption and self-sufficiency in renewable technologies.

c. Xinyi Group

Xinyi's presence in Indonesia began with its landmark plan to build an integrated solar glass manufacturing facility in Rempang, Riau Islands. Announced in July 2023, the US\$11.6 billion project was one of the largest foreign investments in Indonesia's renewable energy sector and was formalized through a memorandum of understanding signed between then-Investment Minister Bahlil Lahadalia and Xinyi Group CEO Lee Yin Yee in the presence of former President Joko Widodo. The facility, developed in partnership with PT Makmur Elok Graha (MEG), will process the island's abundant quartz sand into solar glass, a key component for solar panels, supporting Indonesia's ambition to establish a vertically integrated solar energy supply chain.

Xinyi Group's Rp 174 trillion commitment in September 2024 further reinforces Indonesia's appeal as a strategic renewable energy hub. Their decision, made after President Prabowo's inauguration, signals confidence in working with the new administration. As one of the companies to watch in driving the energy transition agenda despite shifting policy priorities, Xinyi is not just entering the market but actively shaping Indonesia's renewables sector.¹⁰⁶

Despite its strategic significance, the project faced considerable hurdles, particularly with land acquisition and the relocation of approximately 7,500 residents, including indigenous communities. Protests and concerns over social and cultural impacts posed obstacles, prompting government-led mediation efforts. While these challenges stalled progress under the previous administration, Xinyi has now intensified its engagement with Prabowo's government to accelerate its expansion.

The Indonesian government remains committed to fast-tracking Xinyi's Rempang facility while addressing outstanding land acquisition challenges. In January 2025, Deputy Minister of Investment and Downstream Industry Todotua Pasaribu reaffirmed Xinyi's continued commitment, stating that the company is simply waiting for the right time to proceed. Beyond this, Xinyi has pledged a total of Rp 348 trillion in investments through 2080, signalling its long-term vision and growing role in shaping Indonesia's renewable energy future.¹⁰⁷

¹⁰⁶ Gokepri, "Kelanjutan Investasi Rp174 Triliun Xinyi di Rempang Eco City, Jadwal Groundbreaking 2025", 12 Sep 2024, <https://tinyurl.com/yx49f8zp>

¹⁰⁷ IDN Times Sumut, "Xinyi Masih Berminat Investasi di Rempang, DPR Dorong Solusi", 24 Jan 2025, <https://tinyurl.com/ae8fszuc>

d. Kayan Hydro Energy

Kayan cascade hydropower projects in North Kalimantan stand as one of Indonesia's most ambitious renewable energy undertakings, requiring an estimated US\$17.8 billion to develop its 9,000-megawatt capacity. Given its scale, Kayan represents a major opportunity for Chinese businesses to strengthen their foothold in Indonesia's energy transition under the incoming administration.

At the 7th Indonesia-China Energy Forum, Minister of Energy and Mineral Resources Bahlil Lahadalia directly encouraged Chinese investors to participate in Indonesia's renewable energy sector, highlighting Kayan as a key component of the country's net-zero emissions roadmap. He emphasized Indonesia's commitment to ensuring a stable and welcoming investment climate for Chinese businesses and outlined a broader strategy that prioritizes hydropower, solar, geothermal, and hydrogen energy while gradually phasing out coal. Recognizing the scale of investment required, Bahlil stressed that partnerships with China would be essential to realizing Indonesia's energy transition ambitions, particularly in large-scale projects like Kayan.

Chinese investor PowerChina was initially involved in one of the Kayan projects initiated by PT Kayan Hydro Energy (KHE) in 2012. However, PowerChina later withdrew from the project in 2020 without providing a clear explanation. Japan's Sumitomo Corporation then stepped in as a replacement, only to exit in 2024, raising concerns about PT KHE's financial capacity to execute the project.

In response to the government's push for investment in Kayan, Prabowo's brother, Hashim Djojohadikusumo, adopted a pragmatic approach by offering investors a partnership with his company, PT IKANI, which holds concessions in the Kayan area.¹⁰⁸

Despite past setbacks, the government's continued efforts to attract foreign investors, particularly from China, reflect its confidence in the megaproject's eventual realization. Kayan presents a rare opportunity for Chinese investors to expand their presence in Indonesia's renewable energy sector by leading a large-scale hydropower project with strong government support.

e. Bakrie Group and Envision Energy

As Chinese investors seek stable and strategic entry points into Indonesia's renewable energy sector, the role of influential domestic business groups becomes increasingly critical. One such key player is the Bakrie Group, whose recent leadership developments

¹⁰⁸ Bisnis, "Kabar Terbaru Investasi PLTA Kayan & Keterlibatan Hashim Djojohadikusumo", 20 Aug 2024, <https://tinyurl.com/mvw6ty34>

within the Indonesian Chamber of Commerce and Industry (Kadin) could significantly shape the trajectory of Indonesia-China energy cooperation

The Bakrie Group's initiatives in energy transition have gained additional strategic importance following the resolution of Kadin leadership contest in January 2025. After a four-month internal conflict, Anindya Bakrie was officially inaugurated as Kadin's Chairman for the 2024-2029 period, with former chairman Arsjad Rasjid taking the position of Kadin's advisory board chairman. The resolution, marked by a consolidation meeting attended by President Prabowo and his cabinet members, signaled strong political backing for the new leadership.¹⁰⁹

This political-business alignment creates a potentially powerful platform for advancing Indonesia-China energy cooperation. Under Anindya Bakrie's leadership, the Bakrie Group has expanded its role in Indonesia's energy transition through multiple strategic partnerships with Chinese companies. One of the most recent and notable collaborations is PT Bakrie & Brothers' (BNBR) agreement with Envision Energy International Ltd. to develop 200MW floating solar and wind power plants in November 2024.

Signed during the Indonesia-China Business Forum in Beijing and witnessed by President Prabowo himself, the deal underscores the continued relevance of foreign investment in shaping Indonesia's renewable energy landscape. In addition, BNBR and Envision plan to develop a 1,000-hectare green industrial park and strengthen the nickel processing supply chain to support Indonesia's growing electric vehicle battery industry.¹¹⁰¹¹

5.2.2 Electric Vehicle Players

As Indonesia's most significant partner in the electric vehicle (EV) industry, China has played a critical role in shaping the country's transition toward sustainable mobility. Even with the ongoing shift to the Prabowo administration, Chinese EV companies continue to expand their investments, demonstrating confidence in Indonesia's long-term market potential. From passenger vehicles to battery production, these companies are embedding themselves in Indonesia's EV ecosystem, reinforcing their presence despite political changes.

