



WORLD BANK GROUP

THE WORLD BANK
IBRD • IDA

IFC

International
Finance Corporation

MIGA

Multilateral Investment
Guarantee Agency

Indonesia:

Country Private Sector Diagnostic



OCTOBER 2026

About the Country Private Sector Diagnostic

The private sector is an engine of long-term economic growth and a catalyst for global social and economic development. When functioning well, it promotes innovation and entrepreneurship, improves access to and the quality of economic opportunities, and supports the sustainable use of natural resources. In developing economies, the private sector creates the vast majority of jobs, generates tax revenue, and accounts for significant investment.

The Country Private Sector Diagnostic (CPSD) reports seek to unlock private investment and job creation through policy action to remove impediments to private investment. Prepared jointly by the institutions of the World Bank Group, each report analyzes specific sectors of the economy in which increased private investment could accelerate growth if appropriate policy and regulatory issues are addressed.

Designed from the perspective of an investor or entrepreneur, CPSDs seek to identify untapped private investment opportunities and the barriers that stand in their way (earlier reports can be found [here](#)). Subsectors of the economy are chosen based on their potential to attract private investment, create more and better jobs, generate domestic revenue, and foster sustainable, inclusive growth in response to targeted policy action. The report aims to help policy makers prioritize impactful actions that can be taken in the near term to remove disincentives to private investment, while delivering on broader development goals.

The CPSD is a core country diagnostic of the World Bank Group produced to guide the design and implementation of country strategies, public and private investment projects, budget support operations, advisory services, and other analytical work. It is intended to be of interest to domestic and foreign investors, government officials, Bank Group staff and management, civil society, and other development partners.

CPSDs are a central instrument of the World Bank Group's jobs agenda as articulated in the 2025 Development Committee (DC) Paper on [Jobs: The Path to Prosperity](#), which emphasizes translating private sector development into large-scale employment opportunities. CPSDs support this agenda by providing country-level, sector-specific diagnostics that help identify systemic barriers to private investment critical to job creation. They also align with the DC's three-part approach to private sector development and job creation: investing in human capital and infrastructure to establish the basic preconditions for job, supporting business-enabling policies, and mobilizing private capital at scale to help firms create more and better jobs.

Indonesia:

Country Private Sector Diagnostic



OCTOBER 2026



WORLD BANK GROUP

THE WORLD BANK
IBRD • IDA

IFC

International
Finance Corporation

MIGA

Multilateral Investment
Guarantee Agency

Contents

Acknowledgments	iii
Executive Summary	iv
1 Country Context and Business Environment	1
2 Sector Selection	18
3 Commercial and Industrial Solar PV Distributed Generation— Business Solar	22
3.1 Sector Context and Private Investment Potential	23
3.2 Constraints to Private Investment and Recommendations	29
4 Data Centers	34
4.1 Sector Context and Private Investment Potential	35
4.2 Constraints to Private Investment and Recommendations	42
5 Temperature-Controlled Logistics	49
5.1 Sector Context and Private Investment Potential	50
5.2 Constraints to Private Investment and Recommendations	54
Appendix	
A. Estimates of Potential Increases in Private Investment and Employment	62
Notes	68
Abbreviations and Acronyms	72
References	74

Acknowledgments

The Indonesia Country Private Sector Diagnostic was prepared by staff from across the World Bank Group. The team was co-led by Aufa Doarest and Ernesto Lopez-Cordova. The core team included Shihab Ansari Azhar, Serene Ho, Puguh Imanto, Jonathan Marskell, Tehmina Nawab, Issei Takahashi, Natsuko Toba, and Nadege Desiree Yameogo. Adama Badji, Inge Susilo, Rumiah Aritonang, Ariza Nurana, and Aripheorti Woerasinghtijas provided administrative support to the team. Hilary Johnson helped with efficient fact-checking and editing.

The report was conducted under the supervision of Elvira Morella, Ilias Skamnelos, and Jeff Chelsky, and under the guidance of Directors Keiko Miwa, Carolyn Turk, and Denis Medvedev. Euan Marshall provided valuable guidance throughout the preparation of the report.

Peer reviewers at different stages of preparation were, in alphabetical order, Subrata Barman, Alejandro Espinosa-Wang, Conor Healy, Lamtiurida Hutabarat, Ferdinand van Ingen, Christian Ketels, David Knight, Csilla Lakatos, Alexandre Hugo Laure, Alexandre Oliveira, Xavier Rouland, Rosant Isak Rosantsson, Bipulendu Singh, Gonzalo Varela, and Mohamed Wahish.

The team is grateful for generous guidance and feedback from many other colleagues across the World Bank Group, including, in alphabetical order, Agnesia Hasmand, Alan Johnson, Alejandro Rueda Sanz, Alike D. V. Tuwo, Alvaro Gonzalez, Amarilla Hapsari, Amerta Mardjono, Andres Garcia-Novel, Anindito Widyanarendra, Asithandile Mbelu, Asogan Moodaly, Charles Cao, Christa Hardjasaputra, Claudia Ines Vasquez Suarez, Debabrata Chattopadhyay, Edmayeni Sesamie, Elcin Akcura, Eugeniu Croitor, Giles Newmarch, Grace Tjandra, Habib Rab, Ihsani Prawira, Jackie Jiang, Jie Tang, Juliana Beall, Lucio Castro, Maria Tambunan, Muchsin Chasani Abdul Qadir, Myriam Chaudron, Nadia Kartikasari, Natassa Hutagaol, Nevi Aryani, Nicholas David Elms, Nimarjit Singh, Nupur Gupta, Olena Koltko, Petrus Handy Soelaiman, Paolo Mauro, Pooja Shrivastava, Rumiah Aritonang, Samuel Oshinuga, Sarika Salmaria, Shaun Mann, Somil Nagpal, and Vikas Choudhary. The team also wishes to thank the following experts and consultants: Daniel Davi-Arderius, Ebi Junaidi, Gracella Maureen, Luiz Maurer, and Tony Seno Hartono.

The team is also grateful to the government officials, private sector representatives, development partners, and other stakeholders who provided valuable insights that helped improve the quality of the report.

Executive Summary

Indonesia has achieved rapid economic growth and substantial poverty reduction over the past five decades, driven significantly by the private sector.

However, growth has slowed as investment in higher-productivity, higher-paying sectors has been hampered by restrictions that insulate dominant firms and state-owned enterprises from competition. Unlocking high-quality private investment through targeted policy actions that remove such restrictions will be pivotal to boosting growth and creating more jobs.

The private sector is the engine of long-term economic growth and a catalyst for social and economic development. The Indonesia Country Private Sector Diagnostic (CPSD) identifies untapped private investment opportunities and the barriers that stand in their way, and presents concrete, actionable policy recommendations.

The report identifies three sectors where concrete policy actions can generate significant and commercially viable opportunities for private investors: commercial and industrial solar photovoltaic distributed power generation, or business solar; data centers; and temperature-controlled logistics (TCL).¹ Table ES.1 offers an overview of the three sectors, the potential impact of policy actions on private investment and job creation, and the likelihood of removing the identified constraints.

Table ES.1

Summary Evaluation of Selected Sectors

	Investment opportunities assuming concrete reforms are undertaken	Development impact	Feasibility of removing constraints
Commercial and industrial solar photovoltaic distributed generation—business solar	HIGH	MEDIUM	MEDIUM
Temperature-controlled logistics	HIGH	HIGH	MEDIUM
Data centers	HIGH	HIGH	HIGH

Country Context

Indonesia's aspiration of reaching high-income status by 2045 depends on the country's ability to address market restrictions that insulate dominant firms and state-owned enterprises from competition. After regaining upper-middle-income status in 2023, economic growth stabilized at around 5 percent, below the pace required to reach high-income status by 2045. The fundamental constraint is a pattern of market inefficiencies that impede the reallocation of resources toward higher-productivity, higher-paying activities. Foreign direct investment (FDI) is concentrated in commodity-linked sectors rather than in the competitive, high-productivity industries that drive structural transformation. Creative destruction—the entry of productive firms and exit of unproductive ones—has also slowed. Such inefficiencies weaken incentives for private investors and limit the economy's capacity to generate more jobs.

Inefficient markets have discouraged private investment and slowed growth.

Low-productivity firms hold a large share of capital, labor, and market access, while firms with higher growth potential often face barriers to entry and scale. Such resource misallocation reduces aggregate productivity and steers private investment away from higher-productivity activities. Private investment as a share of gross domestic product (GDP) has declined slightly over the last decade, and FDI has shifted away from export-oriented sectors toward domestic markets and natural resources, limiting the scope for productivity gains and higher-paying jobs.

Restrictions that shield dominant firms and state-owned enterprises (SOEs) from competition discourage private investors. SOEs operate across a large share of the economy and are particularly prominent in services and network sectors—such as finance, energy, transport, and infrastructure—that provide critical inputs to private economic activity. In many cases, SOEs operate in markets that are formally open to competition but benefit from preferential access to finance, regulatory protections, and implicit guarantees. The absence of *competitive neutrality*—a level playing field in which public and private businesses compete on equal terms—crowds out private investment and allows less productive firms to persist. The establishment of the sovereign wealth fund “Danantara” reflects the government’s intent to mobilize SOE assets to support development and strategic priorities. However, without strong governance, transparency, and clear commercial discipline, state-led investment can discourage private participation in commercially viable sectors and deepen existing misallocation. Indonesia’s Organisation for Economic Co-operation and Development accession process and its recently concluded Comprehensive Economic Partnership Agreement with the European Union (EU) both include explicit commitments to improve competition policy and competitive neutrality.

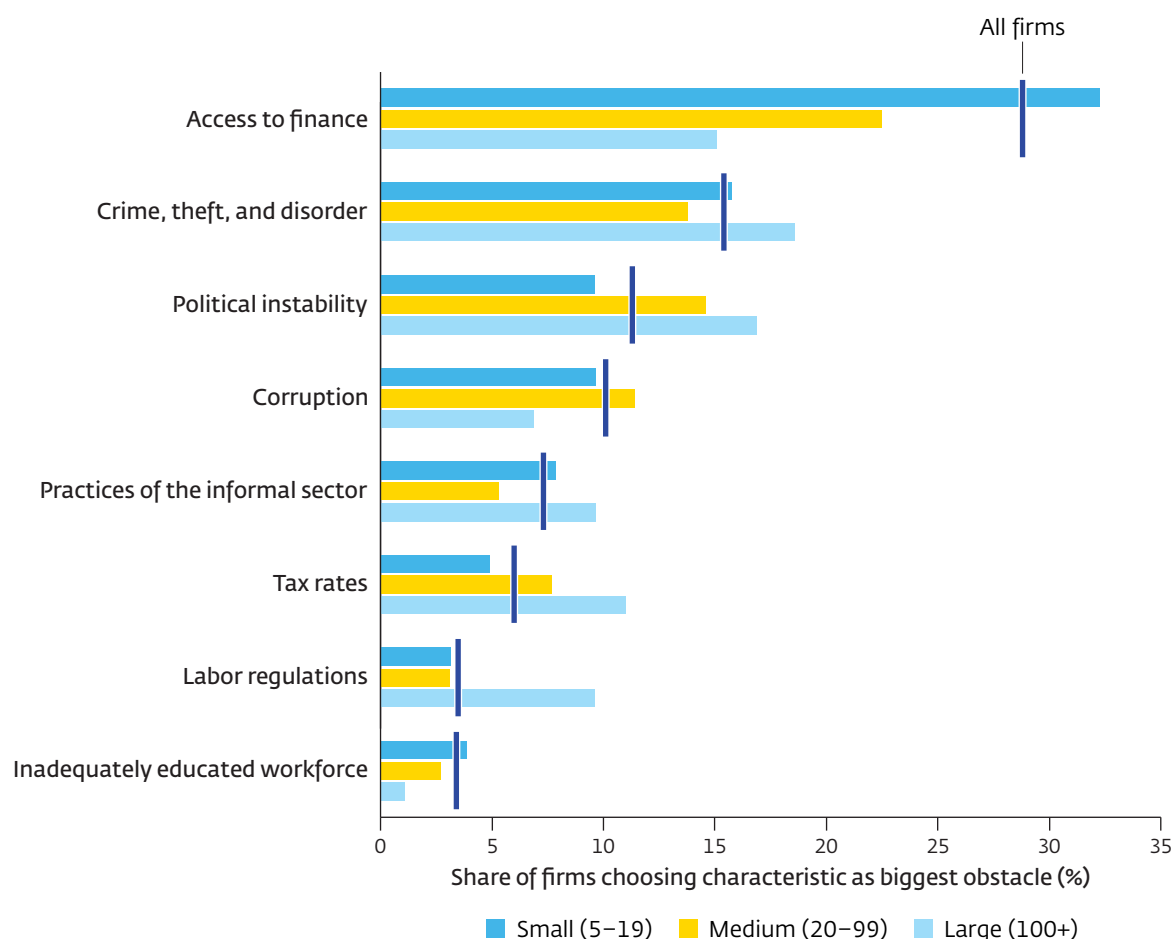
Weaknesses in the design of laws and regulations that govern key input markets, such as energy and telecoms, constrain high-quality private investment across the economy. In sectors where incumbent SOEs benefit from regulatory protections, restricted third-party access, and the absence of vertical separation, the result is higher economic costs, lower reliability, and limited opportunities for private entry. The electricity sector illustrates this challenge: the regulatory framework limits competition in generation and restricts access to and investment in transmission and distribution networks, raising costs and reducing reliability for downstream firms. Heavy reliance on coal-fired power limits access to clean energy, constraining investment in higher-value, export-oriented activities, such as advanced manufacturing, data centers, and electric vehicle value chains. As a result, Indonesia’s competitiveness in the global economy is weakened.

While Indonesia’s macroeconomic fundamentals remain broadly sound, recent turbulence in equity markets signals investor uncertainty about the direction of economic policy and the durability of the reform agenda. This uncertainty has been driven in part by concerns about fiscal management and the pace of structural reform. A protracted conflict in the Middle East could further affect investor behavior.

A weak and unpredictable business environment reinforces barriers to private investment and firm growth. Constraints to firm performance include limited access to finance, crime, political instability, corruption, and unfair competition from informal firms (figure ES.1). Small and medium enterprises (SMEs) face a financing gap driven by insufficient collateral mechanisms and limited credit information, while larger private firms are disadvantaged by state-owned banks’ preference for lending to SOEs and by thin capital

Figure ES.1

Finance, Crime, and Political Instability Are the Top Business Obstacles, Especially for SMEs, 2023



Source: Calculations based on World Bank Enterprise Surveys data.

markets. Despite recent reforms aimed at improving the business climate, including the 2020 Omnibus Law on Job Creation, regulatory complexity, policy uncertainty, and uneven implementation across levels of government continue to raise the cost of doing business. Entry and licensing processes are slow and discretionary, particularly for foreign investors and higher-risk activities. These frictions disproportionately affect new and expanding firms, limiting competitive pressure on incumbents.

Limited effectiveness of competition policy allows anticompetitive behavior to persist. Weak investigative powers, modest sanctions, and lengthy merger review processes reduce deterrence, especially in sectors with strong SOE presence. Close relationships between large incumbents and public institutions can influence market

outcomes, reinforcing rent-seeking behavior and discouraging innovation. Together, these factors sustain market structures that favor dominant firms over more dynamic entrants.

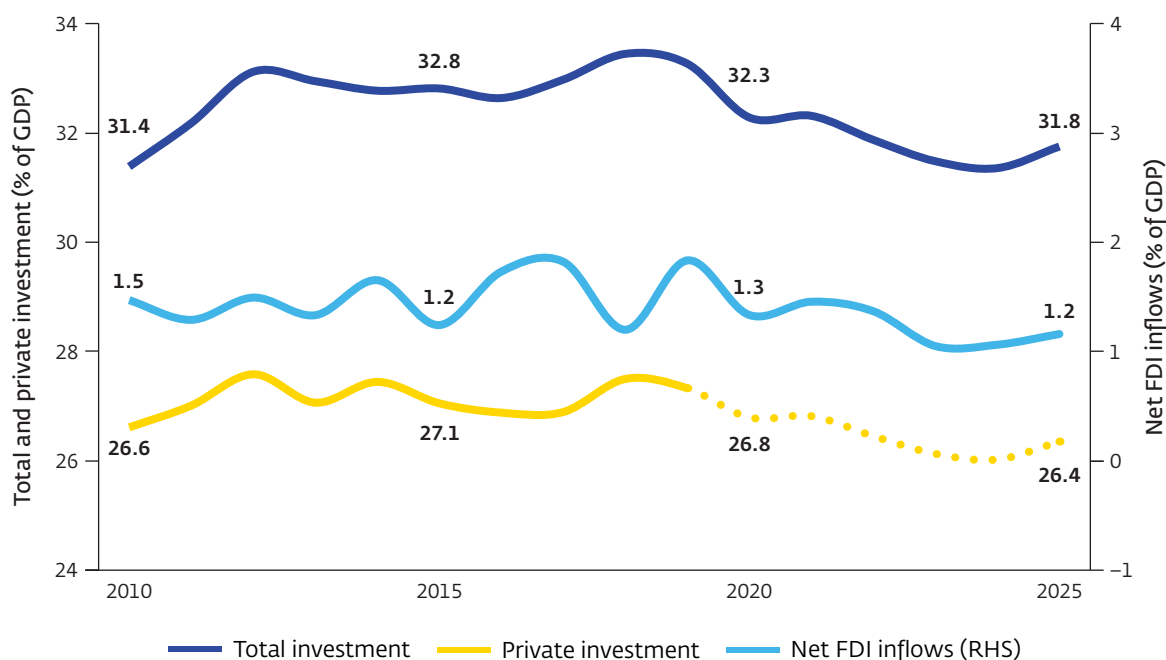
Trade, investment, and financial sector policies divert private capital from higher-productivity activities that create better jobs. Protectionist trade measures, foreign equity restrictions, and local content requirements raise production and input costs and reduce exposure to global competition. At the same time, distortions in the financial sector, which is dominated by state-owned banks and characterized by high lending margins and limited long-term finance, restrict access to capital for young and high-growth firms.