Among them, BYD has committed to establishing Indonesia's largest EV assembly plant, marking a long-term investment in the country's automotive future. Wuling Motors, another key player, is securing its position by localizing battery production, ensuring a stable supply chain for Indonesia's growing EV market. Meanwhile, two-wheeler producer Yadea, despite ending a major partnership with an Indonesian automobile company in

¹⁰⁹ Kompas, "Anindya Bakrie Sah Jadi Ketum Kadin 2024-2029, Konflik Kepengurusan Pun Resmi Selesai...", 17 Jan 2025, <https://tinyurl.com/3cyzvt4n>

¹¹⁰ Market, "Emiten Grup Bakrie BUMI & BNBR Pacu Kerja Sama Bisnis dengan Perusahaan China", 18 Nov 2024, <https://tinyurl.com/yp9932u3>

¹¹¹ Jakarta Globe, "Bakrie Group, China's Envision Energy to Build Floating Solar Power Plant", 11 Nov 2024, <https://tinyurl.com/9jd4a3w6>

early 2025, is pushing ahead with its planned manufacturing facility, reaffirming its faith in Indonesia's market potential. Lastly, MG Motors and its battery assembly collaboration with PT Unified Advanced Battery System Indonesia (UABS) highlight Indonesia's increasing role in the global EV supply chain.

Collectively, these investments signal that China is not just a partner in Indonesia's energy transition but a driving force shaping the nation's path toward EV adoption. As the new administration takes office, the continued influx of Chinese capital into Indonesia's EV sector underscores its strategic importance in the global shift to green energy.

a. BYD

BYD has been dominating Indonesia's EV sales in 2024 with completely built-up (CBU) EVs. Their market entry in June 2024 and strong early performance, with 2,000 units sold by September 2024, indicate that BYD is not just exploring opportunities but is actively embedding itself into Indonesia's EV ecosystem.

The company is currently developing Indonesia's largest EV assembly plant in Subang, West Java, with an investment of US\$1.3 billion. In October 2024, when the political transition was already underway, BYD announced an additional Rp 11.7 trillion investment, further solidifying its role in Indonesia's energy transition ambitions.

BYD has positioned itself as a long-term investor in Indonesia's electric vehicle (EV) sector, signalling its commitment to staying regardless of political shifts. Amid Indonesia's ongoing transition to the Prabowo administration, BYD has reinforced its investment presence, demonstrating confidence in the country's EV market. By expanding its investments under the incoming administration, BYD signals that it is here to stay.¹¹²

b. Wuling

Since its establishment in Indonesia, Wuling has invested over USD 700 million and sold approximately 130,000 vehicles, including exports to Thailand. Wuling is also the first automaker in Indonesia to produce EVs with a 40% local component level, qualifying for key government incentives. Looking ahead, Wuling plans to expand into new markets such as Australia, New Zealand, Malaysia, and South Africa, as well as develop a seven-seater EV to cater to the growing demand for larger electric vehicles.¹¹³

Wuling Motors is reinforcing its role as a long-term partner in Indonesia's energy transition through its Rp 7.5 trillion investment in an EV battery plant in Cikarang, West Java. Set to begin production by the end of 2024 or early 2025, this initiative marks a decisive step

¹¹²Tempo, "BYD akan Investasi di RI Senilai Rp 11,7 Triliun, Bakal Hadirkan Banyak Kendaraan Listrik Plug-in Hybrid", 16 Oct 2024, <https://tinyurl.com/y35h43fd>

¹¹³ Bisnis, "Menperin Dorong Wuling Tingkatkan Produksi Mobil di Indonesia" 20 Jun 2024, <https://tinyurl.com/5bd78x4r>

toward localizing Indonesia's EV supply chain. Despite the political transitions in Indonesia, Wuling remains steadfast in its commitment to expanding its footprint in the country's EV ecosystem, recognizing Indonesia's potential as a regional hub for electric mobility. Indonesia currently hosts Wuling's only EV manufacturing facility outside of China.

Wuling's Marketing Operation Director Liu Yan emphasized that the company is committed to strengthening Indonesia's EV ecosystem by producing its own battery units domestically. Their upcoming MAGIC Battery will integrate multiple components into a single lightweight and high-strength unit, increasing structural integrity by 60% without adding extra weight. This innovation not only enhances vehicle efficiency but also sets a high standard for battery reliability and performance in Indonesia's growing EV market.¹¹⁴

Beyond its battery investments, Wuling is also being actively encouraged by the Indonesian government to deepen its presence in the country. Minister of Industry Agus Gumiwang Kartasasmita has urged Wuling to scale up its production capacity in Indonesia and transform the country into a global export hub for the brand. With local EV manufacturing facility, the government sees significant untapped potential for expansion.¹¹⁵

By investing in local battery production, scaling up manufacturing capacity, and expanding exports, Wuling is not only reinforcing its presence in Indonesia but also positioning itself as a key driver of the country's energy transition. Its continued expansion, despite changes in government leadership, underscores its long-term commitment in Indonesia.

c. MG Motors

Indonesia's EV ecosystem is also seeing deeper investment in battery production. MG Motor Indonesia, in collaboration with PT Unified Advanced Battery System Indonesia (UABS), has committed Rp 110 billion to establish a battery assembly facility in Cikarang, West Java. UABS is 67 percent owned by Shanghai Automotive Industry Corporation (SAIC) - Contemporary Ampere Technology Co., Limited (CATL) (SAIC 51 percent, CATL 49 percent) and 33 percent by Indonesia's Kentjana Group. This structure ensures strong backing from one of China's largest automakers and the world's leading EV battery manufacturer, reinforcing Indonesia's role in the global supply chain.¹¹⁶

MG Motor executives see policy continuity under President Prabowo Subianto as a key factor in their investment decision, with UABS Managing Director Guo Junhua expressing

¹¹⁴ Bisnis, "Wuling Gelontorkan Rp7,5 Triliun untuk Produksi Baterai EV di Indonesia", 22 Sep 2024, <https://tinyurl.com/ees3p9ne>

¹¹⁵ Bisnis, "Menperin Dorong Wuling Tingkatkan Produksi Mobil di Indonesia" 20 Jun 2024, <https://tinyurl.com/5bd78x4r>

¹¹⁶ iNews, "Bikin Baterai Mobil Listrik di Indonesia, MG Gelontorkan Investasi Rp110 Miliar" 6 Nov 2024, <https://tinyurl.com/3nbv39a6>

confidence that the new administration will continue prioritizing renewable energy and EV battery production.¹¹⁷

d. Yadea

Yadea, a major Chinese electric two-wheeler producer, is reinforcing its long-term commitment to Indonesia's EV market, staying in the country despite ending its partnership with PT Indomobil Sukses Internasional Tbk in January 2025. The company is moving forward with its US\$150 million (Rp 2.4 trillion) investment to establish a local manufacturing facility to produce electric two-wheelers, backed by strong government support for new energy transportation policies. Yadea president Wang Jiazhong emphasized that the company sees Indonesia as a key market and is committed to localizing operations. While its planned factory in Karawang, West Java, is still in development, Yadea remains on track to begin operations by 2026. By pushing ahead with its investment under the Prabowo administration, Yadea signals that it is here to stay and its decision to persist signals confidence in the market's long-term potential.¹¹⁸

5.3 Advancing Energy Transition via Indonesia-China Bilateral and Multilateral Channels

China as an emerging global power can potentially take a greater role in climate cooperation with the developing states, including Indonesia. In this uncertain situation, Indonesia has to consider possible alternatives to attract international support in advancing energy transition. Indonesia needs to be active in strengthening international cooperation to diversify potential funding in supporting transition energy. The presence of China potentially fulfills the needs of Indonesia to build the expertise, technology transfer, and funding in the energy transition sector.

Cooperation between Indonesia and China under bilateral and multilateral frameworks has shown the improvement and progress. The following discusses bilateral and multilateral cooperation with China to advance transition energy in Indonesia.

5.3.1 Bilateral Cooperation Channels

The energy sector cooperation has become the foremost part of Indonesia and China's economic and trade cooperation since 2001.¹¹⁹ Indonesia and China have a strategic partnership to facilitate cooperation and accelerate the energy transition. This comprehensive cooperation in the energy sector is supported by commitments stated in several legal frameworks involving some ministries and coordinated under the foreign

¹¹⁷ iNews, "Bikin Baterai Mobil Listrik di Indonesia, MG Gelontorkan Investasi Rp110 Miliar" 6 Nov 2024, <https://tinyurl.com/3nbv39a6>

¹¹⁸ Kompas, "Yadea Investasi Rp 2,4 Triliun buat Bangun Pabrik di Indonesia", 15 Feb 2025, <https://tinyurl.com/3xukj7u3>

¹¹⁹ China org cn, "China and Indonesia ties", Jan. 29, 2011, <https://tinyurl.com/28uzmzhm>

policy frameworks. The strategic partnership between Indonesia and China is implemented under the spirit of cooperation, mutual respect, and mutual benefit. Gradually, Indonesia and China have held bilateral meetings with more than 200 agreements signed concerning the cooperation implementation between Indonesia and China, in which the energy transition is one of the main focuses of the investment cooperation between Indonesia and China.

China is considered among potential partners that provide foreign investment to develop renewable energy in Indonesia. The objective of cooperation has aligned with Indonesia's needs and national interests and China needs to be a global leader in the renewable energy sector. The progress of the cooperation is committed following the legal frameworks and gradual meetings between the two countries.

e. Indonesia China Energy Forum (ICEF)

In the framework of energy cooperation, the two countries agreed to form a bilateral energy forum, the Indonesia-China Energy Forum (ICEF). The establishment of ICEF was officially carried out through the signing of an MoU between the two countries in 2002. The MoU aims to carry out cooperation in the energy sector through collaboration between the governments of the two countries, state-owned enterprises, and facilitating cooperation between private companies. The two countries cooperate in the development of electricity and power plants; oil and gas activities (upstream and downstream); development of new renewable energy and energy conservation; coal development; energy trade and industry; and introduction and application of new technologies.

ICEF has been held since 2002, with the meeting initiated when President Megawati Soekarnoputri visited China. The purpose of ICEF is to establish energy cooperation between two countries and is considered a bilateral cooperation instrument in which the forum results in foreign direct investment, trade, and macro-economy. Recently, ICEF has become a biennial forum led by the Indonesian Ministry of Energy and Mineral Resources and the China National Energy Administration.¹²⁰ The 1st to 6th ICEF meetings has resulted in various agreements with the signing of various Memorandum of Understanding in advancing energy cooperation. The 7th ICEF was held on September 3, 2024 which reiterated the commitment of both countries to strengthen cooperation in the development of conventional and unconventional oil and gas, coal, electricity, and clean energy.¹²¹ In 2025, NEA China will be the host country to hold the next 8th ICEF.

f. Joint Commission for Bilateral Cooperation (JCBC)

In addition to ICEF, parts of Indonesia and China's comprehensive strategic partnership in supporting the energy sector, the Joint Commission for Bilateral Cooperation (JCBC) and

¹²⁰ Kementerian ESDM, "Press Release 485.Pers/04/SJI/2024", Sept. 3, 2024, <https://tinyurl.com/yc5nphfy>

¹²¹ Kementerian ESDM, "Press Release Number 485.Pers/04/SJI/2024", Sept. 3, 2024, <https://tinyurl.com/yc5nphfy>

High-Level Dialogue on Cooperation Mechanism (HDCM) forums are significant in the energy transition cooperation. As previously emphasized in the Joint Statement on Deepening Comprehensive Strategic Cooperation between Indonesia and China 2023, the countries strengthened their commitment to implementing the Plan of Action for Strengthening the Comprehensive Strategic Partnership between China and Indonesia (2022-2026). China shows its appreciation to the commitment of Indonesia in the efforts to achieve the NZE in 2060 by creating acceleration in the Renewable Energy Programs and will support Chinese enterprises in cooperating with Indonesian partners on investment, technology, capacity building, research, and development in respect of commercial principles. Indonesia and China constantly deepen strategic trust and advance practical cooperation in various areas, through HDCM and JCBC as the prime coordinating platform.¹²²

JCBC has become the forum to strengthen the comprehensive strategic partnership in increasing investment cooperation in the energy transition sector. The recent JCBC meeting was on 23 August 2024 (5th JCBC in Beijing). Both countries continue to strive to build mutual trust and strengthen beneficial relations based on respect for multilateralism and international law. The meeting also highlighted the cooperation in the downstream industry and green energy. The next meeting will be in the part of commemoration of 75 years of diplomatic relations between Indonesia and China and will be the forum to advance the concrete activities in discussing the energy transition project.

g. High-Level Dialogue on Cooperation Mechanism (HDCM)

The High-Level Dialogue on Cooperation Mechanism meeting (HDCM) meetings have been held under the cooperation framework in the MoU on Establishing a High-Level Dialogue and Cooperation Mechanism (HDCM) signed on June 5, 2021. Based on this MoU, the High-Level Dialogue and Cooperation forum was integrated into the High-Level Dialogue and Cooperation Mechanism (HDCM) forum, which in the past coordinated by Indonesia's Coordinating Ministry for Maritime Affairs and Investment and State Counselor China.

In the 2021 HDCM, Indonesia and China discuss various related issues of trade barriers, investment, and energy and encourage the acceleration of the implementation of cooperation on the use of local currency/local currency swap (in every trade transaction between the two countries).