Overall gross fixed-capital formation as a share of GDP has decreased slightly over the last decade; private investment has followed a similar trend and is estimated to have reached around 26.4 percent of GDP in 2025 (figure ES.2). Net foreign direct investment inflows are estimated at 1.2 percent of GDP in 2025, essentially unchanged from 2015.

Employment growth has been concentrated in low-productivity and informal activities, while the share of middle-class jobs has declined. Informal employment is high compared with peers in the same income group.² Youth unemployment is elevated, skills

Figure ES.2

Following a Growth Spurt, Private Investment Declined over the past Decade



Source: Based on World Bank Macro-Poverty Outlook Database and data on private investment from IMF Investment and Capital Stock Database, available through 2019.

mismatches are widening, and female labor force participation is low, signaling missed opportunities to translate investment into inclusive growth.

Attracting high-quality private investment is pivotal to restoring growth and creating better jobs. Indonesia's constraints to attracting private investment stem from market inefficiencies that shield less productive firms and SOEs from competition, distorting incentives for private investment. Despite these hurdles, existing private investors have strong interest in deepening their presence in Indonesia, according to a survey of multinational corporations conducted for this report. Among multinational corporations not currently investing in Indonesia, addressing identified obstacles could encourage market entry by 55 percent of those surveyed.

The selection of three sectors for this CPSD follows a rigorous, systematic process that includes analysis of quantitative and qualitative indicators and stakeholder consultations, including interviews with private investors, companies, technical experts, policy makers, and development partners. Sectors were selected based on their potential to attract significant private investment over the medium term if well-identified constraints can feasibly be addressed by the public sector in the near term. Based on the CPSD impact estimation methodology, implementing the recommended policy actions (see the section “Summary of Recommendations” later in this executive summary) could help enable as much as US\$15 billion in private investment and create as many as 300,000 jobs over the medium term.

Commercial and Industrial Solar Photovoltaic Distributed Generation—Business Solar

Indonesia is in the early stages of a transition to a cleaner energy mix. The power sector is still anchored in coal subsidies, artificially low electricity tariffs, and a centralized, state-owned power system. The policy and regulatory framework constrains the nationwide expansion of commercial and industrial (C&I) solar photovoltaic (PV) distributed generation, referred to as *business solar* in this report, reducing its attractiveness to private investors.

Despite this generally unfavorable environment, a market niche for business solar has emerged. This niche includes export-oriented firms seeking to reduce their carbon footprint to comply with international market requirements, notably in the EU.

This segment is small but is driven by sustainability mandates and constrained by regulatory barriers. Installed capacity expanded rapidly over the 2018–25 period as firms

sought lower electricity costs, more reliable power, and compliance with initiatives such as the EU Carbon Border Adjustment Mechanism. Equity investors and banks view business solar as an opportunity to meet sustainability mandates and to deploy dedicated financing programs.³ For many C&I companies, business solar is commercially viable because the cost of solar PV electricity can be lower than public grid tariffs (figure ES.3), making private investment bankable. Yet despite 1.4 gigawatts (GW) of business solar capacity committed in 2022 and 2.4 GW announced in 2024, only 7 percent of planned capacity was realized in each subsequent year in both cases due to regulatory barriers linked to the state-owned utility Perusahaan Listrik Negara (PLN).

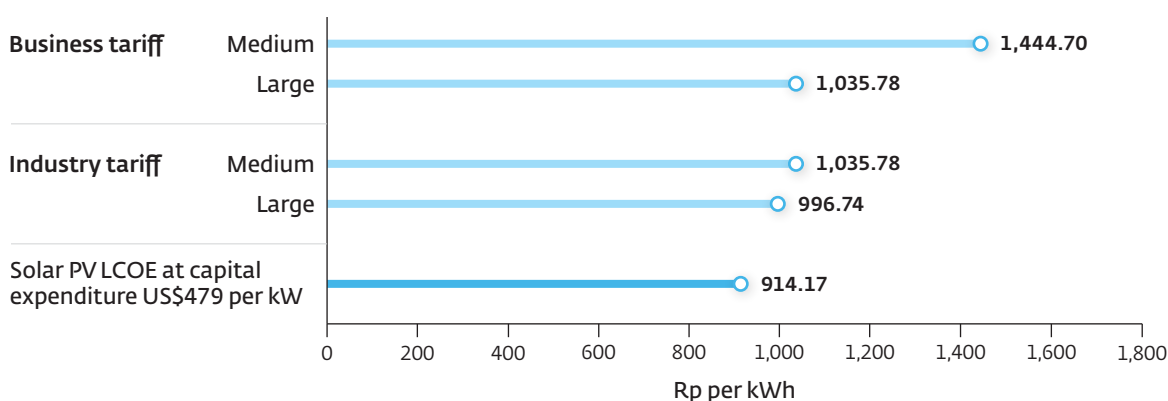
While comprehensive reform of the laws and regulations governing Indonesia's electricity market is beyond the scope of this report, the business solar recommendations presented here can serve as near-term steps on a longer-term reform pathway.

Near-term policy actions to remove constraints on private investment in business solar include (1) publishing the distributed energy resources hosting capacity assessment; (2) introducing a “first-ready, first-served” approach to rooftop solar PV quota allocation; (3) revising the rooftop solar PV project timelines using evidence-based methods; (4) regulating all forms of business solar; and (5) updating the distribution code to enable greater integration of distributed energy sources. Addressing the identified constraints could unlock significant private investment, support the transition to a cleaner energy mix, and strengthen the broader business environment for investors. Under scenarios in which the

Figure ES.3

Rooftop Solar PV Costs Less Than PLN Electricity Tariffs for C&I Customers

Average cost of electricity, real 2025 prices



Source: World Bank Group estimates.

Note: C&I = commercial and industrial; kWh = kilowatt-hour; LCOE = levelized cost of electricity; PLN = Perusahaan Listrik Negara; PV = photovoltaic; Rp = Indonesian rupiah. The average cost reflects the LCOE of solar PV. PLN charges shown reflect the energy component of tariffs.

cost of business solar electricity remains below the applicable grid tariff, the recommended reforms could help mobilize US\$610 million–US\$780 million in private investment and generate 73,000–94,400 direct, indirect, and induced jobs over the medium term.

Data Centers

Data centers have considerable potential to attract private investment, driven by the rapid expansion of Indonesia’s digital economy and growing demand for secure digital infrastructure to support e-commerce, cloud services, artificial intelligence and other data-intensive applications, and digital payments.

Investor interest in data centers is fueled by Indonesia’s more than 180 million internet users—around 73 percent of the population ages five and older—and the growing uptake of e-commerce, social media, and digital payments. Proximity to Singapore and other regional markets is an additional driver.

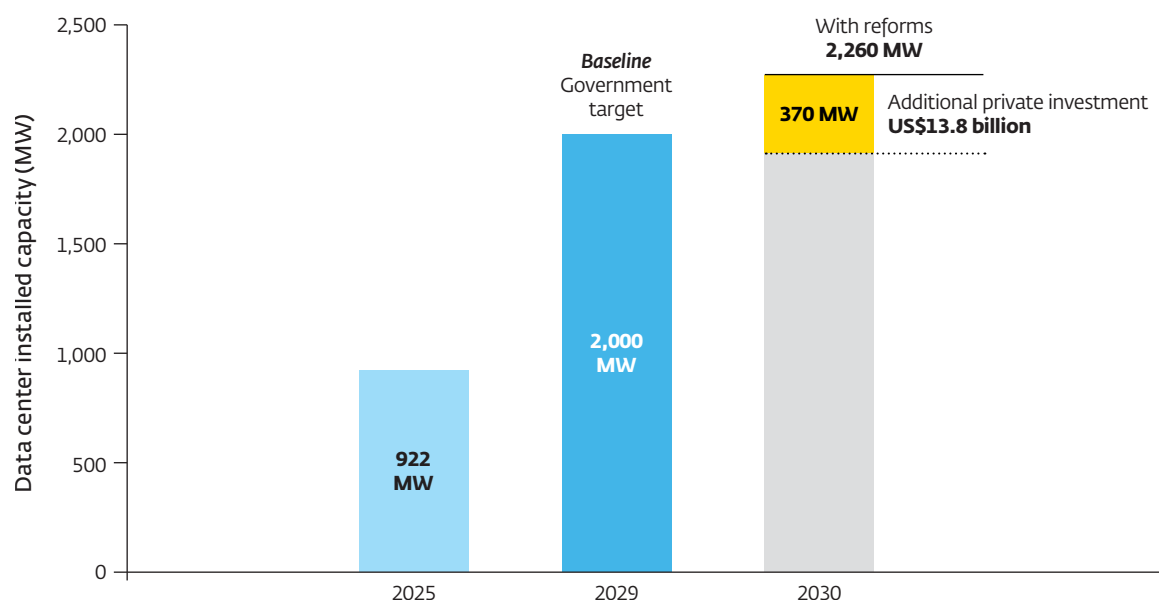
Regulatory complexity, permitting delays, and uneven digital adoption among micro, small, and medium enterprises and public sector agencies discourage private investment. Despite strong demand drivers, achieving the government’s target of 2,000 megawatts of installed capacity by 2029 will require addressing several challenges. Indonesia’s market remains focused primarily on domestic demand, while regional peers such as Malaysia, Singapore, and Thailand are capturing a growing share of hyperscale and cross-border private investment. To meet surging demand and compete regionally, Indonesia must accelerate the conversion of its private investment pipeline into operational capacity, particularly because data center construction is complex and speed to market is critical.

Removing barriers to private investment could position Indonesia as a competitive regional hub for data center development. Concrete actions include establishing expedited permitting approval processes; facilitating imports of data center equipment; officially recognizing green data center standards; issuing implementing regulations on personal data protection and clearer rules to enable cross-border data flows; adopting a risk-based approach to the use of cloud services by government agencies; and improving access to international submarine cables. Targeted policy reforms could attract as much as US\$13.8 billion in additional private investment relative to the no-reform baseline to install 370 megawatts of additional data center capacity (figure ES.4), and create as many as 143,000 direct and indirect jobs in the medium term.

Figure ES.4

Data Center Reforms Could Catalyze Sizable Private Investment

Data center installed capacity



Source: World Bank Group estimates.

Note: The reform scenario considers allowing the public sector to use commercial cloud platforms, removing barriers to critical equipment imports, and reducing permitting complexity.

Temperature-Controlled Logistics

The TCL market is expanding rapidly and offers substantial potential for private investment, driven by rising demand, urbanization, e-commerce growth, and increasing consumption of temperature-sensitive goods. However, shortages of TCL services and infrastructure persist and vary widely by region, including limited national warehousing capacity, insufficient TCL trucks, and inadequate availability of reefer containers and reefer plugs. Private investors are further deterred by unreliable electricity supply, weak interisland transport and logistics infrastructure, complex and fragmented regulations, high minimum investment requirements for foreign firms, and high tariffs and nontariff measures on imported cold chain equipment. Skills shortages, restrictions on foreign workers, and the absence of a national coordinating agency further constrain private investment.

Policy and operational reforms to unlock private investment include establishing a digital marketplace platform to reduce regional logistics imbalances, expanding reefer plug capacity, streamlining and integrating business regulations, lowering minimum capital requirements for foreign investors, enabling firms to hire specialized professionals, including foreign workers, and removing nontariff restrictions on imports of critical TCL equipment.

Targeted actions could mobilize considerable private investment in TCL services, potentially increasing investment by US\$244 million–US\$489 million over the medium term, creating 17,500–70,000 direct and indirect jobs.

Summary of Recommendations

Commercial and Industrial Solar Photovoltaic Distributed Generation—Business Solar

Rationale: Addressing existing constraints could unlock significant private investment, support Indonesia's transition to clean energy, and strengthen the overall business environment for private investors.

Table ES.2

Priority Policy Actions to Remove Impediments to Private Investment in Business Solar

Constraint	Recommended actions
1. PLN's rooftop solar PV quota allocation process lacks transparency and is subject to unexpected changes, creating uncertainty for investors and developers.	1. Amend Ministry of Energy and Mineral Resources (MEMR) Regulation No. 2/2024 to require MEMR and PLN to publish distributed energy resources hosting capacity assessments approved by PLN. <i>Responsible government entity:</i> Lead—MEMR
2. The “first-come, first-served” allocation of rooftop solar PV quotas favors speculative or unprepared applicants over projects that are ready to proceed.	2. Amend MEMR Regulation No. 2/2024 to replace the “first-come, first-served” approach to quota allocation with a “first-ready, first-served” approach. <i>Responsible government entity:</i> Lead—MEMR
3. Under MEMR Regulation No. 2/2024, short deadlines to obtain operational feasibility certificates (SLO) or registration numbers have led to a significant number of revoked rooftop solar PV quota allocations, complicating investment and business planning for solar PV project developers and C&I firms.	3. Revise the deadlines under MEMR regulation 2/2024 for rooftop solar PV projects to obtain an SLO or registration number, based on realistic project timelines that reflect system size and technical specifications. <i>Responsible government entity:</i> Lead—MEMR
4. Private investment in business solar is restricted to rooftop installations.	4. Revise MEMR Regulation No. 2/2024 to permit behind-the-meter business solar PV generation across all forms of distributed solar PV generations. <i>Responsible government entity:</i> Lead—MEMR
5. The Distribution Code under MEMR Regulation No. 4/2009 lacks the technical specifications needed to support business solar integration, limiting private investment opportunities.	5. Revise the Distribution Code under MEMR Regulation No. 4/2009 to support the integration of distributed energy resources, including solar PV, while strengthening cybersecurity and data privacy. <i>Responsible government entity:</i> Lead—MEMR

Note: C&I = commercial and industrial; MEMR = Ministry of Energy and Mineral Resources; PLN = Perusahaan Listrik Negara; PV = photovoltaic; SLO = sertifikat laik operasi (operational feasibility certificates).

Data Centers

Rationale: Fueled by the rapid expansion of the country's digital economy and growing demand for secure infrastructure to support e-commerce, cloud services, artificial intelligence applications, and digital payments, this sector has considerable potential to attract private investment.

Table ES.3

Priority Policy Actions to Remove Impediments to Private Investment in Data Centers

Constraint	Recommended actions
1. Complex and time-consuming permitting processes, resulting from inadequate business classification of data centers, increase costs and reduce predictability for investors.	1. Integrate all data center permitting and approval processes under the new risk-based licensing framework, Government Regulation No. 28/2025, by mapping, simplifying, and sequencing all relevant permits into a unified process within the OSS system. <i>Responsible government entities:</i> Lead—Komdigi, Ministry of Investment/BKPM, and Central Statistics Agency (BPS); others—CMEA
2. Nontariff measures and local content requirements, especially for specialized and proprietary equipment, increase operating costs.	2. Issue a government regulation on data centers, coordinated by CMEA, to (i) establish a fast-track mechanism for importing specialized data center equipment through simplified import and customs procedures; (ii) remove TKDN requirements for specialized data center equipment not available domestically; and (iii) accelerate Masterlist approvals and customs clearance. <i>Responsible government entities:</i> Lead—CMEA; supporting—Ministry of Finance (Kemenkeu), Ministry of Industry/Kemenperin (TKDN), BKPM (facilitation), and Komdigi.
3. The absence of green standards discourages sustainable data center investment.	3. Officially recognize industry-led green data center standards aligned with international benchmarks, such as ISO/IEC 30134, including power usage effectiveness and water usage effectiveness; ISO 50001; ISO 14001; LEED; and the Uptime Institute's sustainability rating. <i>Responsible government entities:</i> Lead—MEMR and Komdigi; others—PLN, Ministry of Environment and Forestry/KLHK (standards/environment), Ministry of Investment/BKPM (permits) and IDPRO (green DC standards).

(Table continues next page)

Table ES.3

Priority Policy Actions to Remove Impediments to Private Investment in Data Centers *(continued)*

Constraint	Recommended actions
4. Overlapping and incomplete data localization rules and the absence of a clear cross-border data transfer framework create legal uncertainty and raise compliance costs.	4. Issue implementing regulations for Personal Data Protection Law No. 27/2022 to establish an independent data protection authority and adopt a risk-based framework to enable cross-border data flows, including the use of standard contractual clauses and binding corporate rules. <i>Responsible government entities:</i> Lead—Komdigi; others—Ministry of Investment /BKPM, Coordinating Ministry for Economic Affairs (CMEA), Ministry of Law and Human Rights, and future data protection authority.
5. Restrictions on the use of commercial cloud and colocation services limit the public sector's ability to pool data infrastructure needs into predictable demand that can anchor private investment in data centers.	5. Issue a presidential regulation to operationalize a risk-based cloud policy that enables government agencies to store and process nonsensitive and limited-classification data on certified commercial cloud platforms. <i>Responsible government entities:</i> Lead—Komdigi; others—Coordinating Ministry for Economic Affairs (CMEA), and Ministry of Law.
6. Excluding Greater Jakarta from new international submarine cable landings raises connectivity costs, weakens network resilience, and constrains the scalability of data center investment.	6. Amend Kepmen KP No. 14/2021 to expand designated submarine cable landing sites to include Jakarta and Surabaya. <i>Responsible government entities:</i> Lead—Ministry of Marine Affairs and Fisheries (KKP) and Ministry of Transportation (Kemenhub); others—Komdigi and CMEA
7. Restrictions on the use of foreign-flagged vessels for submarine cable installation and repair increase downtime risk and deter data center investment.	7. Grant exemptions under the cabotage provision in Shipping Law No. 17/2008 to allow foreign-flagged vessels to undertake submarine cable repair and maintenance. <i>Responsible government entities:</i> Lead—Ministry of Marine Affairs and Fisheries (KKP) and Ministry of Transportation (Kemenhub); others—Komdigi and CMEA

Note: BKPM = Ministry of Investment/Investment Coordinating Board; BPS = Central Statistics Agency; CMEA = Coordinating Ministry for Economic Affairs; IDPRO = Indonesia Data Center Provider Organization; ISO = International Organization for Standardization; Komdigi = Ministry of Communication and Digital Affairs; KP = Marine Affairs and Fisheries; LEED = Leadership in Energy and Environmental Design; OSS = online single submission; PLN = Perusahaan Listrik Negara; TKDN = tingkat komponen dalam negeri (local content requirement).

Temperature-Controlled Logistics

Rationale: Supported by rising demand from a large population, urbanization, e-commerce growth, and increasing consumption of temperature-sensitive goods, this market is growing quickly and offers substantial private investment potential.

Table ES.4

Priority Policy Actions to Remove Impediments to Private Investment in TCL

Constraints	Recommended actions
1. Reefer container imbalances between the western and eastern parts of Indonesia, for both outbound and return shipments, raise logistics costs in eastern Indonesia relative to other areas.	1. Create a digital marketplace platform under a national logistics agency as a designated national aggregator to enable “buy-and-bid” mechanisms. <i>Responsible government entities:</i> Ministry of National Development Planning, Ministry of Marine Affairs and Fisheries, Ministry of Transportation, Directorate General of Customs and Excise.
2. Access to reefer container plugs is inadequate in container ports.	2. Update the National Logistics Dashboard, including INSW and Inaportnet, to provide real-time data on reefer container plug capacity, availability, and occupancy. <i>Responsible government entities:</i> Ministry of Transportation, Coordinating Ministry of Infrastructure and Regional Development, National Single Window Agency (LNSW) of Ministry of Finance.
3. Single-purpose regulation prevents freight forwarding companies from expanding into related logistics business lines.	3. Establish an “integrated logistics” category within the online single submission system, encompassing storage, transportation, freight forwarding, and handling under a single business activity classification (KBLI). <i>Responsible government entities:</i> Coordinating Ministry for Economic Affairs, Ministry of Investment and Downstream Industry (BKPM), Ministry of National Development Planning.
4. High minimum investment requirements for foreign direct investment are a costly entry barrier for foreign firms seeking to operate integrated logistics operations.	4. Amend Presidential Decree No. 49/2021 and BKPM Regulation No. 5/2025 to streamline the minimum capital requirement for foreign investment in the TCL sector by adopting a “single-sector” approach. <i>Responsible government entities:</i> Coordinating Ministry for Economic Affairs, Ministry of Investment (BKPM), Ministry of National Development Planning.

(Table continues next page)

Table ES.4

Priority Policy Actions to Remove Impediments to Private Investment in TCL (*continued*)

Constraints	Recommended actions
5. Indonesia faces a shortage of professionals with the skills required to operate modern TCL technologies.	5. Amend Government Regulation No. 34/2021 to extend the duration of work permits by five years for specialized foreign professionals in the TCL sector, in line with international practices. <i>Responsible government entities:</i> Ministry of Manpower, Ministry of Law and Human Rights, Ministry of Transportation.
6. Indonesia imposes restrictive nontariff measures on imports of critical TCL equipment, such as advanced refrigerating appliances and automated cold storage machinery.	6a. Amend Ministry of Trade and Ministry of Industry import policies to establish a specialized “green lane” or Masterlist exemption for advanced TCL equipment and essential cold chain components. 6b. Expand mutual recognition agreements through the National Standardization Agency (BSN) to allow international safety and energy testing standards, such as IEC certificates for commercial refrigeration, to be accepted in lieu of redundant SNI domestic laboratory testing. <i>Responsible government entities:</i> Ministry of Trade and Ministry of Industry.

Note: BKPM = Badan Koordinasi Penanaman Modal (Ministry of Investment); BSN = Badan Standardisasi Nasional; IEC = International Electrotechnical Committee; INSW = Indonesia National Single Window; LNSW = Lembaga Nasional Single Window; KBLI = Klasifikasi Baku Lapangan Usaha Indonesia; SNI = Standar Nasional Indonesia (Indonesia National Standard); TCL = temperature-controlled logistics.

A high-angle, long-exposure photograph of a multi-lane highway in a city. The highway is filled with cars, creating a sense of motion blur. In the background, several tall, modern skyscrapers with glass facades rise against a hazy sky. The overall scene depicts a bustling urban environment.

1

Country Context and Business Environment

Private investment has been a significant driver of Indonesia's social and economic progress, but reforms are essential for it to realize its full potential.

Over the past five decades, the country has achieved rapid economic growth and substantial poverty reduction, regaining upper-middle-income country (UMIC) status in 2023. Nevertheless, Indonesia's aspiration to reach high-income status by 2045 requires the economy to grow by at least 6 percent annually. Growth has slowed, and its quality remains a concern: while aggregate investment levels are relatively high, foreign direct investment (FDI) is stagnant and concentrated in commodity-linked sectors rather than in the competitive, high-productivity industries that drive structural transformation. Reallocation of resources to higher-productivity industries is hampered by market restrictions that insulate dominant firms and state-owned enterprises (SOEs) from competition. Attracting more and higher-quality private investment through targeted policy actions that remove such distortions will be pivotal to boosting growth and creating better jobs.⁴

1.1 Inefficient Markets Have Slowed Growth

Indonesia faces the challenge of allocating resources more efficiently across firms and industries.⁵ Overall economic growth slowed from an average of 5.4 percent in the decade before 2020 to around 5 percent since 2023 (table 1.1). Market dynamism has declined as the rate of creative destruction—the entry of productive firms and exit of unproductive ones—has slowed. Less productive Indonesian firms account for a significant share of inputs and markets, while barriers to competition restrict the movement of resources toward businesses, both domestic and foreign, with higher growth potential, according to the Indonesia Growth and Jobs Report.⁶

Performance in manufacturing and services is particularly affected by constraints on the efficient allocation of resources. The weighted average of manufacturing productivity has declined since the early and mid-1990s.⁷ Services have consistently contributed

Table 1.1

Economic Indicators for Indonesia

	2010–19 average	2020	2021	2022	2023	2024	2025	2026f
Population (millions)	256.5	273.5	276.4	279.1	282.1	285.1	288.0	290.9
GDP (US\$ billion)	933.9	1,059.1	1,186.5	1,319.1	1,371.2	1,396.3	1,445.6	1,503.1
Real GDP growth (%)	5.4	2.1	3.7	5.3	5.0	5.0	5.1	4.7
PPP GDP per capita (constant 2021 international US\$)	10,746	12,389	12,757	13,334	13,890	14,470	—	—
Investment (% of GDP)	32.8	32.3	32.3	31.9	31.5	31.4	31.3	31.3
Inflation, period average (%)	4.7	2.0	1.6	4.1	3.7	2.3	1.9	3.4
Fiscal balance (% of GDP)	–2.0	–6.1	–4.6	–2.4	–1.6	–2.3	–2.9	–2.8
Public debt (% of GDP)	26.5	39.4	40.7	39.7	39.2	39.8	40.5	40.6
Current account balance (% GDP)	–1.9	–0.4	0.3	1.0	–0.1	–0.6	–0.1	–0.6
Gross reserves (US\$, billions)	113.3	135.9	144.9	137.2	146.4	153.6	145.8	159.4
Total reserves in months of imports	7.3	10.2	8.0	6.0	6.7	6.6	6.0	6.3
FDI, net inflows (% of GDP)	1.5	1.3	1.5	1.4	1.1	1.1	1.0	1.0

Sources: Based on World Bank Group (2026b); World Development Indicators; and IMF World Economic Outlook.

Note: f = forecast; FDI = foreign direct investment; GDP = gross domestic product.

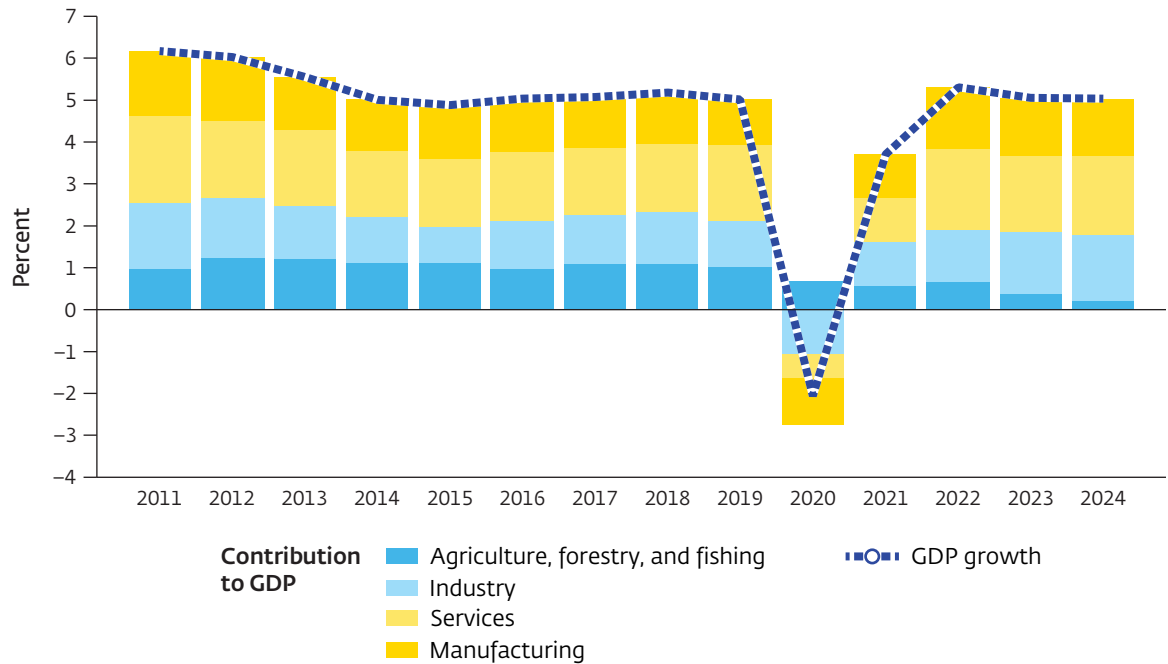
significantly to gross domestic product (GDP) growth (figure 1.1), but more than half of Indonesia's services sector is characterized by low-value-added activities, affecting the competitiveness of manufacturing and tradable industries. Established industries also face challenges in competitiveness and innovation, whereas the digital sector continues to develop through technology adoption and capital investment.

Recent financial market developments underscore the urgency of structural reform.

In early 2026, Indonesia's equity markets experienced significant turbulence, with the Jakarta Composite Index declining sharply. A major index provider paused index changes for Indonesian stocks, and two rating agencies revised their outlook on Indonesia's sovereign rating to negative, citing concerns about the medium-term policy mix and the fiscal framework.⁸ A protracted conflict in the Middle East could further affect investor behavior.⁹ While Indonesia's macroeconomic fundamentals remain broadly sound, these market signals reinforce the importance of maintaining policy credibility and advancing sustained

Figure 1.1

Services Drive GDP Growth but Remain Concentrated in Low-Value Activities to Serve the Domestic Market



Source: Calculations based on data from World Bank World Development Indicators database.

Note: GDP = gross domestic product.

structural reforms in competition policy, the investment climate, fiscal governance, and other areas to restore confidence and attract the quality private investment the economy requires.

1.2

Market Efficiency Is Hampered by Institutional Weaknesses and a Large State Footprint

The allocation of resources to less productive activities and low-paying jobs is driven by market inefficiencies that reflect a weak enabling environment. These inefficiencies stem from institutional barriers to competition and the dominant role of SOEs in Indonesia's economy. Business-enabling policies—such as competition-friendly regulations and enforcement, less restrictive and discretionary regulatory frameworks, predictable policies, and freer trade and investment regimes—would boost productivity and attract investment into high-value sectors and new technologies.¹⁰

SOEs are a significant part of the Indonesian economy, with around 1,324 active SOEs operating across 40 percent of all industries. These enterprises have a substantial economic footprint, with revenue equivalent to 44 percent of Indonesia's GDP, and employ 2.6 percent of the formal workforce. The central government owns about 80 percent of domestically oriented SOEs, while subnational authorities own the remaining 20 percent.¹¹

The central concern regarding SOEs is not state ownership per se, but the conditions under which SOEs operate. These conditions can undermine competitive neutrality—the principle that SOEs should not have a competitive advantage over private sector competitors simply because of their public ownership. When SOEs receive preferential access to finance, regulatory protections, or exclusive market positions, they can crowd out private investment and reduce economy-wide productivity. Indonesia's Organisation for Economic Co-operation and Development accession process and its recently concluded comprehensive economic partnership agreement (CEPA) with the European Union (EU) include explicit commitments to improve competition policy and competitive neutrality. Leveraging these external anchors could provide a constructive basis for reform.

State involvement is particularly pronounced in the services sector, where more than half of SOEs operate. Three-quarters of Indonesia's SOEs operate in competitive sectors, including many in enabling and global innovator services that are struggling to expand. For example, more than 250 SOEs are active in the financial industry, controlling 32 percent of total financial sector assets. Four state-owned banks account for most of the country's five largest banks and 46 percent of all lending.¹² SOE presence in key network sectors affects the efficiency of markets for critical inputs in downstream industries. In competitive markets, state-owned businesses can distort markets and weigh on productivity when they receive preferential treatment or are shielded from competition, thereby crowding out private investment in more productive firms.

The creation of Danantara, Indonesia's sovereign wealth fund (SWF), was intended to leverage SOE assets to foster Indonesia's development, but it also risks crowding out private investment.¹³ Established in February 2025, Danantara manages US\$900 billion in assets from 1,044 SOEs and will invest dividends in strategic sectors, including minerals, petrochemicals, oil refineries, food security, and renewable energy. While the new SWF could play a transformative role, it carries fiscal and monetary risks and could undermine private investment incentives in commercially viable sectors.¹⁴ Mitigating these risks would require Danantara to follow international good-practice guidelines for SWFs, including clear objectives, effective governance, and transparent rules.

Despite recent reforms, Indonesia faces enduring structural and institutional challenges that affect its business environment. According to the World Bank's Business Ready (B-READY) 2024 report,¹⁵ Indonesia achieved an overall score of 64 out of 100, with the lowest ratings in market competition, at 52; financial services, at 57; and business insolvency, at 57. Regulatory complexity and uncertainty pose significant challenges for investors. While the Job Creation Omnibus Law attempted to streamline processes and simplify permitting, the regulatory landscape remains fragmented and unpredictable across government levels, increasing operational costs and hindering effective business planning.¹⁶ This is exacerbated by policy incoherence, which occurs when liberalizing reforms conflict with protectionist policies, such as Indonesia's import substitution strategy.

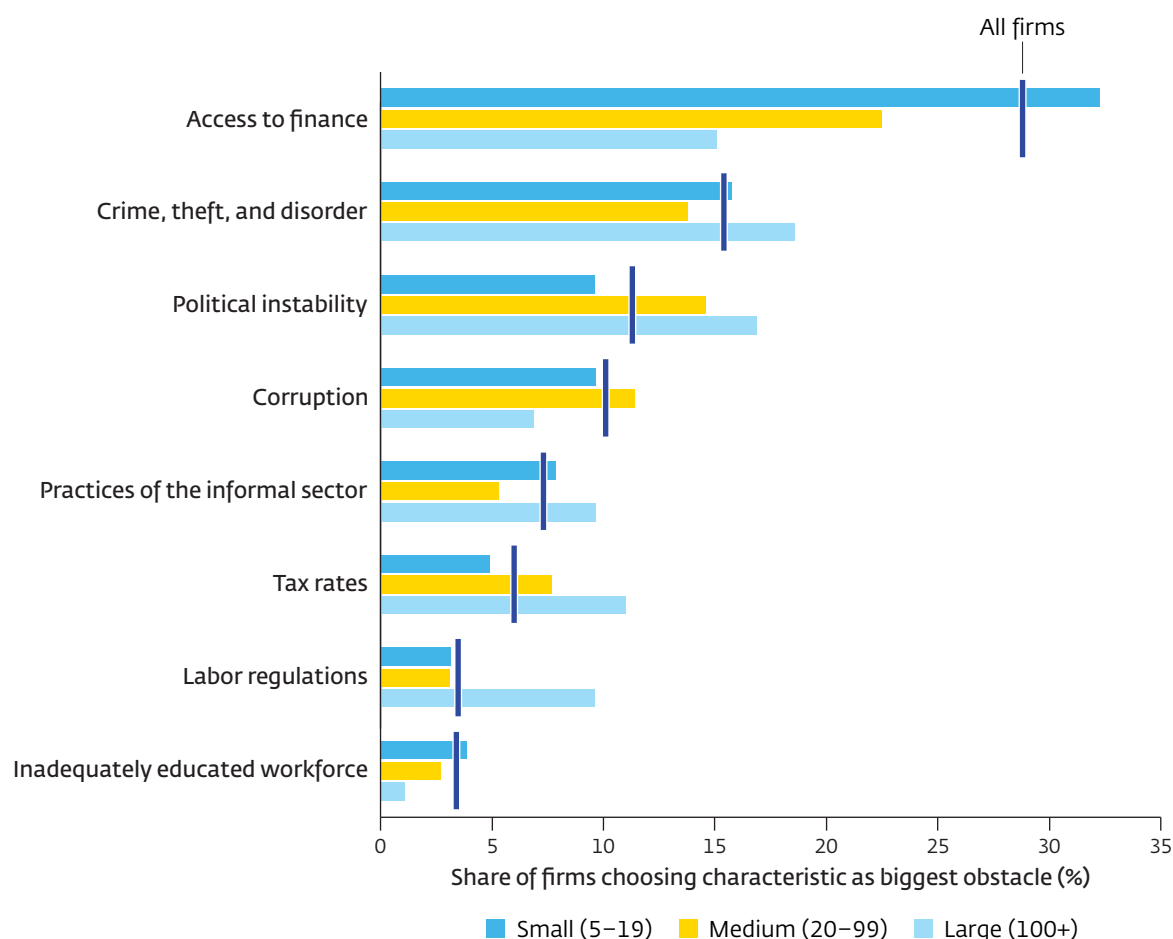
Business entry conditions test well on paper but are slow in practice. Foreign entities take, on average, 65 days to register; environmental permits for medium-high- and high-risk sectors take roughly 300 days and are costly. Government Regulation No. 28/2025 on risk-based licensing introduces automatic approval to accelerate processing. However, its impact is tempered by limited interoperability among government information technology systems and by extensive operational and commercial licensing requirements that continue to prolong the time needed to start operations.