The recent (4th HDCM) meeting was held on April 19, 2024. The meeting was purposed to strengthen the sustainability of comprehensive cooperation, strategic partnerships, and cooperation in all sectors. HDCM is prospected as the epicenter of the sustainability of comprehensive strategic partnerships and the framework for the Global Maritime Fulcrum

¹²² China Embassy, "Joint Statement on Deepening Comprehensive Strategic Cooperation between the People's Republic of China and the Republic of Indonesia", <https://tinyurl.com/bdfrydfc>

(GMF) cooperation by Indonesia and the Belt and Road Initiative by China, which supports Indonesia's progress in energy transition, industrialization, and mineral downstream.

h. President Prabowo's 2024 visit to Beijing

In November 2024, President Prabowo conducted a state visit to China. The Bilateral Meeting between President Prabowo and President Xi Jinping witnessed the signing of several government-to-government cooperation agreements between Indonesia and China. President Prabowo witnessed the signing of several MoUs worth US\$10.07 billion (equivalent to Rp 157.64 trillion), which shows the commitment of Indonesia and China to expand investment cooperation in various sectors in line with the government's priority programs, including renewable energy.

5.3.2 Multilateral Cooperation Channels

In addition to bilateral cooperation, multilateralism plays a crucial role in accelerating the energy transition. Multilateral collaboration is essential for addressing global climate change challenges, as no single country can achieve its climate targets alone. Effective multilateral cooperation enables nations to collectively tackle potential issues, share resources, and overcome challenges together.

In this context, several multilateral initiatives reflect the relationship between Indonesia and China. This discussion explores the multilateral partnerships in which both countries participate and their potential impact on advancing Indonesia's energy transition.

a. ASEAN and China partnership

ASEAN commits to increasing the use of renewable energy. The Association of Southeast Asian Nations (ASEAN) has set an ambitious target to achieve 25% of its energy mix from renewable sources by 2025. This goal is part of a broader strategy to reduce greenhouse gas emissions, promote sustainable development, and align with global climate agreements such as the Paris Accord. However, the fact is that the ASEAN region is still mostly dependent on the use of coal. Various issues in the region also become challenges to achieving energy transition in ASEAN countries. Then, cooperation with ASEAN countries in developing interconnected energy transition lines needs to be advanced. According to the ASEAN Energy Center, to accelerate the energy transition in the Southeast Asia region, two main aspects need to be considered: electricity infrastructure and energy security.

Indonesia is one of the Southeast Asian countries with the highest energy transition index which shows Indonesia is still committed to the agenda. Indonesia can utilize the support and cooperation of ASEAN countries to increase interconnectivity and implementation of the ASEAN Plan for Energy Cooperation (APAEC), in addition to encouraging the development of the ASEAN Power Grid.

In collaboration with ASEAN, China has various cooperation initiatives, including the promotion of mutually beneficial cooperation between the Belt and Road Initiative (BRI) and ASEAN Outlook on the Indo-Pacific (AOIP). China has hosted the 2023 ASEAN-China Clean Energy Week (CACEW) with the active ASEAN's participation. To strengthen the cooperation between ASEAN and China in the energy sector, it is important to accelerate a just energy transition, which connects to the Regional Comprehensive Economic Partnership (RCEP).

Since the 30th anniversary of China-ASEAN Dialogue Relations, energy transition has become one of the priority issues of multilateral cooperation. It highlighted the proposal to jointly promote regional energy transition, discuss the establishment of a China-ASEAN clean energy cooperation center, enhance technology sharing in renewable energy, and intensify cooperation in green finance and investment to support low-carbon development and sustainable development at the regional level.¹²³

b. Regional Comprehensive Economic Partnership (RCEP)

ASEAN establishes the Regional Comprehensive Economic Partnership (RCEP) with five ASEAN dialogue partners in Asia Pacific, including China, Japan, South Korea, Australia, and New Zealand, to maximize the role of trade agreements to reduce transaction costs. RCEP can assist in reducing the high cost of producing renewable energy.¹²⁴ The Indonesian Ministry of Trade has summarized the main benefits of RCEP, as follows:¹²⁵

- RCEP is a modern, comprehensive, high-quality and mutually beneficial economic partnership built on ASEAN's bilateral agreements with 5 Free Trade Agreement (FTA) Partners.
- On average, tariff elimination of around 92% of goods traded between RCEP parties.
- Simplified Rules of Origin to provide businesses with greater flexibility to take advantage of preferential market access benefits. Regional accumulation provisions will also allow businesses to take advantage of the region's supply chain.
- Simplified customs procedures and enhanced trade facilitation provisions will enable efficient administration of procedures and expeditious clearance of goods including expedited release of consignments and perishable goods within 6 hours of arrival.

¹²³ IESR, "Kerja Sama Transisi Energi Indonesia-Tiongkok, Dialog Tingkat Tinggi Pertama Digelar", Sept. 26, 2023, <https://tinyurl.com/e25uytc3>

¹²⁴ Republika ID, "Transisi Energi pada Keketuaan Indonesia di ASEAN", Aug. 8, 2023, <https://tinyurl.com/29tv2szb>

¹²⁵ Kemendag RI, "Regional Comprehensive Economic Partnership", 02 Januari 2023, <https://tinyurl.com/52uk6t4u>

- Enhanced commitments over the existing ASEAN Plus One FTAs in Professional Services, Research and Development, Computer and Related Services, Distribution and Logistics Services, among others.

RCEP, initiated by Indonesia's when it assumed ASEAN chairmanship in 2011, will eliminate import tariffs on goods between member countries in stages. As a general overview, around 65 percent of tariff items will be immediately eliminated (to 0%) when RCEP came into effect in 2022 for most RCEP countries that had ratified it and 2023 for Indonesia and the Philippines, 15% of tariff items within 10 years after it comes into effect, and the rest will be gradually within 10-20 years after the agreement comes into effect.¹²⁶

RCEP spans 20 chapters, with provisions across: Trade in goods, services, e-commerce and digital trade, trade facilitation, rule of origin, investment, and intellectual property. A secretariat and four subsidiary bodies will be established: a committee on goods, a committee on services and investment, a committee on sustainable growth, and a committee on the business environment.

Both ASEAN and China have agreed to pursue high-quality implementation of the RCEP, work for the early signing and implementation of China-ASEAN FTA 3.0, commit to promoting higher-level regional economic integration, and welcome the adoption of the Procedures for Accession to the RCEP Agreement by the RCEP Joint Committee on 22 September 2024.¹²⁷

c. BRICS

Indonesia officially joined BRICS on 6 January 2025. Despite criticism from a number of quarters, the Indonesian government in this case stated that the BRICS priorities are in line with the Prabowo administration's work program plans, including on energy issues. In another aspect, Indonesia sees the BRICS' roles in promoting solidarity and coordination among Global South countries, and China welcomes Indonesia joining BRICS.¹²⁸

BRICS has a commitment to the climate agenda. According to the joint statement of the BRICS Summit on Climate Change in 2022, BRICS countries have played an active role in the multilateral process on climate change and made contributions to low-carbon, climate-friendly, and sustainable global development. The BRICS High-level Meeting on Climate Change aims to jointly address climate change, explore approaches to accelerate low-carbon and climate resilient transition and achieve sustainable, balanced and inclusive recovery and development. BRICS member-states have set the nationally determined

¹²⁶ Ministry of Foreign Affairs Policy Brief, Utilization of Regional Comprehensive Economic Partnership (RCEP) to Increase Indonesia's Trade with Five Non-ASEAN RCEP Countries

¹²⁷ China Embassy, "Joint Statement on Deepening Comprehensive Strategic Cooperation between the People's Republic of China and the Republic of Indonesia", <https://tinyurl.com/bdfrydfc>

¹²⁸ Joint Statement between the People's Republic of China and the Republic of Indonesia, Nov. 9, 2024, <https://tinyurl.com/44aa3hb4>

contributions to address climate change in relevant with national circumstances and capabilities. With its commitment, BRICS could be considered one of multilateral cooperation that supports energy transition. Therefore, therefore, could utilize BRICS to collaborate in accelerating the energy transition. In addition, BRICS has a focus on hydrogen and Carbon Capture, Utilization, and Storage (CCUS) technology which is relevant to Indonesia's target of Net Zero Emissions.¹²⁹

BRICS also provides access to the New Development Bank (NDB), which was established by BRICS to finance infrastructure projects and sustainable development. This funding is a prominent alternative for Indonesia, to accelerate infrastructure development and energy transition. With a focus on green energy projects, the NDB can help Indonesia reduce its dependence on traditional financial institution funding that often comes with restrictive conditions. Indonesia can also leverage BRICS to accelerate its energy transition through green technology collaboration. BRICS' focus on hydrogen and Carbon Capture, Utilization, and Storage (CCUS) technology could be relevant to Indonesia's needs in achieving its Net Zero Emission target. By joining BRICS, Indonesia can encourage innovative financing for renewable energy, as Indonesia has always raised through the Just Energy Transition Partnership (JETP).¹³⁰

5.4 Challenges of Advancing Indonesia's Energy Transition

All options remain open for Indonesia to accelerate its energy transition. Despite reduced financial support from Western countries, particularly the United States, Indonesia can still seek assistance from China. However, the ultimate decision rests with Indonesia—whether it will leverage available international resources, including those from China, to drive its energy transition forward and whether it remains committed to pursuing this transition at all. Current indications suggest that momentum for the energy transition has slowed under the Prabowo administration.

Toward the end of President Joko “Jokowi” Widodo’s tenure, several initiatives were introduced to strengthen energy transition governance. These included the Just Energy Transition Partnership (JETP) program and the establishment of the National Energy Transition Task Force (Satgas TEN) and its implementing team, Rumah PaTEN, under the Coordinating Ministry of Maritime Affairs and Investment. This ministry played a crucial role in the previous administration as a key stakeholder in the energy transition and a primary facilitator of Chinese investment in Indonesia, especially in nickel downstream and electric vehicle (EV) manufacturing industry. However, this important coordinating ministry was dissolved, with its functions have been distributed among various ministries, including

¹²⁹ Detik, “BRICS dan Babak Baru Diplomasi Indonesia”, Jan. 31, 2025, <https://tinyurl.com/yn4ynk32>

¹³⁰ Detik, “BRICS dan Babak Baru Diplomasi Indonesia”, Jan. 31, 2025, <https://tinyurl.com/yn4ynk32>

the Ministry of Energy and Mineral Resources and the Ministry of Investment and Downstream.

Former Coordinating Minister of Maritime Affairs and Investment, Luhut Binsar Pandjaitan—widely regarded as an indispensable figure in Jokowi’s energy sector policies and the main official handling Indonesia-China bilateral relations—has now been appointed Chairman of the National Economic Council. However, this position is largely advisory and holds no real executive power. Similarly, Rachmat Kaimuddin, previously the Deputy for Transportation and Infrastructure in the now-dissolved ministry and Chairman of Satgas TEN, has been reassigned as Deputy of Basic Infrastructure Coordination in the Coordinating Ministry of Infrastructure and Regional Development, a role that has no direct authority over energy transition efforts.

Under President Prabowo Subianto’s administration, the Ministry of Energy and Mineral Resources, now led by Bahlil Lahadalia—Chairman of the Golkar Party and a close ally of Jokowi—has emerged as the primary institution overseeing Indonesia’s energy transition. Additionally, Prabowo appointed Bahlil to chair the task force on accelerating the downstream industry and energy resilience, a role traditionally held by a coordinating minister. However, Bahlil has shown little interest in energy transition. On multiple occasions, he has expressed strong support for coal, arguing that as long as Indonesia has sufficient and affordable energy—especially for those living below the poverty line—the government should not risk prioritizing energy transition over economic stability. He has consistently emphasized that Indonesia should fully capitalize on its coal resources rather than jeopardizing its energy reserves and affordability for the sake of renewable energy.

Bahlil has also reassured coal investors about Indonesia’s commitment to the industry, even as European investors explore long-term coal export agreements for the next 20 years. Additionally, the influence of coal industry players within key public institutions, including the House of Representatives, remains strong. Nearly all members of Commission VII, which oversees energy and mining affairs, have links to coal mining companies. Moreover, several high-ranking figures in Prabowo’s cabinet—including Bahlil Lahadalia, State-Owned Enterprises Minister Erick Thohir, Law Minister Supratman Andi Agtas, and Prabowo’s brother, Hashim Djojohadikusumo—are known to have longstanding ties to the coal industry. Furthermore, financial support for Prabowo’s previous presidential campaign is widely believed to have come from coal-related businesses.

These political and business dynamics are evident in ongoing debates over key policies, such as the amendment of the Coal and Mineral Mining Law and the draft Government Regulation on the National Energy Policy (KEN). These discussions reflect the broader challenges facing Indonesia’s energy sector and the complex interests shaping the country’s energy transition trajectory.

5.4.1 Amendment of Coal and Mineral Mining Law

On January 23, 2025, the House of Representatives and the government agreed to revise Law No. 3/2020 on Coal and Mineral Mining, following a late-night discussion in the Legislation Body (Baleg) on the final day of the House recess period. The amendment was deemed necessary to comply with a Constitutional Court ruling that allows entities beyond traditional businesses—such as small and medium-sized enterprises (SMEs) and faith-based mass organizations—to engage in mining activities.

Previously, in July 2024, former President Joko Widodo signed Government Regulation No. 25/2024, permitting religious-based mass organizations to own mining concessions, particularly for coal, as a means to support their operations. This regulation prompted the House to amend the mining law to provide a stronger legal foundation for non-business entities to manage mining concessions. However, rather than being handled by Commission VII—the House body responsible for energy and mining affairs—the amendment was fast-tracked through Baleg, raising concerns about procedural transparency. Notably, all eight political party factions in the House, including the quasi-opposition Indonesian Democratic Party of Struggle (PDI-P), backed the revision.