Limited competition enables large incumbents to engage in rent seeking, supported by their connections with state officials. Such connections influence policy making, license allocation, access to credit, and resource concessions, stifling innovation and leading to inefficient policies. Regulatory gaps also create opportunities for conflicts of interest. Although bribery rates declined from 31 percent in 2015 to 20 percent in 2023, incidence remains high relative to peer countries, such as Mexico, the Philippines, and Turkey, and is associated with lower productivity.¹⁷

Weaknesses in the business environment raise the cost of doing business for Indonesian firms. Although Indonesia has introduced reforms aimed at deregulation and improving the business climate, including the 2020 Omnibus Law on Job Creation, persistent obstacles to firm performance include limited access to finance, crime, political instability, corruption, and unfair competition from informal firms (figure 1.2). World Bank Enterprise Surveys data indicate that regulatory compliance has become a growing burden. Between 2015 and 2023, senior managers spent increasing time dealing with regulatory requirements, while large regional disparities reflect inconsistent rule enforcement across Indonesia. Small and medium enterprises (SMEs) perceive access to finance and corruption as more disruptive obstacles to performance than large firms, whereas the opposite is true for crime, political instability, and practices of the informal sector (figure 1.2). Large firms also have more financial and administrative resources than SMEs to navigate regulatory uncertainty and complexity.¹⁸

Figure 1.2

Finance, Crime, and Political Instability Are the Top Business Obstacles, Especially for SMEs, 2023



Source: Calculations based on World Bank Enterprise Surveys data.

The effectiveness of competition law enforcement in Indonesia is limited by weak investigative powers, low sanctions, and constrained merger control. Although Indonesia enacted its competition law in 1999 and established the antitrust agency in 2000, significant challenges persist. Convictions have increased over time, but authorities continue to struggle to meet evidentiary standards needed to build strong anticompetitive cases. These challenges stem largely from statutory restrictions on critical investigative tools. The prominent role of SOEs in many cases adds political and institutional complexity, making enforcement more difficult. Weak sanctions reduce deterrence, while the requirement for mandatory postmerger notification prolongs review timelines, even for transactions with limited or no competition concerns. As a result, merger approvals generally take longer in Indonesia than in other jurisdictions.

Effective implementation of a reform agenda requires sustained coordination across government ministries and agencies. Many of the constraints identified in this diagnostic—from FDI minimum capital requirements to local content rules and licensing complexity—cut across the mandates of multiple institutions, including the Coordinating Ministry for Economic Affairs, the Ministry of Investment and Downstream Industry (Badan Koordinasi Penanaman Modal; BKPM), the Ministry of Finance, and the Ministry of National Development Planning (Badan Perencanaan Pembangunan Nasional). Without high-level policy dialogue and clear coordination mechanisms, reform efforts risk becoming fragmented or being undermined by conflicting regulatory signals.

Investment and Trade Dynamics

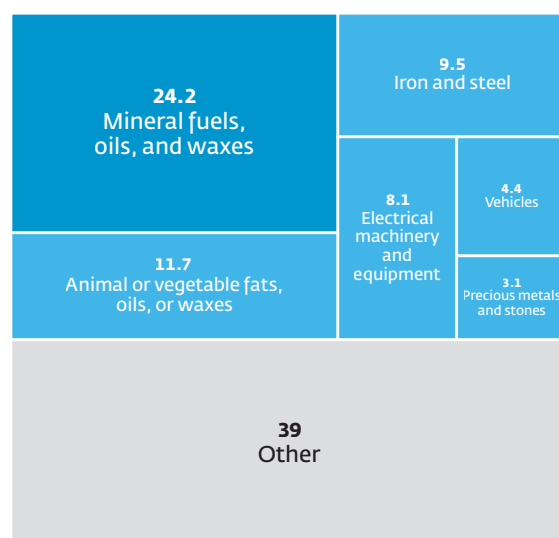
Over the past decade, Indonesia has adopted a more protectionist approach to global trade, but recent reforms seek to ease trade and investment restrictions. Between 2009 and 2017, increased import barriers, including tariffs and nontariff measures, raised input costs and reduced the availability of essential goods. Strict limitations on service imports diminished competitiveness by increasing costs and reducing the quality of domestic services, many of which are vital production inputs. Despite significant reforms to reduce investment restrictions through the 2020 Job Creation Omnibus Law, Presidential Decrees No. 10/2021 and No. 49/2021, restrictions on foreign investors persist. A Negative Investment List (Daftar Negatif Investasi) enforces explicit foreign equity limits, prioritizes specific industries for SMEs, and imposes local partnership requirements in many sectors. These policies restrict domestic and foreign investment, limit market entry, and distort pricing. According to the World Bank's B-READY 2024, Indonesia receives low ratings for electronic contracts and signatures, gender equality in trade agreements, and export and import compliance costs. More recently, the government embarked on reforms to ease import restrictions through Ministry of Trade Regulation No. 16 of 2025 concerning import policies and regulations (MOTR 16/2025). In addition, Indonesia has begun pursuing new trade agreements, including a political agreement with the EU, announced in July 2025, on the CEPA, paving the way for the deal's finalization in 2026.

Despite some successes, local content requirements (tingkat komponen dalam negeri; TKDN) have increased business costs and operational burdens in Indonesia.¹⁹ While designed to promote industrialization and “downstreaming,” they have had limited success in reducing dependence on imported inputs. In practice, TKDN raise production costs, slows technology adoption, and diminishes the global competitiveness of Indonesian firms.²⁰ Weak sector-specific assessments of supply chain readiness have produced

Figure 1.3

Commodities and Less Sophisticated Products Dominate Indonesia's Exports

Share of five-year average annual exports, 2019–24



Source: Calculations based on UN Comtrade data.

unrealistic TKDN targets, deterring investment. For example, stringent TKDN thresholds in renewable energy, including 20 percent for solar power plants and 34 percent for hydropower, along with requirements related to electric vehicles, have contributed to market distortions, efficiency losses, and constrained industry growth.²¹

Indonesia's export basket is heavily concentrated in mineral fuels, oils, and waxes, highlighting its continued reliance on commodity exports and less sophisticated products (figure 1.3).

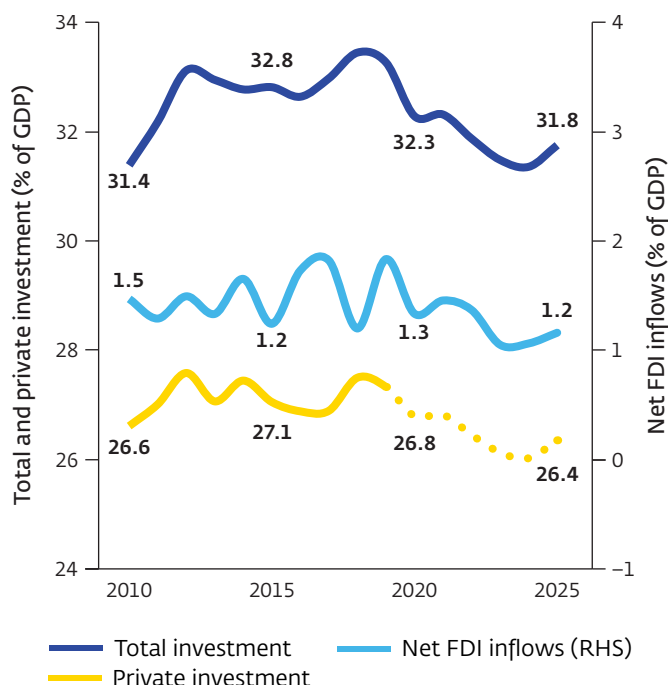
Export performance is commodity heavy, and Indonesia's share of global manufacturing exports has stagnated near 1.1 percent since 2000. Services trade restrictiveness is among the highest globally, with Indonesia's services restrictiveness index notably exceeding the Association of Southeast Asian Nations (ASEAN) average. Nontariff measures have also imposed high tariff-equivalent costs on critical capital goods, often reaching 60–130 percent.²²

Overall gross fixed capital formation as a fraction of GDP has slightly declined over the last decade; private investment has followed a similar trend and is projected to reach around 26.4 percent of GDP (figure 1.4). Net FDI inflows are estimated at 1.2 percent of GDP in 2025, unchanged from 2015. Indonesia's performance in attracting FDI is mixed compared with peers (figure 1.5). Average net FDI inflows during 2019–24 reached 1.8 percent of GDP, surpassing those of China, the Republic of Korea, and Thailand, but lagging those of top regional and aspirational competitors, such as Viet Nam, at 4.4 percent; Brazil, at 3.2 percent; and Malaysia, at 3.1 percent. Recent macroeconomic uncertainty stemming from concerns about central bank autonomy, commitment to fiscal discipline, and exchange rate volatility has created headwinds to private investment.

The quality of investment is as important as its quantity. FDI has shifted away from export-oriented sectors and increasingly toward domestic markets and natural resources, with FDI in export-oriented manufacturing firms dropping slightly from 5.9 percent of

Figure 1.4

Investment Flows Slightly Declined over the past Decade



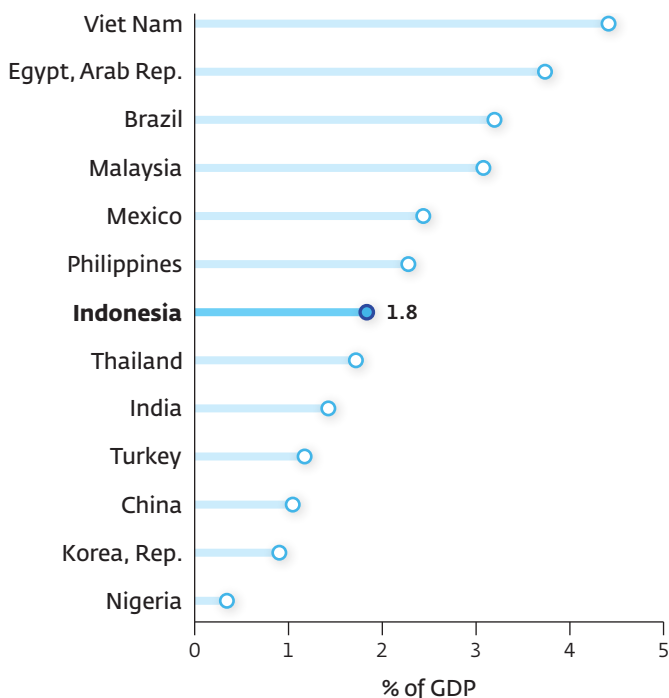
Source: Based on World Bank Macro Poverty Outlook Database and data on private investment from IMF Investment and Capital Stock Database, available through 2019.

Note: GDP = gross domestic product; FDI = foreign direct investment.

Figure 1.5

Indonesia's FDI Performance Is Mixed Among Peers

FDI, average net inflows, 2019–24



Source: World Development Indicators.

Note: GDP = gross domestic product; FDI = foreign direct investment.

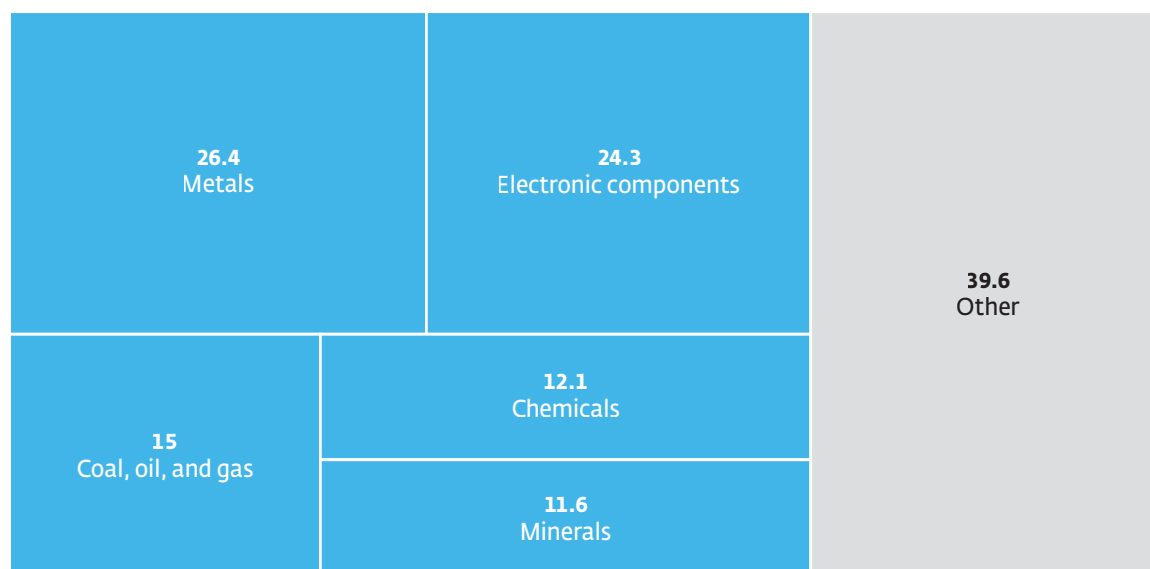
GDP in 2015 to 4.9 percent in 2023, according to the World Bank Enterprise Surveys. The concentration of FDI in Indonesia's metals, minerals, coal, and gas sectors (figure 1.6) makes the economy vulnerable to fluctuations in global commodity prices. Commodity exports can provide short-term economic gains, but they carry long-term risks, including depletion of finite resources and limited diversification into more advanced, high-value industries like manufacturing and technology. The government's downstreaming policy, which enforces export bans on unprocessed minerals, has spurred growth in some sectors of the economy, but it raises concerns regarding continued commodity dependence and the potential diversion of resources away from other promising manufacturing segments. This dependency highlights the challenge of balancing targeted industrial strategies with reforms that foster competition, innovation, and diversified economic development.

Emerging sectors are reshaping Indonesia's investment environment. The digital economy, encompassing e-commerce, fintech, data centers, and digital infrastructure, has attracted considerable private capital, supported by widespread internet penetration and

Figure 1.6

FDI Concentration in Commodities Makes Indonesia Vulnerable to Global Price Volatility

Cumulative FDI announcements, by capital expenditure, 2020–24 (US\$, billions)



Source: Financial Times fDi Markets.

Note: FDI = foreign direct investment.

a digitally savvy population. Sustainable development imperatives have also stimulated incipient investment in green energy and blue economy initiatives, leveraging Indonesia's substantial natural resources.

A survey of multinational corporations (MNCs) conducted for this report confirmed investor interest in deepening their presence in Indonesia, while also identifying deterrents to new investments.²³ Among MNCs present in Indonesia, 76 percent intend to increase investment over the next three to five years, citing opportunities such as new business prospects (64.8 percent), relocation (53.7 percent), and domestic market expansion (53.7 percent). Strategic priorities include expanding existing facilities (45.6 percent), initiating new projects (26.3 percent), and nearshoring (15.8 percent). However, current investors cited red tape (40 percent), inadequate digital and information and communication technology infrastructure (34.7 percent), logistics and energy infrastructure constraints (30.7 percent each), and restrictions on FDI and policy unpredictability (28 percent each) as the primary obstacles discouraging investment expansion. For MNCs not presently investing in Indonesia, primary deterrents include regulatory constraints (25 percent); costly exit barriers, such as closing a business or repatriating capital (23 percent);

and the lack of transparent and consistent FDI policies (20 percent). Addressing these obstacles could encourage market entry by 55 percent of currently absent investors.

1.4

Financial and Capital Markets

Indonesia's financial sector presents barriers to private investment, primarily due to elevated real interest rates, rigid collateral requirements, and procedural complexity.

According to the 2024 Financial Sector Assessment Program, Indonesia's financial system is small compared with some peers, at 73 percent of GDP, and is dominated by banks.²⁴ As detailed in table 1.2, private sector credit remained subdued in 2024, at 36.4 percent of GDP, relative to the UMICs average of 39.6 percent. The banking sector, which holds about 73 percent of total financial assets,²⁵ is fragmented and has high net interest margins, averaging 4.9 percent between January 2012 and October 2025, limiting competition. State-owned banks dominate lending and tend to prioritize other SOEs over private sector clients.

Table 1.2

Financial Sector Indicators for Indonesia, Selected Years

	2024	Indonesia Five-year average	EAP median	UMIC median	EMDE median
Domestic credit to the private sector (% of GDP)	36.4	36.7	89.6	39.6	33.9
Bank penetration (assets % of GDP)	31.8	31.8	76.2	38.9	31.8
Capital adequacy ratio (% of RWA)	25.1	24.2	20.1	18.9	18.9
NPLs (% of loans)	1.9	2.3	2.8	3.0	3.3
Provisioning rate for NPLs (%)	64.8	68.6	50.8	67.0	64.3
Loans in foreign currency (% of loans)	14.2	13.0	11.3	20.8	20.8
Government debt (% of assets)	11.5	13.4	11.6	11.9	12.5

Sources: IMF International Financial Statistics and World Development Indicators.

Note: EAP = East Asia and Pacific; EMDE = emerging markets and developing economy; GDP = gross domestic product; NPLs = nonperforming loans; RWA = risk-weighted assets; UMIC = upper-middle-income country.

Access to finance is the top business environment constraint, identified by three out of 10 firms in Indonesia (figure 1.2), but access varies significantly by firm size. Approximately 60 percent of firms that require financing do not apply for loans, constraining productivity and employment growth. For SMEs, the financing gap is driven by insufficient legal mechanisms for movable collateral and limited credit information.²⁶ Long-term capital availability is constrained, with institutional investors managing modest asset pools: pension funds comprise less than 7 percent of GDP, and insurance penetration was only 2.7 percent in 2024. The prevalence of short-term bank lending to SOEs and regulatory impediments, including weak legal frameworks for repurchase transactions and gaps in Indonesia's credit reporting system, further restrict institutional investment. Elevated real interest rates and currency pressures raise capital costs.²⁷

Despite capital market growth, with market capitalization at 55.7 percent of GDP and 947 listed companies in 2025 (table 1.3),²⁸ liquidity remains thin. The private sector, especially SMEs, rarely taps public markets due to cost and regulatory barriers, while alternative and international financing serve only a small share of SMEs and trail peer benchmarks (table 1.4). In response, Indonesia enacted the 2023 Financial Sector Development and Strengthening Law (P2SK) to strengthen the oversight of the Financial

Table 1.3

Capital Market Indicators for Indonesia

	2024	Indonesia Five-year average	EAP median	UMIC median
Corporate bond market				
Outstanding private bonds (% of GDP)	5.9	6.7	34.4	6
No. of listed bonds	195	238.6	166.5	17
Public equity market				
Market capitalization (% of GDP)	54.4	50.3	105.9	33.9
No. of listed firms, 2024	947	831	970	115
Share turnover velocity (%)	19.1	26.2	58.1	5.7
FDI				
FDI flows (% of GDP)	1.7	1.8	1.9	2.4

Sources: World Federation of Exchanges database.