Despite its swift approval, the bill's rushed development and lack of public consultation have drawn criticism. Legal experts have also questioned its legitimacy, as it was finalized during the House recess period. Bisman Bhaktiar, head of the Center for Energy and Mining Law Studies (PUSHEP), argued that the Constitutional Court ruling did not mandate such a revision, as it found no constitutional issues with faith-based organizations obtaining mining permits. This raises doubts about the necessity of the amendment.

Additionally, the revision process has been criticized for failing to meet formal legislative standards. Bisman noted that the amendment lacked proper preparation and was not included in the National Legislation Program. He views the expansion of mining licenses to SMEs and religious organizations as a "political gimmick" intended to distribute economic benefits to specific groups in exchange for political support.

The move to broaden mining concession eligibility also reflects the government's continued reliance on coal. Energy and Mineral Resources Minister Bahlil Lahadalia has openly stated his commitment to maintaining coal as a key energy source. Furthermore, the Golkar Party has pushed to expedite the revision process, aligning with its agenda to promote downstream mining initiatives—a top priority for Bahlil's ministry.

Although the bill was ultimately passed, the PDI-P expressed reluctance during deliberations. A PDI-P member in Baleg argued that neither the House nor the government had an urgent need to rush the amendment. He insisted that lawmakers should adhere to proper legislative procedures to ensure the revision aligns with legal requirements. He also

suggested that only a select few factions in the House would significantly benefit from the changes, excluding the PDI-P.

While the Coal and Mineral Mining Law had undergone swift revision in the House, the New and Renewable Energy Bill has been idle even though it was started in 2018, and included in the National Legislation Program priority list for 2019-2024. In that period, the bill was initiated by the House Commission VII and would be carried over by the House Commission XII for the 2024-2029 period. The New and Renewable Energy Bill, which could be a more detailed legal basis for existing Energy Law, would reflect the government's seriousness in the energy transition agenda. The House has committed to include the New and Renewable Energy Bill in the 2024-2029 National Legislation Program priority list. The most sensitive part of the bill, which was understood to put the lawmakers in a deadlock, is the privatization of power wheeling to distribute the energy directly to users utilizing the network owned by the PLN.¹³¹

5.4.2 Revision of 2025-2029 National Energy Policy (KEN)

Another example of the government's inconsistency in energy transition policy is the approval of a draft Government Regulation on the National Energy Policy (KEN) by the House of Representatives' Commission XII, which includes a less ambitious decarbonization target. This draft regulation, intended to replace Government Regulation No. 79 of 2014 on National Energy Policy, was initially approved by Commission VII—the House body overseeing energy affairs—during the previous administration in September 2024.

Following President Prabowo's inauguration in October 2024, the Energy and Mineral Resources Ministry revised the draft to align with the new administration's priorities, particularly its focus on national energy resilience and achieving 8% economic growth by 2029. The updated proposal was then resubmitted for approval to House Commission XII, which now oversees energy and mineral resources. According to Energy and Mineral Resources Minister Bahlil Lahadalia, the revisions were based on studies conducted by the National Development Planning Agency (Bappenas), the National Energy Council (DEN), the Institute for Development of Economics and Finance (INDEF), and the Bandung Institute of Technology.

The studies concluded that Indonesia could achieve 8% economic growth and energy self-sufficiency if the energy sector supported industrial expansion. The revised draft regulation provides greater flexibility in implementing the energy transition while maintaining Indonesia's commitment to global decarbonization efforts. Article 7e explicitly states that the transition to net-zero emissions (NZE) by 2060 must not compromise energy security

¹³¹ Pusat Analisis Keparlemenan, "Penundaan Pengesahan RUU EBET", Sept. 2024, <https://tinyurl.com/4xvkw9x>

and self-sufficiency, effectively allowing policy adjustments if decarbonization measures are deemed to hinder Prabowo's energy self-sufficiency agenda.

The latest version of the National Energy Policy outlines a slower pace for renewable energy development, maintaining the 23% renewable energy target until 2030 and gradually increasing it to 72% by 2060. Despite this gradual shift toward renewables, coal will continue to dominate Indonesia's energy landscape for the foreseeable future. The draft policy anticipates an increase in coal-generated electricity from 39.48% in 2024 to 40.7% in 2030, followed by a gradual decline to 7.8% by 2060. Meanwhile, electricity generated from oil is expected to decrease from 29.9% in 2024 to 22.4 percent in 2030, and further down to 4.7% by 2060.

The government's continued reliance on coal highlights its reluctance to transition away from fossil fuels too quickly, citing affordability, availability, and energy security as primary concerns. To reconcile this stance with its decarbonization commitments, the government plans to adopt low-carbon technologies in coal-fired power plants to facilitate a gradual transition while minimizing economic disruption.

The House's approval of the draft National Energy Policy also signals the need for adjustments in the broader electricity policy framework, including the Ministry of Energy and Mineral Resources' 2024–2060 National Electricity Master Plan (RUKN), which was released on November 29. According to a Constitutional Court ruling, any revisions to the National Energy Policy must be reflected in the RUKN and require legislative approval. This ruling strengthens parliamentary oversight of national electricity planning, potentially affecting PLN's long-term electricity supply business plan (RUPTL) as well as future investments in renewable energy and power infrastructure.

6 Recommendation

Despite potential setbacks in the pace of Indonesia's energy transition under President Prabowo, all stakeholders can continue advocating for reforms to accelerate the transition and support the country's goal of achieving Net Zero Emissions (NZE) by 2060. Indonesia's deepening engagement with China in the renewable energy sector presents a valuable opportunity to strengthen its transition efforts while leveraging foreign investment.

Below are our recommendations for all energy transition stakeholders to advance Indonesia's energy transition by capitalizing on China's strengths in financing, its surplus renewable energy capacity, and, most importantly, its commitment to supporting Indonesia's energy transition agenda.

6.1 Aligning Energy Transition with Long-Term Electricity Targets

Recent adjustments in the National Energy Policy (KEN) draft indicate a more measured approach to the energy transition, reflecting the government's focus on energy security and gradual decarbonization. To ensure investment continuity amid shifting policies, renewable energy development should be aligned with sectors already embedded in Indonesia's long-term electricity planning. The National Electricity Master Plan (RUKN) 2024–2060, published in November 2024, serves as a key reference for Indonesia's electricity sector development, focusing on grid expansion, renewable energy integration, and energy security. This roadmap will be operationalized through the Electricity Supply Business Plan (RUPTL) 2025–2034, which will serve as the foundation for state-owned utility PLN's investment decisions in the coming decade. Aligning Indonesia-China energy cooperation with these plans is crucial to ensuring regulatory stability and long-term investment security.

As Indonesia's energy transition strategies must be adapted to the latest policy directions, investment priorities should be directed toward sectors that align with the government's officially endorsed electricity plans:

a. Prioritizing grid expansion and transmission infrastructure

RUKN 2024–2060 identifies grid modernization and inter-island transmission projects as key priorities. The planned Java-Sumatra and Kalimantan-Java interconnections will require HVDC transmission infrastructure, a technology where China has demonstrated global leadership. Chinese firms such as State Grid Corporation of China (SGCC) have already collaborated with PLN on smart grid initiatives, and further engagement should focus on:

- Strengthening transmission corridors to connect high-potential renewable energy zones with demand centers.
- Deploying smart grid technologies to optimize electricity flow and reduce losses.
- Integrating battery energy storage systems (BESS) to manage variability in renewable power generation.

b. Targeting renewable energy projects aligned with RUPTL priorities

Despite a shift in emphasis within the latest National Energy Policy (KEN) draft, the increase of renewable energy in Indonesia's primary energy mix remains a critical target in both RUKN 2024–2060 and the upcoming RUPTL 2025–2034. These strategic plans continue to outline ambitious goals for integrating renewables, making it imperative for investment to align with sectors that are already prioritized by the government.

- **Hydropower:** China, as a global leader in hydropower engineering, can play a key role in financing and developing Indonesia's large-scale hydropower projects. The Kayan Cascade Hydropower Project (9,000 MW) in North Kalimantan remains a top priority but requires substantial investment following the withdrawal of previous partners.
- **Solar Power:** Chinese investment should focus on scaling up utility-scale solar PV plants, such as the Batang Solar PV (50 MW) and Sumenep 1 & 2 Solar PV (100 MW) projects, which are already planned in RUPTL 2025–2034 but still need financing.
- **Wind Energy:** China, with over 4,300 operational or planned wind farms, has advanced wind turbine technology that can be leveraged to optimize wind projects in Indonesia. Additionally, integrating battery energy storage systems (BESS) with wind power plants can help manage intermittency issues and improve grid stability.

c. Expanding renewable energy supply chain investment

A critical aspect of Indonesia's renewable energy strategy is developing a robust local supply chain, particularly for solar photovoltaic (PV) components. The Indonesian government mandates a 40 percent domestic content requirement (TKDN) for solar panels and other key renewable energy technologies. This regulation presents both a challenge and an opportunity for Chinese investors.

Instead of focusing solely on power plant development, Chinese companies should expand their investments into the manufacturing of renewable energy components, such as:

- Solar PV manufacturing, including polysilicon, wafers, cells, and modules.
- Wind turbine production, particularly for onshore and offshore wind projects.
- Battery and energy storage manufacturing, ensuring supply chain resilience for large-scale renewable integration.

Several Chinese solar manufacturers, such as Suntech Power and SEG Solar, have already initiated investments in Indonesia's solar manufacturing sector, but further expansion is needed to meet domestic content requirements and support Indonesia's growing solar panel industry. Developing local production facilities will also help reduce reliance on imported components, making renewable projects more cost-competitive while ensuring compliance with government procurement standards.

6.2 Drawing lessons from China to reform power market

Indonesia should leverage its cooperation with China not only to attract investment but also to learn from China's evolving approach to power sector governance—particularly its experience in implementing electricity reforms that have gradually opened up the sector to competition, innovation, and large-scale renewable integration.

Before its electricity reform, China's power sector was structurally similar to Indonesia's current setup—dominated by a vertically integrated, state-owned monopoly with strict central control over generation, transmission, and distribution. However, China's reform journey—initiated through the 2002 unbundling of generation from grid operations and accelerated by the 2022 market reform—has led to a more open and dynamic system. Today, power generators in China, including private and renewable players, are able to access spot markets, enter direct power purchase agreements (PPAs), and participate in regional electricity trading schemes.

Indonesia can draw valuable insights from this transformation to reform its own power management model. Specific areas for institutional learning and technical cooperation include:

- Unbundling generation from grid operations but still controlled by the state or state-owned enterprises so that it would be in line with the 1945 Constitution.
- Enhancing grid openness through technical standards, regulatory reform, and transparent access protocols for independent power producers (IPPs);
- Improving coordination between grid operators and power generators to support integration of variable renewable energy (VRE);
- Designing and implementing power market mechanisms, such as spot markets and direct PPAs that enable competitive electricity pricing and renewable uptake;
- Modernizing dispatch and trading systems to reflect supply-demand signals and carbon intensity considerations.

China's experience shows that structural reforms—while complex—can coexist with strong state coordination and long-term planning. By studying China's hybrid governance model, Indonesia can begin shaping a more open, decentralized, and investment-friendly electricity system that strengthens private sector participation and accelerates energy transition efforts.

Bilateral platforms such as technical working groups, joint training programs, or structured knowledge exchanges with institutions like the National Energy Administration (NEA), State Grid Corporation of China (SGCC), and major Chinese power generators could serve as strategic entry points to advance this learning agenda.

6.3 Boosting Demand for Renewable Energy

Given China's need for export markets for its renewable energy technology, Indonesia must strategically position itself by fostering strong domestic demand for renewables to attract and absorb China's excess supply. The Singapore export deal serves as a key example of how Indonesia can stimulate demand in a sector that has yet to see large-scale investment. By securing guaranteed buyers, Indonesia can attract foreign investors and justify

infrastructure development that might not otherwise be financially viable under current conditions, where coal and other non-renewable energy sources still dominate.

Although the Prabowo administration has shown little interest in exporting low-carbon electricity to Singapore, Prabowo's brother, Hashim Djojohadikusumo, has proposed developing a green data center in the Riau Islands. This project would benefit from renewable energy initiatives already in progress by several companies that have received initial approval from Singaporean authorities to export clean energy to Singapore. Whether through renewable energy exports to Singapore or the establishment of a green data center in the Riau Islands, both initiatives would significantly increase demand for renewables.

The growing partnership between Chinese and Indonesian companies can further facilitate investment and ensure that local businesses play a central role in Indonesia's renewable energy expansion. Encouraging deeper collaboration between Chinese and Indonesian firms in the electricity sector will not only help distribute economic benefits domestically but also create a more sustainable and politically viable energy transition agenda. These partnerships can provide Indonesian companies with access to advanced technology, financing, and expertise while ensuring that foreign investments align with national priorities.

6.4 Boosting Domestic Adoption of EVs

Indonesia has made significant strides in promoting the adoption of electric vehicles (EVs) through a combination of fiscal and non-fiscal policies. Various financial incentives, including reductions in value-added tax (PPN), exemptions from luxury tax (PPnBM), title transfer fees (BBNKB), and annual vehicle taxes (PKB), have been instrumental in narrowing the price gap between EVs and internal combustion engine (ICE) vehicles. However, these incentives are not permanent and are granted on an annual basis. Therefore, stakeholders must continue advocating for their extension to sustain and accelerate EV adoption.

Additionally, at the beginning of 2025, the government reduced the Risk-Weighted Assets (RWA) for EV financing, enabling zero down payment credit schemes that make EV ownership more accessible. These policies have contributed to a significant surge in EV adoption over the past two years. However, despite these advancements, Indonesia still faces challenges in maintaining consumer confidence and ensuring sustained growth in EV adoption.