Note: EAP = East Asia and Pacific; FDI = foreign direct investment; GDP = gross domestic product; EMDE = emerging markets and developing economy; UMIC = upper-middle-income country.

Table 1.4

International Financing Indicators

	Indonesia	EAP	UMIC	EMDE
International corporate bond issuances				
2023 (% of GDP)	0.0		0.4	0.5
Five-year average (% of GDP)	0.2		0.6	1.2
Loans from foreign banks to residents, all sectors				
2023 (% of GDP)	5.8	37.5	15.8	19.3
Five-year average (% of GDP)	7.3	38.9	15.7	19.3
FDI flows				
2023 (% of GDP)	1.6	5.4	2.4	2.8
Five-year average (% of GDP)	1.9	4.8	1.7	2.6
Portfolio equity flows				
2023 (% of GDP)	0.0	0.0	0.0	0.0
Five-year average (% of GDP)	−0.0	0.1	−0.0	0.0

Source: Based on various sources.

Note: EAP = East Asia and Pacific; FDI = foreign direct investment; GDP = gross domestic product; EMDE = emerging markets and developing economy; UMIC = upper-middle-income country.

Services Authority (Otoritas Jasa Keuangan) across capital markets and to advance reforms, including streamlined initial public offerings and innovative instruments such as environmental, social, and governance products. These measures are complimented by initiatives to expand domestic investor participation, deepen bond markets, and broaden retail involvement as part of national economic policy.

1.5 Electricity Market

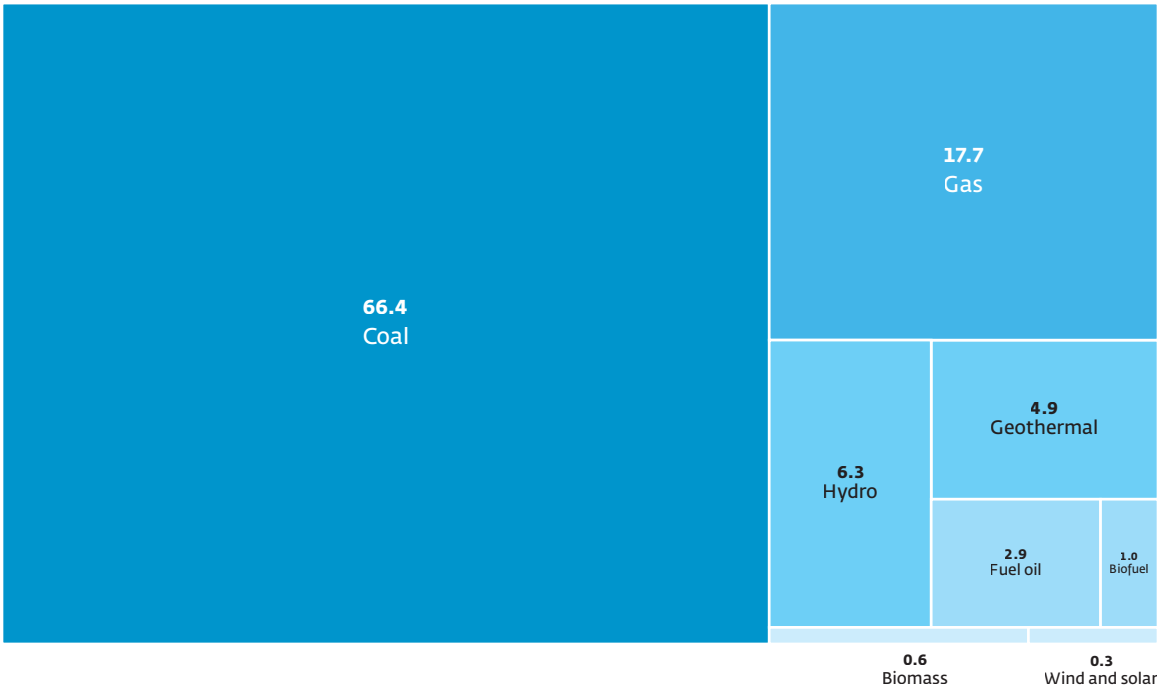
Existing regulations limit entry and competition in the electricity market.²⁹

Restrictions are higher in sectors with larger SOE presence and network sectors that provide critical inputs to downstream activities. In the electricity market, competition restrictions are more severe than in peer countries, according to the Indonesia Growth and Jobs Report.³⁰ Indonesia's 1945 Constitution and subsequent legislation give SOEs

priority rights to supply electricity to the public. The absence of vertical separation across electricity generation, transmission, distribution and retail supply, as well as the lack of third-party access to electricity transmission and distribution, reduces market efficiency. The National Electricity General Plan 2024–60 lists power transmission projects needed to increase and integrate renewable energy and improve electricity access that are open to the private sector under certain business models, such as build operate transfer, build lease transfer, or power wheeling using the public grid. Yet such models had not been adopted as of 2025.³¹

Coal is the dominant source of electricity generation. Despite the government’s commitment to gradually phase out diesel fuel and coal-fired power generation, progress in shifting toward Indonesia’s abundant renewable energy resources, such as geothermal, hydro, solar, and wind, has been sluggish. Coal-fired power generation accounted for 66.4 percent of state utility Perusahaan Listrik Negara’s (PLN) power generation mix in 2024,³² while renewable energy resources accounted for 13 percent of total power generation in 2024 (figure 1.7). Reliance on coal-fired electricity affects export-oriented manufacturing and services industries, including the electric vehicle battery value chain and data centers. PLN’s power generation mix exposes exporters to risks associated with the EU

Figure 1.7
Coal Dominates PLN’s Electricity Generation Mix, 2024



Source: MEMR (2025).
Note: PLN = Perusahaan Listrik Negara.

Carbon Border Adjustment Mechanism, limits their capacity to benefit from the CEPA with EU countries because of sustainability concerns, and constrains their capacity to serve clients that require green energy as part of their services. While some companies are moving toward renewable energy, coal power plants are increasing. Captive coal projects in development as of 2025 would bring Indonesia's total captive coal capacity over 31 gigawatts, triple the nation's 2023 captive coal power capacity, driven largely by the nickel industry.³³

1.6

Labor Market and Skills

Indonesia's unemployment rate fell to about 5 percent in 2024, and the employment-to-working-age ratio is high, at roughly two-thirds of the population (table 1.5).

However, the share of jobs categorized as middle-class jobs fell from 14 percent in 2019 to 8.4 percent in 2023, with employment gains concentrated in low-complexity, low-productivity activities. The youth unemployment rate was nearly 18 percent in 2024. Female labor force participation has stagnated below 60 percent, signaling untapped human capital.³⁴

Nearly half of jobs are in services, while agriculture still absorbs 29 percent of workers and industry 22 percent. Formal job creation has not kept pace with the expanding labor force, and informal employment accounted for almost 60 percent of total jobs in February 2025. Reliance on temporary and short-term contracts leaves many workers outside formal protections. The share of workers in high-skill occupations rose from 7.6 percent in 2014 to 8.8 percent in 2023, and many university graduates are employed in low skill roles.

At the same time, fast-growing fields such as digital technology face significant skills gaps. The education system is expected to supply about 9 million of the roughly 12 million workers needed by 2030.³⁵ Learning-adjusted years of schooling stand at 7.8, below aspirational comparators, and tertiary enrollment is 45 percent, compared with 62–64 percent in other UMICs. Yet only 5.7 percent of firms identify an inadequately educated workforce as a severe constraint, and only 8.4 percent of employers provide formal training. The share of young people not in education, employment, or training is high, at 21 percent, relative to ASEAN peers. Skills mismatches are particularly acute for youth and women.

Table 1.5

Labor Market Indicators

	Indonesia	EAP	UMIC	Regional and structural peers	Aspirational comparators
Labor force supply					
Population ages 15–64 (as % of total population)	68.0	68.2	68.3	69.8	66.3
Labor force participation rate (% of population ages 15–64)	69.1	66.4	70.1	73.2	65.9
Learning-adjusted years of school	7.8	8.3	7.9	9.6	8.1
School enrollment tertiary (% gross)	45.0	62.0	64.0	57.8	60.1
Labor market conditions					
Unemployment, total (% of total labor force)	3.3	3.8	5.6	2.6	4.7
Share of firms identifying an inadequately educated workforce as a major or very severe constraint (%)	5.7	11.2	21.9	9.0	17.2
Employment by sector (% of total employment)					
Industry	22.1	28.3	27.9	24.3	24.3
Agriculture	28.8	22.6	20.4	19.6	20.2
Services	49.1	49.1	51.7	56.1	55.6

Sources: Approach follows that used in the World Bank Group Growth and Jobs Reports and draws on data from World Development Indicators; International Labour Organization, modelled estimates for 2024 and sectoral employment for 2023; Human Capital Index; UNESCO, latest available data, with Indonesia from 2023; and World Bank Enterprise Surveys, latest available results, with Indonesia from 2023.

Note: EAP = East Asia and Pacific; UMICs = upper-middle-income countries. Learning-adjusted years of school adjusts years of schooling for how much students learn in each year of school, based on standardized test results.

2

Sector Selection



OPERASI TERMINAL

The Indonesia Country Private Sector Diagnostic identifies three sectors of the economy where concrete policy actions can generate commercially viable opportunities for private investors: **business solar, temperature-controlled logistics, and data centers**. These sectors have the potential to contribute to growth and job creation while encouraging broader, systemic reforms.

The sector selection followed a rigorous process that included desk research, data analysis, internal consultations with World Bank Group experts, and in-country consultations. The process applied the following criteria:

- 1 Potential to attract significant private capital if reforms are undertaken to alleviate constraints.
- 2 Potential to achieve development impact, with a particular focus on creating more and better jobs.
- 3 Feasibility of removing key constraints through government action in the near term.

Sector selection is not intended to be exhaustive or to imply that other sectors lack investment or growth potential. Private investors may identify profitable opportunities in other sectors. Inclusion of a sector does not imply that it is a priority for current

Table 2.1

Sector Selection Assessment

	Investment opportunities assuming concrete reforms are undertaken	Development impact	Feasibility of removing constraints
Commercial and industrial solar photovoltaic distributed generation—business solar	HIGH	MEDIUM	MEDIUM
Temperature-controlled logistics	HIGH	HIGH	MEDIUM
Data centers	HIGH	HIGH	HIGH

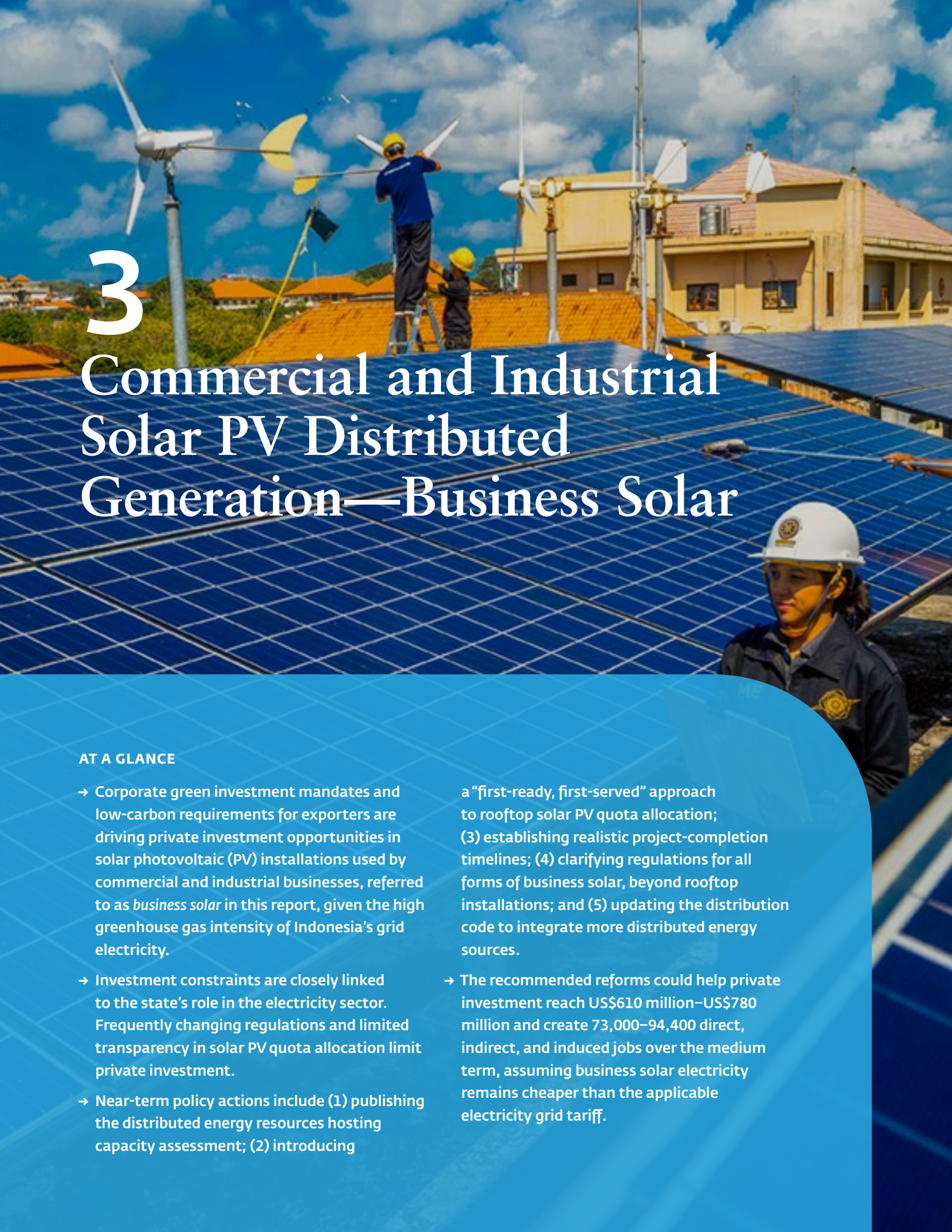
or future support from the World Bank or International Finance Corporation. The focus is on sectors where an identified constraint to private investment can feasibly be alleviated through public policy actions, thereby generating commercially viable opportunities for domestic and foreign private investors. Recommended actions are not necessarily sufficient on their own. Their impact on investment and job creation will likely require complementary measures and capacity building, in some cases extending beyond the medium term.

1. Business solar. Indonesia's electricity law (30/2009) grants state-owned enterprises (SOEs) priority in supplying electricity to the public, resulting in a market dominated by SOE generators that rely on the country's abundant but subsidized coal. Within this structure, a small but rapidly growing niche has emerged: commercial and industrial (C&I) solar photovoltaic distributed generation, referred to as "business solar" in this report. Operating through business-to-business transactions between private solar developers and C&I firms, business solar is attracting strong demand from companies seeking lower electricity costs, more reliable power supply, and compliance with international initiatives such as the European Union's Carbon Border Adjustment Mechanism and Renewable Energy 100 (RE100) commitments. This demand has emerged despite significant regulatory barriers. It also attracts equity investors and lenders with sustainability mandates. Installed capacity has grown rapidly, from 37 megawatts (MW) in 2020 to 329 MW by mid-2024. Yet, despite 1.4 gigawatts (GW) of business solar capacity committed in 2022 and 2.4 GW announced in 2024, regulatory barriers linked to the state-owned utility Perusahaan Listrik Negara meant that only 7 percent of the committed capacity was realized in each subsequent year. Recent reforms introduced by the Ministry of Energy and Mineral Resources have improved the investment climate, but further regulatory actions are needed to attract private capital at scale. Removing the remaining constraints could unlock substantial private investment, support Indonesia's clean energy transition in a financially sustainable manner, and strengthen the broader investment environment.

2. Data centers. Indonesia's data center sector presents significant private investment potential, fueled by the rapid expansion of the digital economy and growing demand for secure digital infrastructure to support digital public services, e-commerce, cloud services, artificial intelligence (AI) and other data-intensive applications, and digital payments. However, fragmented and overlapping data-hosting rules create uncertainty for investors, particularly cloud providers that depend on globally integrated architectures. Data localization requirements can reduce efficiency, limit the use of cross-border resources, and weaken Indonesia's attractiveness as a regional data center hub. Regulatory requirements for government data to be hosted in government-managed facilities, including the national data centers (pusat data nasional), also limit opportunities to leverage private capital and innovation for improved

digital government systems and services. The government aims to increase data center capacity to 2,000 MW by 2029, from 584 MW in operation and 337 MW under construction in 2025. Achieving this target would require an estimated US\$32 billion in capital investment. Recent announcements, including a US\$500 million AI-ready facility, US\$1.7 billion in regional cloud expansion, and a US\$2.3 billion AI-focused campus, demonstrate strong investor interest. However, these multiyear commitments remain subject to execution. Regulatory complexity, permitting delays, and fragmented digital adoption among micro, small, and medium enterprises and public agencies create headwinds for investment. Addressing these challenges and accelerating project execution could position Indonesia as a competitive regional hub for data centers and digital infrastructure development.