Battery warranty

One of the most pressing concerns among potential EV buyers is the reliability and cost of EV batteries. As the most expensive component of an electric vehicle, accounting for 40-50% of total production costs, batteries play a critical role in consumer decision-making.

Many buyers worry about battery lifespan, performance degradation, and replacement expenses, which can be prohibitively high without adequate warranty protection. While Chinese EV manufacturers such as BYD, Wuling, and MG Motors, have made strides in establishing local battery production, there is still a need for clear and comprehensive warranty policies to assure consumers. The Indonesian government should work closely with EV manufacturers to standardize and enforce extended battery warranty policies, ensuring that buyers receive long-term coverage for battery performance and degradation. This approach would significantly reduce concerns over battery-related risks and encourage broader EV adoption within the country.

EV charging stations

Beyond battery concerns, the accessibility of public charging infrastructure remains a major obstacle to expanding Indonesia's EV market. A key issue is the high minimum investment requirement imposed on foreign companies looking to develop EV charging stations. Currently, foreign investors must allocate at least Rp 10 billion per charging station, while reports indicate that actual construction costs range from only Rp 500 to 700 million per unit. This investment threshold creates an unnecessary barrier, slowing the development of critical charging infrastructure.¹³² To accelerate EV adoption, the government should reassess and lower this requirement to encourage more foreign investor participation, allowing for a rapid expansion of charging stations nationwide.

Additionally, the lack of universal charging standards further complicates the user experience. Different EV brands use varying plug types, meaning consumers must find charging stations that specifically support their vehicle model. This adds to the hassle of owning an EV, particularly when public charging stations are already limited. Standardizing charging port compatibility across brands would greatly improve accessibility and convenience, making EVs a more attractive option for potential consumers.

6.5 Partnership with China via Bilateral, Multilateral Channels

Indonesia sees the strategic partnership with China will be beneficial to advancing the energy transition agenda. China is one of the most potential partners with the resources to support Indonesia in accelerating renewable energy development and provides potential funding through various investments by government and private enterprises cooperation. Indonesia also needs to foster multilateral cooperation in the region and globally to collaborate and build regional capacity to collaboratively implement the decarbonization program.

¹³² Kompas, "Minat Bangun SPKLU, Berapa Biayanya?", 12 Oct 2022, <https://tinyurl.com/yjs2xbxx>

G-to-B agreement

Indonesia and China need to strengthen their bilateral cooperation through agreements and meetings between the two countries. Under the bilateral agreement framework, Indonesia has had a strategic partnership with China, particularly in the energy sector with the gradual ICEF, JCBC, and HDCM meetings which resulted in the prospect of strengthening in energy sectors. Indonesia needs to maintain its strategic partnership with China to advance the energy transition agenda through investment, expertise, and transfer of technology. Concerning Chinese enterprise's support, Indonesia needs to provide laws and regulations certainty and safe investment, in line with establishing agreements with the parties.

To implement Indonesia and China's strategic partnership, the G to B agreement is significant to follow up. China has the potential to support Indonesia's energy transition project. Under the BRI investment framework, Chinese corporations investing in Indonesian energy transition projects will support energy transition across Indonesia. The involvement of Indonesian corporations is also significant in building strong collaboration. Then, Indonesia could enhance technical cooperation with the investors through government and business cooperation and support local enterprises to be involved in international collaboration.

Multilateral cooperation

ASEAN and BRICS are multilateral corporations that are beneficial to Indonesia and China's cooperation in energy transition. Indonesia can take advantage of a similar vision to transition energy by actively contributing to multilateral initiatives agenda. Indonesia shall consider the benefits of economic integrations in the region under BRICS and ASEAN Plus China.

As a member of BRICS, Indonesia needs to take the potential opportunity to commit to international cooperation in the green energy target. Indonesia may take beneficial access to the New Development Bank to fund energy transition projects and cooperate to develop the technology of energy transition by transfer of technology among members. With the same vision towards energy security among global south countries, BRICS collaboration will bring support to Indonesia to develop renewable energy technology with strong cooperation of developing countries.

Within ASEAN, Indonesia should play an active role in strengthening regional energy resilience with strong cooperation through the interconnectivity of ASEAN. With ASEAN Plus China cooperation, Indonesia and China through its strategic partnership could increase economic cooperation through RCEP under this framework.

6.6 Creating a focal point for Chinese investors

Establishing a dedicated focal point for Chinese investors, similar to the former Coordinating Ministry of Maritime Affairs and Investment, could help streamline negotiations between the two sides. The Coordinating Ministry had previously played a crucial role in facilitating Chinese investments, particularly in nickel downstream processing and electric vehicle (EV) manufacturing.

The Prabowo administration should designate a specific ministry—whether the Ministry of Energy and Mineral Resources or the Ministry of Investment and Downstream—as the primary point of contact for Chinese investment in Indonesia, particularly in the energy transition sector. The current approach, in which the Ministry of Investment and Downstream manages incoming investments, has yet to fully assume the role previously held by the Coordinating Ministry of Maritime Affairs and Investment in facilitating and expediting Chinese investment.

Once a ministry is formally appointed as the focal point, it can actively promote investment opportunities to Chinese investors, particularly in sectors that align with Indonesia’s energy security and transition goals.

<p>Tenggara Strategics is a business and investment research and advisory institute established by the Centre for Strategic and International Studies (CSIS), The Jakarta Post and Prasetiya Mulya University. Combining the capabilities of the three organizations, we aim to provide the business community with the most reliable and comprehensive business intelligence related to areas that will help business leaders make strategic decisions.</p>	
 <p>PT Trisaka Wahana Tenggara The Jakarta Post Building Jl. Palmerah Barat 142-143 Jakarta 10270 +62 21 5300476/8 ext. 5001 info@tenggara.id www.tenggara.id</p>	<p>Board of Commissioners: Jusuf Wanandi, Djisman S. Simandjuntak, Endy M. Bayuni</p> <p>Board of Directors: Riyadi Suparno, Yose Rizal Damuri, Fathony Rahman</p> <p>Guarantor: Riyadi Suparno</p> <p>Inhouse Researchers & Writers: Andreas Meidyan, Arisa Febia Rahma, Bayo Adhika Putra, Dananjaya Rijaluzaman, Dwi Atmanta, Eva Novi Karina, Fara Az-Zahra Rahman, Ferdinand Phoe, Galby R. Samhudi, Intan Salsabila Firman, Irvan Iswaraputra, Kesya Adhalia, Shifa Rafida Fitri, Rayhan Kalevi Barung, Yessy Rizky</p> <p>In addition, we have access to researchers and experts at the Centre for Strategic and International Studies (CSIS), <i>The Jakarta Post</i> and Prasetiya Mulya University</p>