- 3. Temperature-controlled logistics.** Indonesia's temperature-controlled logistics (TCL) market has substantial untapped private investment potential, supported by a large and growing population, urbanization, e-commerce growth, and rising demand for temperature-sensitive goods. The market reached US\$11.6 billion in 2024 and is expected to grow to US\$16.9 billion by 2031. Despite this growth, significant capacity gaps and regional disparities persist, including a national shortfall of about 300,000 warehouse pallet positions, 1,268 TCL trucks, 707 reefer containers, and 240 reefer plugs. The largest unmet demand occurs outside Java, where only 14 percent of needs are currently served. Investment has been concentrated in Java, which accounts for 63 percent of market value and 77 percent of warehouse capacity, while regions such as Maluku and Papua face the most severe shortages. Reducing regulatory and infrastructure constraints could unlock substantial private investment in the sector.



3

Commercial and Industrial Solar PV Distributed Generation—Business Solar

AT A GLANCE

- Corporate green investment mandates and low-carbon requirements for exporters are driving private investment opportunities in solar photovoltaic (PV) installations used by commercial and industrial businesses, referred to as *business solar* in this report, given the high greenhouse gas intensity of Indonesia's grid electricity.
- Investment constraints are closely linked to the state's role in the electricity sector. Frequently changing regulations and limited transparency in solar PV quota allocation limit private investment.
- Near-term policy actions include (1) publishing the distributed energy resources hosting capacity assessment; (2) introducing a "first-ready, first-served" approach to rooftop solar PV quota allocation; (3) establishing realistic project-completion timelines; (4) clarifying regulations for all forms of business solar, beyond rooftop installations; and (5) updating the distribution code to integrate more distributed energy sources.
- The recommended reforms could help private investment reach US\$610 million–US\$780 million and create 73,000–94,400 direct, indirect, and induced jobs over the medium term, assuming business solar electricity remains cheaper than the applicable electricity grid tariff.

Sector Context and Private Investment Potential

As Indonesia's economy expands, meeting rising electricity demand, particularly from renewable energy, will require mobilizing and catalyzing private investment.

Indonesia's National Electricity General Plan 2024–60 projects average annual electricity demand growth of 3.8 percent, driven by industrial zones, “downstreaming”—that is, processing natural resources into higher-value-added products—smelters, fisheries, tourism, and electric vehicles.³⁶ Indonesia has abundant carbon-rich ecosystems and fossil fuel resources, including forests, peatlands, and coal, as well as significant renewable energy potential from geothermal, hydropower, wind, and solar resources. To shift to a more sustainable growth path, the National Electricity General Plan aims to raise the share of renewable energy in the power generation technology mix to 21 percent by 2030 and 73.6 percent by 2060, requiring major investments in solar, wind, hydro, and geothermal power generation. The plan requires US\$30 billion annually for generation and transmission, with significant participation expected from the private sector.

Growing corporate green investment mandates are creating opportunities for private investors in commercial and industrial solar photovoltaic distributed generation,

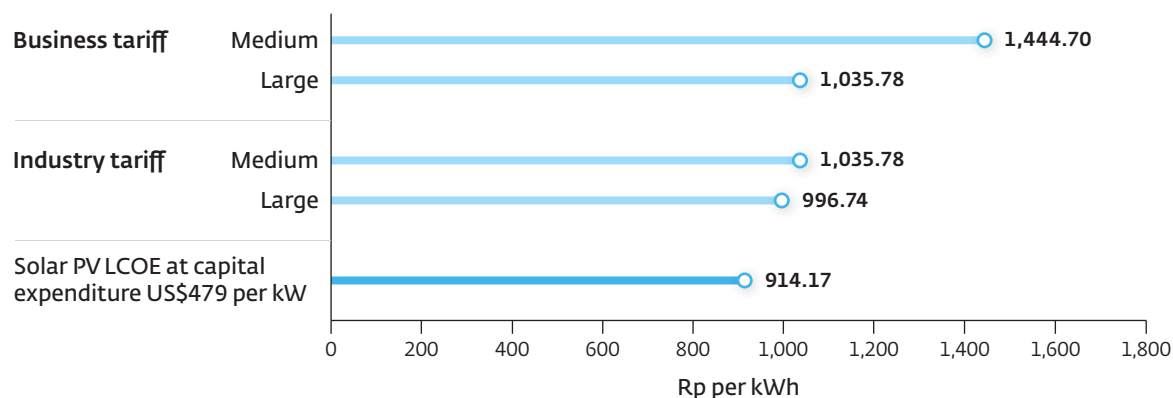
referred to as business solar in this report. Demand for solar photovoltaic (PV) power from commercial and industrial (C&I) clients is driven by several factors. The unreliability and high greenhouse gas intensity of grid electricity make harder for export-oriented firms to comply with the European Union's Carbon Border Adjustment Mechanism and for RE100 member companies to meet their commitment to use 100 percent renewable energy.³⁷ Private investors and banks are also seeking opportunities to meet their sustainability mandates and fulfill dedicated sustainable finance programs. Solar PV investment is also cost driven, with solar PV electricity costs lower than grid electricity tariffs (figure 3.1).

Private investment in business solar in Indonesia is emerging but requires policy reform to reach scale.³⁸ Despite the sector's potential, business solar installations have fallen short of the volume of projects committed or announced by investors and companies. In 2022, committed projects totaled 1.4 gigawatts (GW), but regulatory constraints linked to PLN limited rooftop solar PV installations, even though the Ministry of Energy and Mineral Resources (MEMR) had permitted such projects under MEMR Regulation No. 26/2021). Consequently, only 7 percent of the committed capacity was realized in 2023. Similarly, following the introduction of MEMR Regulation No. 2/2024 in January 2024, 2.4 GW of new rooftop solar PV capacity was announced in PLN-served areas as of August 2024, but only 7 percent had been installed by the second quarter of 2025, due to regulatory barriers. Since 2017, the number of Indonesia's non-PLN electricity providers has tripled, reflecting insufficient grid connections for reliable industrial electricity supply from PLN, particularly in remote industrial zones in eastern Indonesia.³⁹

Figure 3.1

Rooftop Solar PV Costs Less Than PLN Electricity Tariffs for C&I Consumers

Average cost of electricity, real 2025 prices



Source: World Bank Group estimates.

Note: C&I = commercial and industrial; kW = kilowatt; kWh = kilowatt-hour; LCOE = levelized cost of electricity; PLN = Perusahaan Listrik Negara; PV = photovoltaic. The average cost reflects the LCOE of solar PV power generation. PLN charges shown reflect the energy component of tariffs.

Rooftop solar adoption is concentrated in urban, high-electricity-consumption provinces within the Jawa-Madura-Bali (JAMALI) system, notably West Java, Banten, and Daerah Khusus Ibukota Jakarta. Adoption is generally higher where grid reliability is strong because distribution operators are more likely to grant approvals, although provinces such as Lampung, North Sulawesi, and South Sumatra show relatively high installation rates despite weaker grid reliability. Growth in industrialized regions is driven mainly by medium- to large-scale systems, with some exceptions, such as Jakarta and Banten, where small installations dominate. Several provinces, including Bangka Belitung, Yogyakarta, and North Sumatra, remain underpenetrated despite favorable demand and grid conditions, suggesting significant untapped potential. Permitting delays at regional PLN units are cited as a constraint. Remote areas, such as Papua, Bengkulu, and Riau Islands, have low adoption of rooftop solar.

Business solar customers are typically export-oriented medium and large C&I firms. They include manufacturing plants, export-oriented factories, logistics warehouses, industrial estates, and large commercial buildings. Their high daytime electricity demand and large rooftop areas make “behind-the-meter” self-consumption systems economically viable, even after the removal of net metering under MEMR Regulation No. 2/2024. Adoption is driven less by short-term tariff savings than by environmental, social, and governance commitments; supply chain decarbonization pressure; and cost

hedging, particularly for firms linked to multinational buyers. Developers are mainly specialized Indonesian and regional private solar engineering, procurement, and construction firms offering turnkey and leasing models. Investors include international and domestic strategic and technical equity investors and international and local banks, often with sustainable energy financing mandates or programs.

Regulatory constraints on business solar are linked to state utility PLN's role in the electricity sector.⁴⁰ Guided by the 1945 constitution, Electricity Law No. 30/2009 and Law No. 6/2023, as of July 2026, give state-owned enterprises such as PLN priority rights to supply electricity to the public. PLN retains a state-owned single buyer model, acting as a centralized state agent that purchases power from private independent power producers (IPPs) through power purchase agreements (PPAs), often alongside power generated by state-run providers. C&I firms may pursue captive power projects within industrial estates or PLN-unserved remote locations, but the complexity of developing such projects presents a significant barrier for C&I end users. Alternative options for C&I firms therefore include distributed generation under various arrangements such as operating lease agreements and equipment supply contracts with finance companies.⁴¹

Indonesia, the world's third-largest coal producer in 2024,⁴² also grants PLN a subsidized coal price capped at US\$70 per metric ton (MT),⁴³ while all domestic industries except for metal processing and refining, receive a coal price cap at US\$90 per MT.⁴⁴ As a result, in 2023, coal and coal products accounted for 72 percent of domestic energy production, and coal generated 69 percent of total electricity in Indonesia.⁴⁵ Coal subsidies contribute to making business solar less competitive. At the same time, the rising coal content of PLN's grid electricity drives demand from export-oriented C&I firms for solar PV distributed generation as they seek to avoid carbon-intensive electricity supply from PLN grids.

PLN has been reluctant to expand private investment in business solar because it would reduce electricity sales revenue while leaving the utility responsible for absorbing excess generation capacity in the JAMALI grid.⁴⁶ Drivers of this excess capacity include the 2015 presidential plan to add 35 GW of power generation capacity, including 20 GW of coal-fired capacity.⁴⁷ IPPs contribute to this excess capacity under PPAs with PLN, including take-or-pay clauses that require PLN to pay for a minimum contracted amount of power whether or not it dispatches electricity from IPPs. Until electricity demand closes the excess-capacity gap, which is expected around 2028, scaling up private investment in business solar will remain challenging.⁴⁸

Private investment in business solar through typical corporate PPAs is unavailable due to PLN's single-buyer status; thus C&I firms cannot directly purchase electricity from private solar PV power developers (IPPs). Instead, a common business model for C&I companies is to enter into operational leases with performance-based payments. This model

is unregulated and allows business solar developers to compete by offering electricity prices below utility tariffs. Because rooftop solar PV projects serving C&I customers are not subject to local content requirements, developers can use less expensive, higher-quality imported solar PV modules. Domestic modules are more expensive, less efficient, and degrade faster, although they have longer warranty periods.⁴⁹ Solar PV project developers mitigate offtaker risks by focusing on multinationals and creditworthy offtakers, requiring compensation for early termination, using take-or-pay schemes, and diversifying their businesses.

MEMR keeps PLN customer tariffs below cost-recovery levels, and PLN's revenue model is inadequate to support grid investment needed to accommodate increasing distributed generation. Government support to PLN includes public service obligations (PSOs), compensation for below-cost tariffs, loan guarantees, equity injections, and policy support to stabilize fuel costs, such as the coal price cap of US\$70 per MT.⁵⁰ In fiscal 2024, PSOs and compensation subsidies represented about 32.5 percent of PLN's total revenues. The end-user tariff structure comprises two broad consumer groups: (1) consumers that pay subsidized tariffs and (2) consumers that pay the full cost under PLN's cost-plus-margin tariff model.⁵¹ PSOs compensate PLN for serving subsidized consumers. PLN's revenue model is based on cost-plus regulation, which allows it to recover operating expenses, depreciation, and interest expenses, plus a regulated margin of 7 percent, net of electricity sales revenue. However, the model does not generate sufficient returns to fund new investment; average return on equity during 2018–22 was only 2 percent. This limits PLN's ability to upgrade the distribution system, manage congestion, enhance grid stability, and accommodate business solar.⁵²

The absence of an updated Electricity Distribution Code under MEMR Regulation No. 4/2009 weakens the case for PLN to invest in grid upgrades needed to integrate business solar. Despite major technological and organizational changes in the distribution system, including the growth of distributed energy resources such as rooftop solar PV, and broader energy system shifts by electrification, decarbonization, and digitalization, the distribution code has not been revised since 2009. As a result, it lacks essential technical specifications and data governance provisions for integrating resources like business solar. Updating the code to include smart-grid and distributed generation integration requirements would help justify PLN's investment in modernizing distribution networks and, in turn, support greater private investment in C&I solar PV systems. Such upgrades are also aligned with MEMR Regulation No. 2/2024, which provides compensation to PLN when rooftop solar PV deployment affects electricity supply costs (box 3.1).

Regulation of business solar has changed frequently and inconsistently, discouraging even investors already participating in the sector. As of 2025, investment is de facto limited to rooftop solar PV, excluding other options such as ground-mounted, canopy-mounted, and floating installations. Indonesia introduced business solar regulations in

2013, starting with a PLN rule that allowed full retail tariff credits for electricity injected into the grid through net metering. In 2014, PLN limited the size of PV distributed generation systems. In 2018, the MEMR issued a regulation specific to rooftop solar PV and shifted from net metering to net billing. This reduced credits to 65 percent of the retail tariff and added capacity and emergency energy charges for industrial customers, while permitting rooftop PV up to 100 percent of grid capacity. MEMR's 2021 regulation restored full credits, removed the additional charges, and expanded coverage beyond PLN. However, in 2022, PLN capped installations at 10–15 percent of grid capacity, hindering the planned 1.4 GW pipeline.

To address the rooftop solar PV capacity limits imposed by PLN, MEMR introduced MEMR Regulation No. 2/2024 in early 2024. The regulation eliminated the kilowatt-hour tariff credits and the capacity limit for individual installations and established a quota system for rooftop solar PV installations to resolve PLN's concerns about grid stability and congestion. Under the regulation, PLN and other holders of an Electricity Supply Business License for Public Interest (Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Umum; IUPTLU) must develop a five-year rooftop solar PV plan for their business areas. Applications for rooftop solar systems may be submitted to the relevant IUPTLU holder in January or July of each year. Box 3.1 summarizes Indonesia's rooftop solar PV quota system and its impacts on private investment.

While MEMR Regulation No. 2/2024 allows each applicant to install unlimited rooftop solar PV capacity, private investors face limited transparency and integrity in quota determination and allocation. The distributed energy resources hosting capacity assessment for the electricity distribution network and its underlying methodology, which determine quota levels, are not publicly available. As a result, private investors and solar PV developers believe PLN sets quotas below the level that the distribution grid can accommodate, undermining investment opportunities. Abrupt quota readjustments in the final days of the submission period have also disrupted solar PV developers' business operations and investment.⁵³ As PLN controls quotas in its business areas, its role in determining and allocating quotas raises concerns about the integrity and fairness of the system.⁵⁴ The participation of PLN subsidiary Icon Plus in the rooftop solar PV business further heightens these concerns and obscures competition between Icon Plus and private solar PV developers in quota allocation. Applicants are not informed of the reasons their applications are rejected.

The rooftop solar PV quota is allocated on a “first-come, first-served” basis, allowing solar developers without signed customer contracts to claim quota ahead of investment-ready applicants. This crowds out businesses prepared to proceed immediately and pushes them onto a waiting list, resulting in inefficient quota utilization. In PLN business areas between July 2024 and August 2025, the gross cumulative quota reached 1,505 MW, of which 1,190 MW was utilized, 315 MW went unallocated, and applications for 374 MW remained on the waiting list. This reflects a geographic mismatch: quota goes unused in

Indonesia's Rooftop Solar PV Quota System

What the Quota System Is and How It Works

- Indonesia's MEMR Regulation No. 2/2024 introduces a quota system that regulates how much rooftop solar photovoltaic (PV) capacity, measured in megawatts (MW), can be installed on each grid or subsystem.
- PLN and other holders of an Electricity Supply Business License for Public Interest (Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Umum; IUPTLU) prepare and submit a five-year rooftop PV quota plan to MEMR for their business area and publish the quota.
- Applicants seeking to install rooftop solar systems may submit applications to the relevant IUPTLU holder in January or July each year.
- Quota approval is granted on a "first-come, first-served" basis, regardless of project readiness or the existence of a valid rooftop solar PV installation contract.
- Approved quotas are subject to revocation if the quota recipient fails to obtain an operational feasibility certificate (Sertifikat Laik Operasi) or a registration number within three or six months, depending on system size and technical specifications. Revoked quota capacity is returned to the next allocation round.
- Applications that exceed the available quotas are placed on a waiting list.
- Rooftop solar PV installations are not subject to a capacity limit per installation.
- The government compensates PLN if rooftop solar PV deployment affects the cost of electricity supply under this regulation.
- The regulation abolishes the previous net-metering scheme, meaning that excess electricity

exported by users to PLN is no longer credited against electricity bills.

- For rooftop solar PV with a capacity greater than 3 MW, users must provide weather forecast database settings integrated with the supervisory control and data acquisition system or distribution smart grid owned by the IUPTLU holder.

Why the Quota System Exists

- Quotas have been imposed to limit the rapid scale-up of rooftop solar PV and help prevent destabilization and congestion of Indonesia's distribution grids, which require significant upgrades to accommodate large-scale solar penetration. Quotas also shield PLN from the financial burden of crediting exported power and from revenue losses associated with reduced electricity sales.
- Quotas are intended to align energy policy with utility plans and pace solar expansion given system and planning constraints.

Impacts on Private Investment

- Private investment in the residential customer market has almost disappeared because the removal of credits for exported excess electricity has made residential rooftop solar financially unviable. By contrast, commercial and industrial (C&I) market uptake remains because C&I customers operate mainly during daytime business hours.
- For private investors and C&I firms seeking to install rooftop solar PV at scale, the lack of transparency in quota determination raises uncertainty and exacerbates risks associated with quota approval.

areas with low demand for rooftop solar PV installations, while areas with high demand have insufficient quota to accommodate all applicants. The mismatch creates uncertainty

for project developers and C&I firms in financing and business planning, undermining the broader rollout of rooftop solar.

Unrealistic permitting and licensing deadlines also frequently lead to quota revocation, disrupting private investment. PLN or other IUPTLU holders revoke quotas if recipients fail to obtain an operational feasibility certificate (sertifikat laik operasi; SLO) or a registration number within three or six months, depending on system size and technical specifications. These deadlines are often impractical as many rooftops require structural reinforcement before installation can begin, extending project timelines. Additionally, obtaining the required SLO from local regulatory agencies is frequently delayed due to inconsistent rules and lengthy follow-up processes. According to solar PV developers, government authorities impose different permitting and licensing requirements, including environmental impact assessments or different levels of inverter installation completion before issuing SLOs. One developer noted 80 percent of delays in their solar PV rooftop projects are caused by local government processes. As of June 2025, nearly half of rooftop solar PV projects that received quota allocations had experienced significant delays, and a substantial portion of available quota remained unallocated despite strong market demand.⁵⁵

Despite increasing private investor interest in other modes of solar PV distributed generation beyond rooftop solar, formal regulations for alternative project types are either absent or inconsistent. Due to limited rooftop space, some C&I firms seek to install solar PV systems on car park canopies, ground-mounted on spare space, or floated over water reservoirs. However, PLN reportedly treats those forms of solar PV installation inconsistently, either prohibiting them or imposing additional charges. For example, a shipyard firm pays extra charges for ground-mounted solar PV on its property; as a result, its solar PV power supply does not reduce electricity costs. However, the firm retains the ground-mounted solar PV to meet corporate and equity investor requirements. In August 2025, the MEMR noted that it was considering revising MEMR Regulation No. 2/2024 to include these other modes of solar PV distributed generation, but as of February 2026, no revision was publicly available.

3.2 Constraints to Private Investment and Recommendations

The government could undertake concrete policy actions in the near term to reduce constraints to private investment in business solar. Comprehensive reforms to PLN's cost-plus business model would require long-term efforts and are therefore beyond the scope of this report. However, the recommendations aim to reduce constraints to private investment while considering the challenges that expanded solar PV distributed

generation could pose for PLN. Such challenges include excess power generation capacity, which is expected to persist until 2028,⁵⁶ as well as potential impacts on grid congestion, grid stability, and PLN's revenues. The proposed actions could also support a regulatory framework that prioritizes investment in industrial estates and export-oriented industries, as well as in regions with lower reserve margins and fewer grid absorption constraints, without unduly regulating quota allocation.

CONSTRAINT 1. PLN's rooftop solar PV quota allocation process lacks transparency and is subject to unexpected changes, creating uncertainty for investors and developers. PLN's 2025–34 business plan sets a 3 GW quota for rooftop solar PV capacity, but the hosting capacity assessments of the electricity distribution network that underpin this quota are not publicly available. Without access to these assessments and their underlying methodology, private investors and solar PV developers cannot verify whether the quota accurately reflects what the distribution network can accommodate. The lack of transparency in quota allocation reduces private investors' trust in PLN and affects investment planning. Unexpected quota reallocations further undermine investor confidence. The involvement of PLN's subsidiary Icon Plus in the allocation process raises additional concerns about integrity and fair competition, as PLN effectively controls the quota system within its own business areas.

RECOMMENDATION 1. Amend MEMR Regulation No. 2/2024 to require MEMR and PLN to publish distributed energy resources hosting capacity assessments approved by PLN. Requiring MEMR and PLN to publish distributed energy resources hosting capacity assessments for regional distribution network areas on their websites at least once a year would improve transparency and support private investor decision-making by providing critical information on where, when, and how much to invest. The scope of the published assessments should cover distributed energy resources broadly rather than being limited to rooftop solar PV. Broader coverage is warranted given the expected penetration of a range of distributed energy resources into Indonesia's electricity distribution grids, including electric vehicles, battery energy storage systems, flexible demand solutions, and ground-mounted, canopy-mounted, and floating solar PV, in addition to rooftop solar PV.

CONSTRAINT 2. The "first-come, first-served" allocation of rooftop solar PV quotas favors speculative or unprepared applicants over projects that are ready to proceed. Rooftop solar PV quotas are allocated on a "first-come, first-served" basis without requiring applicants to have signed contracts between solar PV developers and the commercial or industrial customers. As a result, quota allocations may go to applicants that are not ready to proceed with installation, leaving investment-ready developers and C&I firms on waiting lists.

RECOMMENDATION 2. Amend MEMR Regulation No. 2/2024 to replace the “first-come, first-served” approach to quota allocation with a “first-ready, first-served” approach. A “first-ready, first-served” approach would require MEMR to introduce a prequalification process to ensure that quota allocations go to applicants ready to proceed with installations. Prequalification should require a signed contractual agreement between the solar PV developer and the commercial or industrial customer as evidence of project readiness, as well as an adequate financial deposit as security. Prequalification documents should remain confidential between the applicant and the quota-awarding authority. The deposit would be refunded if the applicant is not awarded a quota or upon successful project completion within the stipulated timeframe, and forfeited if the project is not completed within that timeframe.

CONSTRAINT 3. Under MEMR Regulation No. 2/2024, short deadlines to obtain operational feasibility certificates (sertifikat laik operasi; SLOs) or registration numbers have led to a significant number of revoked rooftop solar PV quota allocations, complicating investment and business planning for solar PV project developers and C&I firms. The deadlines for obtaining an operational feasibility certificate or registration number, depending on rooftop solar PV system size and technical specifications, are often unrealistic.

RECOMMENDATION 3. Revise the deadlines under MEMR regulation 2/2024 for rooftop solar PV projects to obtain an SLO or registration number, based on realistic project timelines that reflect system size and technical specifications. The revision process should include surveys at key project milestones to identify bottlenecks and opportunities to streamline administrative processes, including through digitalization, and enable MEMR to implement targeted corrective actions.

CONSTRAINT 4. Private investment in business solar is restricted to rooftop installations. This limitation arises because MEMR Regulation No. 2/2024 does not cover behind-the-meter ground-mounted, canopy-mounted, or floating business solar systems. For PLN customers, such on-site solar PV options are either prohibited or subject to additional charges, which can undermine the financial benefits of solar PV.

RECOMMENDATION 4. Revise MEMR Regulation No. 2/2024 to permit behind-the-meter business solar PV generation across all forms of distributed solar PV generations. This would include rooftop, ground-mounted, canopy-mounted, and floating installations. The revised regulation should also eliminate additional charges imposed on C&I firms that install ground-mounted, canopy-mounted, and floating solar PV installations.

CONSTRAINT 5. The Distribution Code under MEMR Regulation No. 4/2009 lacks the technical specifications needed to support business solar integration, limiting private

investment opportunities. Despite major technological and organizational changes in electricity distribution, digitalization, and data governance since 2009, the code has not been updated. Requirements for integrating distributed energy resources, including smart-grid functionality and technical standards for business solar, are missing. Updating the Distribution Code to incorporate these advanced specifications would enable PLN to justify investment in necessary grid upgrades and expand the grid's capacity to accommodate additional business solar, thereby unlocking greater private investment.

RECOMMENDATION 5. Revise the Distribution Code under MEMR Regulation No. 4/2009 to support the integration of distributed energy resources, including solar PV, while strengthening cybersecurity and data privacy. An updated distribution grid code should define clear technical requirements for smart grids and distributed energy resource integration. The three priority requirements should be (1) two-way communication for distributed energy resource visibility and control, (2) distributed energy resource interoperability standards, and (3) mandatory cybersecurity standards for distributed energy resources and communication systems. Such enhancements would require PLN to invest in modernizing distribution infrastructure, enabling greater private investment in C&I solar PV and facilitating pilots for microgrids and virtual power plants.

3.3

Expected Impact on Private Investment and Jobs

The proposed reforms could contribute to private investment in solar PV systems of US\$610 million–US\$780 million, in real 2025 US dollars, over the medium term and create 73,000–94,400 direct, indirect, and induced jobs. Direct jobs would account for 29 percent of the total, indirect jobs for 29 percent, and induced jobs for 42 percent. The estimates are based on scenarios in which the cost of business solar electricity remains below PLN's large-industry consumer tariff, energy only and excluding capacity charge, of Rp 997—the cheapest of the C&I tariff categories. The C&I firms assessed include manufacturing, resource-based, and services firms, whose wages are generally higher than average wages in Indonesia.⁵⁷

Implementing the recommendations would increase clean solar PV power generation, helping C&I firms and investors meet mandates to use or finance renewable energy. The increase in clean energy generation would be equivalent to an estimated 11–14 million metric tons of carbon dioxide emissions over the modeled 25-year period, or an average of 0.4–0.6 million metric tons of carbon dioxide per year, using Indonesia's grid electricity emissions factor.

Table 3.1

Priority Policy Actions to Remove Impediments to Private Investment in Business Solar

Constraint	Recommended actions
1. PLN's rooftop solar PV quota allocation process lacks transparency and is subject to unexpected changes, creating uncertainty for investors and developers.	1. Amend MEMR Regulation No. 2/2024 to require MEMR and PLN to publish distributed energy resources hosting capacity assessments approved by PLN. <i>Responsible government entity: Lead—MEMR</i>
2. The "first-come, first-served" allocation of rooftop solar PV quotas favors speculative or unprepared applicants over projects that are ready to proceed.	2. Amend MEMR Regulation No. 2/2024 to replace the "first-come, first-served" approach to quota allocation with a "first-ready, first-served" approach. <i>Responsible government entity: Lead—MEMR</i>
3. Under MEMR Regulation No. 2/2024, short deadlines to obtain operational feasibility certificates (SLO) or registration numbers have led to a significant number of revoked rooftop solar PV quota allocations, complicating investment and business planning for solar PV project developers and C&I firms.	3. Revise the deadlines under MEMR regulation 2/2024 for rooftop solar PV projects to obtain an SLO or registration number, based on realistic project timelines that reflect system size and technical specifications. <i>Responsible government entity: Lead—MEMR</i>
4. Private investment in business solar is restricted to rooftop installations.	4. Revise MEMR Regulation No. 2/2024 to permit behind-the-meter business solar PV generation across all forms of distributed solar PV generations. <i>Responsible government entity: Lead—MEMR</i>
5. The Distribution Code under MEMR Regulation No. 4/2009 lacks the technical specifications needed to support business solar integration, limiting private investment opportunities.	5. Revise the Distribution Code under MEMR Regulation No. 4/2009 to support the integration of distributed energy resources, including solar PV, while strengthening cybersecurity and data privacy. <i>Responsible government entity: Lead—MEMR</i>

Note: C&I = commercial and industrial; MEMR = Ministry of Energy and Mineral Resources; PLN = Perusahaan Listrik Negara; PV = photovoltaic; SLO = sertifikat laik operasi (operational feasibility certificates).

4

Data Centers

AT A GLANCE

- Private investor interest in Indonesia's data center sector is driven by rapid digital economy growth, a large internet user base, and strategic proximity to Singapore and other regional markets.
- Investment is deterred by regulatory uncertainty, restrictions on landing international submarine cables near Jakarta, and fragmented permitting. Reliable and increasingly renewable energy is necessary but not sufficient to unlock private investment. Public sector demand is not being leveraged to anchor large-scale investment because government agencies lack enabling policies to adopt cloud services. Limited access to reliable power, water, and renewable energy also raises costs and slows project development.
- Removing obstacles to investment will require expedited permitting, easier imports of data center equipment, officially recognized green data center standards, implementing regulations on personal data protection, clearer rules on cross-border data flows, a risk-based approach to cloud use by government agencies, and improved access to reliable submarine cables.
- Targeted near-term policy actions could catalyze as much as US\$13.8 billion of private investment and create as many as 143,000 direct and indirect jobs.

Sector Context and Private Investment Potential

The global data center⁵⁸ market is experiencing unprecedented growth, driven by surging demand for artificial intelligence (AI) workloads, hyperscale cloud services, data-intensive applications, and low-latency connectivity. The market is projected to grow at a compound annual growth rate (CAGR) of 11.06 percent, reaching US\$1,104 billion by 2035.⁵⁹

In Southeast Asia, the data center market is projected to grow at a CAGR of 20 percent during 2025–28. Countries in the region are competing to become digital hubs. Across the Association of Southeast Asian Nations (ASEAN), excluding Singapore, capital and operating expenditures are highly competitive: construction costs are 20 percent below the global average, and electricity prices, which make up 35–40 percent of a data center's operating costs, are 20–30 percent below the global average.⁶⁰ Indonesia, Malaysia, Singapore, and Thailand are effectively engaged in an AI race, competing to become regional hubs for AI-ready data centers and digital services.⁶¹

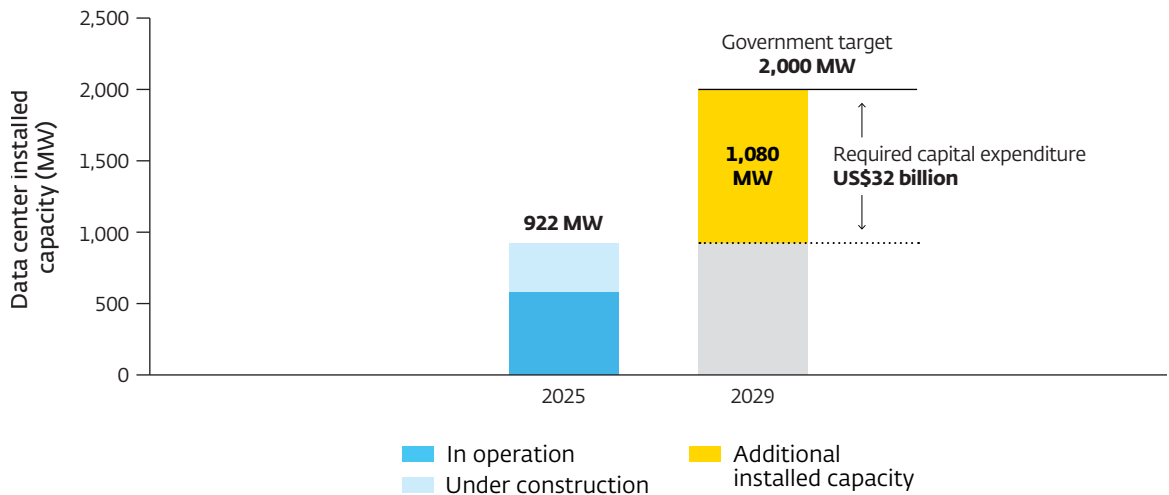
The rapid expansion of Indonesia's digital economy is fueling strong growth in its data center industry. The country's digital economy is projected to increase from US\$99 billion in gross merchandise value in 2025 to US\$340 billion by 2030.⁶² Growth is fueled by more than 180 million internet users, around 73 percent of the population ages five and older,⁶³ and the growing uptake of e-commerce, social media, and digital payments. These services rely on low-latency, secure, and reliable digital infrastructure, making data centers a critical enabler of Indonesia's digital transformation. In 2025, Indonesia's operational data center capacity reached 584 MW, with an additional 337 MW under construction. The government's 2025–29 National Medium-Term Development Plan (Rencana Pembangunan Jangka Panjang Nasional) targets data center capacity of 6.87 watts per capita by 2029, equivalent to roughly 2,000 MW.⁶⁴ Achieving the target would require cumulative investment of US\$32 billion (see figure 4.1), which will require addressing several challenges.

Data center capacity has expanded unevenly across Southeast Asia, reflecting differences in policy coordination, infrastructure readiness, and speed of execution. Malaysia has rapidly scaled operational and near-term capacity, positioning itself as a regional hub for hyperscale and cross-border workloads, while Singapore continues to anchor high-value demand despite land and power constraints. Thailand's pipeline of operational and planned facilities is also growing quickly. By contrast, Indonesia's operational data center capacity remains relatively modest relative to its market and population size (figure 4.2).

Indonesia's data center market has developed primarily to serve domestic demand, with investment and enabling policies largely oriented toward local digital services

Figure 4.1

Achieving Data Center Capacity Targets Would Require More Than US\$30 Billion in Investment



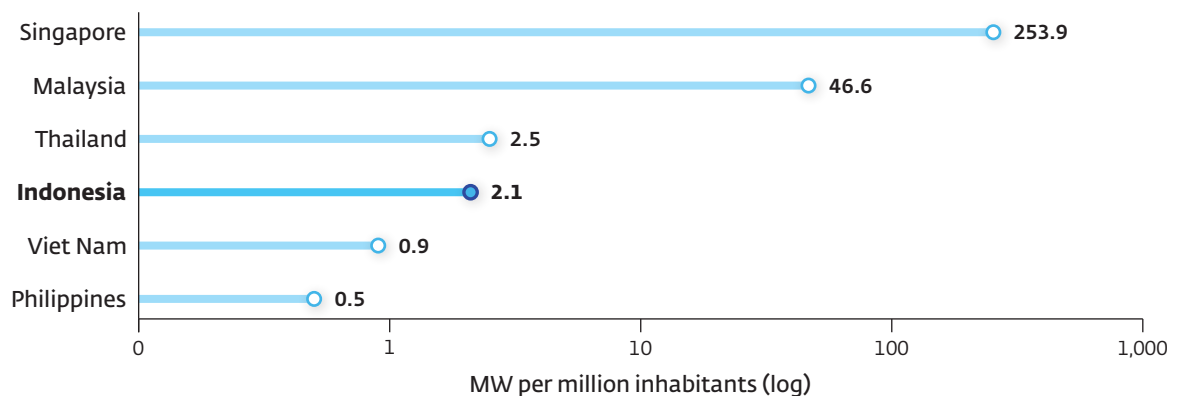
Sources: Estimates based on data from Cushman and Wakefield (2025).

Note: MW = megawatt.

Figure 4.2

Indonesia Trails Regional Peers in Operational Data Center Capacity

Data center capacity load in operation, 2025



Source: Estimates based on Cushman and Wakefield (2025) and World Bank Group World Development Indicators.

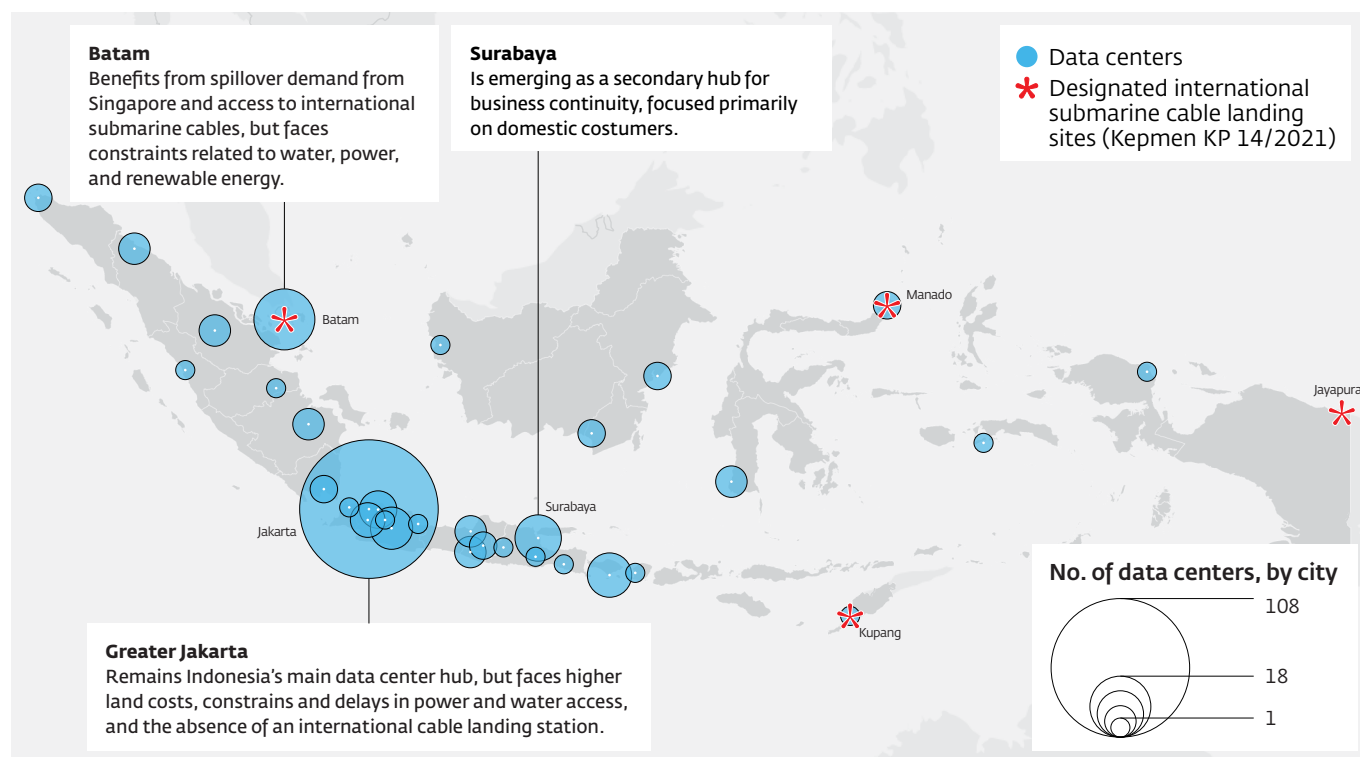
Note: MW = megawatt.

and data localization compliance. Data center development is highly concentrated geographically (figure 4.3). Greater Jakarta accounts for 55 percent of data center facilities and over 85 percent of installed capacity, reflecting proximity to end users, enterprise demand, and existing power and fiber infrastructure.⁶⁵

Despite its geographic position in the Asia-Pacific, Indonesia is not yet competing for large hyperscale and regional workloads. By contrast, Malaysia, Singapore, and increasingly Thailand have deliberately positioned their data center sectors to serve both domestic and regional markets. This has translated into significantly higher data center capacity, particularly on a per capita basis, than Indonesia. Regional demand is critical to the data center investment case in South and Southeast Asia because many smaller markets lack sufficient scale to support large facilities on a stand-alone basis. This creates opportunities for regional hubs to host shared cloud and digital infrastructure and aggregate demand at a scale attractive to private investors. International submarine cable connectivity plays a critical role in this model, enabling low-latency, cross-border service delivery

Figure 4.3

Data Center Installed Capacity in Indonesia Is Highly Concentrated Geographically



Source: Adapted from DatacenterMap.

from a small number of hub locations. It is also a core requirement for hyperscale cloud providers that rely on high-capacity, dedicated international connectivity to serve multiple markets. Regional initiatives such as the ASEAN Digital Economy Framework Agreement, which aims to facilitate cross-border digital trade, data flows, and interoperability, reinforce the economic case for regionally oriented data centers rather than purely domestic deployments.

Singapore's 2019–22 moratorium on new data centers created a window of opportunity for neighboring countries to capture redirected investment. Malaysia responded swiftly with investor-friendly policies and infrastructure, including a one-stop Digital Investment Office; Malaysia Digital status, which offers tax incentives and foreign worker allowances;⁶⁶ import duty waivers; renewable energy access and green data center incentives;⁶⁷ foreign ownership rights; and a US\$10 billion electricity grid upgrade. As a result, Malaysia has emerged as the regional frontrunner, ranked first in Knight Frank's 2024 Southeast Asia–5 Data Center Opportunity Index, which covers Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam,⁶⁸ with the Malaysian city of Johor Bahru capturing most of the spillover demand from Singapore.⁶⁹ The Johor-Singapore Economic Zone, launched in 2025, further strengthened Johor Bahru's position as a regional hub. Thailand is also gaining traction as a growth hub, offering similar one-stop facilitation, full foreign ownership, tax holidays, land rights, Smart Visas for tech talent,⁷⁰ and expanded renewable energy access through utility green tariffs and direct power purchase agreements (PPAs).⁷¹

Malaysia's and Thailand's advantages lie in coordinated investment incentives, policy certainty, speed of action, and expanded access to reliable and renewable energy.

Together, these advantages lower the cost and complexity of establishing large-scale data centers and allow investors to use these countries as regional platforms to serve multiple markets. The opportunity cost of Indonesia's regulatory and policy gaps is visible. Despite being TikTok's largest user market in Southeast Asia, Indonesia lost out to Malaysia and Thailand on ByteDance's multibillion-dollar regional data center and AI hub investments—infrastructure that will serve Indonesian users.

4.1.1 *Indonesia's Data Center Landscape: Investment Potential and Challenges*

Indonesia has attracted investor interest in data centers, but announced investments have been realized more slowly than projected. More than US\$5 billion of investment in data centers has been announced in recent years, primarily in the Greater Jakarta area—Jakarta, Bogor, Depok, Tangerang, and Bekasi, also known as Jabodetabek. Many foreign entrants have partnered with local incumbents, reflecting the regulatory complexity of operating in Indonesia. Nongsa Digital Park within the Nongsa Special Economic Zone (SEZ) in Batam has also attracted significant investor interest and land allocation for data

centers, but much of this capacity remains in the planning or early development stages. Large data center developments are typically delivered in phases and face long lead times related to permitting, utility connections, and infrastructure readiness. As a result, recent additions to operational capacity have been modest: only 27 MW of new capacity was commissioned in the first half of 2025.⁷² Even if the 123 MW currently under construction is completed on schedule, total operational capacity would reach around 456 MW by end-2025, still below planned growth.

These delays reflect constraints that extend beyond the availability of power. While access to reliable and increasingly renewable energy remains necessary for large-scale data center development, investment outcomes in Indonesia are also affected by fragmented governance and lengthy permitting processes, regulatory uncertainty around data localization and cross-border data flows, limited availability of investment-ready land with adequate power and fiber connectivity, and weak coordination of investment facilitation. Together, these constraints have slowed project execution and limited the conversion of announced investments into operational capacity.

Several issues constrain Indonesia's ability to attract private investment in data centers:

- a. **Regulatory uncertainty.** Data center operators and investors depend on predictable rules governing data use, storage, and cross-border flows. In Indonesia, overlapping and incomplete regulations—including inconsistencies between general and sector-specific rules—create ambiguity and legal risk and complicate cross-border data transfers. For local businesses, the main challenge is the lack of clear, uniform rules defining what types of data may be transferred offshore. For international hyperscalers and digital platforms, mandatory local storage and processing requirements create a significantly more complex operating environment than in Malaysia, Singapore, and Thailand, where cross-border data regimes are more consolidated and predictable. This policy landscape increases operational complexity and costs, complicates infrastructure planning, and discourages private investment. Research found that Indonesia's rising data restrictiveness between 2013 and 2018 resulted in a 7.8 percent decline in trade output and a 3.2 percent drop in productivity.⁷³ By contrast, countries like Malaysia and Singapore have shown that robust data center ecosystems and strong data protection can coexist without imposing restrictive data localization mandates.
- b. **Infrastructure constraints and access to renewable energy.** Indonesia's two key data center hubs, Greater Jakarta and Batam, face infrastructure constraints that hinder their ability to scale, especially for AI-ready facilities. Expansion in Jakarta is constrained by rising land prices; limited industrial-zoned land with SEZ benefits; uneven access to reliable utilities; limited access to renewable energy; and regulatory restrictions on new international submarine cable landing points, which are currently

limited to Batam, Kupang, Manado, and Jayapura. Delays in securing high-capacity electricity connections and cabotage laws that restrict submarine cable work to Indonesian-flagged vessels further complicate infrastructure development. Batam leverages its proximity to Singapore, competitive land costs (US\$209 per square meter compared with US\$1,037 per square meter in Johor), international submarine cable connectivity, SEZ incentives, and potential access to solar farms. It has attracted over 10 projects with as much as 400 MW of planned capacity.⁷⁴ However, Batam faces constraints similar to those faced in Greater Jakarta: electricity supply secured through 2031 is 369 MVA, compared with projected demand of 1,000 MVA, and water availability is limited.⁷⁵ These challenges are compounded by the emergence of AI-ready data centers, which require large volumes of power and water for high-density computing and cooling systems.

- c. **Limited mechanisms for securing long-term green energy.** The absence of regulations for direct PPAs and power wheeling prevents data center operators from securing long-term green energy, undermining sustainability targets and reducing Indonesia's appeal to climate-conscious investors. Mechanisms such as bring your own power and direct PPAs are critical. With rapid growth in data centers and AI facilities, including the government's national data center (*pusat data nasional*; PDN) program, Danantara's investments in green data centers, and the Indonesia Investment Authority's DayOne data center campus, demand for renewable energy will increase sharply. However, clear and nondiscriminatory frameworks for corporate PPAs and wheeling—essential to ensure that both public and private operators have equal access to sustainable power and meet environmental, social, and governance (ESG) goals—are lacking.
- d. **Fragmented governance and complex permitting.** Oversight of Indonesia's data center industry is fragmented across 12 ministries, with no single lead institution responsible for coordinating sector development, investment facilitation, and permitting. The former Coordinating Ministry of Maritime Affairs and Investment previously played a role in coordinating investment incentives for data centers, but since its dissolution in 2024, that role has not clearly been assumed by a single successor body. In 2024, the Ministry of Communication and Digital Affairs (Komdigi) was restructured to include a Directorate General for Digital Infrastructure, with a mandate to oversee the broader data center industry development beyond the Ministry's earlier focus on government data centers and the PDN. However, other institutions—including the Coordinating Ministry for Economic Affairs, the Coordinating Ministry for Infrastructure and Regional Development, the Ministry of Investment and Downstream Industry/ Indonesia Investment Coordinating Board (Badan Koordinasi Penanaman Modal; BKPM), the Ministry of Industry, the Ministry of National Development Planning (Badan Perencanaan Pembangunan Nasional; Bappenas), the Ministry of Energy and Mineral Resources, the Ministry of Environment, the Ministry of Finance, the

Ministry of Marine Affairs and Fisheries, and the Ministry of Transportation—continue to oversee various related policies, processes, and regulations. This has led to fragmented planning, regulatory overlaps, and complex permitting processes with unclear investment pathways. For example, the BKPM oversees the only relevant Indonesian Standard Industrial Classification (Klasifikasi Baku Lapangan Usaha Indonesia; KBLI) code for data centers—website hosting and data processing—even though the sector’s activities extend well beyond that narrow classification. Overall permitting in Indonesia can take 12–24 months, compared with 3–9 months in Malaysia and Thailand. This hinders the development of a cohesive investor-friendly strategy and slows private participation.

- e. **High energy and water intensity amid limited sustainable resources.** Data centers consume large amounts of electricity and water for cooling. A single hyperscale facility can use 340,000 gallons per day, although modern chiller-only cooling architectures can significantly reduce water dependency. The more pressing constraint in Indonesia remains its coal-dependent grid and limited access to renewables. Countries across the region are responding with green data center standards and ESG reporting requirements to attract responsible investment and ensure long-term resilience. International benchmarks such as International Organization for Standardization and International Electrotechnical Commission (ISO/IEC) 30134, which covers efficiency metrics, are increasingly used to assess and certify sustainable performance. In Southeast Asia, Malaysia has introduced sustainability guidelines for data centers aligned with ISO standards, including mandatory ESG reporting. Thailand promotes green infrastructure incentives tied to energy efficiency benchmarks and supports renewable-powered facilities and access to clean energy. Singapore has institutionalized green standards via the SS 564, Green Mark for Data Centers certification scheme, and the Green Data Centre Roadmap.
- f. **Limited government demand to anchor private investment.** International experience shows that leveraging government demand as an anchor client, while maintaining strong data protection, can significantly improve the investment case for large-scale data center development. In Indonesia, regulations require government agencies to use state-owned infrastructure, such as the national data centers (PDN), or agency-owned facilities. However, because the first PDN is not yet fully operational, public sector demand remains fragmented across an estimated 2,700 government data centers and server rooms at the central and subnational levels. The absence of a clear, legally binding cloud-first or hybrid cloud policy creates uncertainty for agencies and providers, limiting the ability to procure commercial cloud and colocation services. As a result, private investors face higher demand risk.

Constraints to Private Investment and Recommendations

To catalyze private investment in data centers, Indonesia can implement targeted near-term policy actions that address specific constraints and bolster investor confidence. Indonesia's large domestic market provides a strong foundation, but capturing the largest hyperscale and AI-driven investments will require positioning the country as a credible platform for regional workloads. The following recommended reforms aim to unlock domestic and regional investment opportunities.

CONSTRAINT 1. Complex and time-consuming permitting processes, resulting from inadequate business classification of data centers, increase costs and reduce predictability for investors. Despite the introduction of the online single submission risk-based approach (OSS-RBA) system, data centers are classified as medium-high risk under Government Regulation No. 28/2025. This classification requires investors to secure various certificates validated by relevant authorities before operations can begin. As a result, data center projects require multiple permits outside the OSS system, including approvals from PLN for electricity, Komdigi for telecommunications, the Ministry of Investment/BKPM, the Ministry of Transport, the Ministry of Environment (AMDAL; environmental impact analysis), and local governments, each with separate documentation requirements, processes, and timelines. Weak interagency coordination and integration lead to duplication, extending permitting timelines by as much as two years, compared with 3–9 months in Malaysia and Thailand, where one-stop investment centers streamline and fast-track approvals. These delays increase costs and reduce predictability for investors.

RECOMMENDATION 1. Integrate all data center permitting and approval processes under the new risk-based licensing framework, Government Regulation No. 28/2025, by mapping, simplifying, and sequencing all relevant permits into a unified process within the OSS system. Reducing approval timelines from the current 12–24 months to the 3–9 months achieved by regional peers would lower project development risks and costs. For hyperscale and AI-ready facilities in particular, where speed to market is a critical factor in site selection, a streamlined and time-bound process would make Indonesia more attractive as an investment destination.

CONSTRAINT 2. Nontariff measures and local content requirements, especially for specialized and proprietary equipment, increase operating costs. Obtaining specialized data center equipment is difficult, costly, and time-consuming. Relevant goods and services face customs duties of up to 25 percent. Although the BKPM Masterlist⁷⁶ offers import duty exemptions for machinery and equipment, the approval process is complex and time-consuming, requiring detailed documentation, verification, and approvals from multiple agencies, which limits its effectiveness. Local content requirements (tingkat

komponen dalam negeri; TKDN), ranging from 25 percent to 60 percent depending on the category, further constrain access to specialized equipment. While the Ministry of Communications and Informatics Regulation No. 12/2019 defines TKDN values for information technology (IT) goods and services, actual TKDN requirements are set by multiple ministries,⁷⁷ creating uncertainty for investors and increasing noncompliance risk. Some components, such as uninterruptible power supply systems and batteries, can be locally sourced relatively easily. However, meeting TKDN requirements for high-tech items like graphics processing units and transceivers is costly and slow. Obtaining such products can involve import delays of up to one year, increasing the risk of hardware obsolescence as chips advance roughly every 18 months. Although Indonesia has recently offered exemptions for select information and communication technology (ICT) equipment originating in the United States, similar exemptions are not extended to imports from Asia-Pacific economies and the European Union.

RECOMMENDATION 2. Issue a government regulation on data centers, coordinated by Coordinating Ministry for Economic Affairs (CMEA), to (1) establish a fast-track mechanism for importing specialized data center equipment through simplified import and customs procedures; (2) remove TKDN requirements for specialized data center equipment not available domestically; and (3) accelerate Masterlist approvals and customs clearance. The proposed regulation would lower both the time and financial costs of importing data center equipment. This is particularly important for AI-ready and hyperscale facilities, where equipment deployment delays can materially affect project viability and competitiveness.

CONSTRAINT 3. The absence of green standards discourages sustainable data center investment. Indonesia lacks government-endorsed, sector-wide green data center standards. Voluntary initiatives exist, including the Greenship data center certification⁷⁸ developed by the Green Building Council Indonesia and industry-led sustainability initiatives coordinated by the Indonesia Data Center Provider Organization.⁷⁹ However, uptake has been limited because these frameworks are not government endorsed or linked to incentives, permitting, or procurement. Without clear policy direction or recognized benchmarks, companies face cost and capability gaps in adopting energy-efficient and advanced cooling technologies. As global sustainability expectations rise, particularly among hyperscale cloud providers and investors that require or prioritize alignment with internationally recognized standards, Indonesia risks falling behind in attracting hyperscale and AI-ready facilities if the absence of green standards persists.

RECOMMENDATION 3. Officially recognize industry-led green data center standards aligned with international benchmarks, such as ISO/IEC 30134, including power usage effectiveness and water usage effectiveness; ISO 50001; ISO 14001; Leadership in Energy and Environmental Design; and the Uptime Institute's sustainability

rating. Leveraging industry-led standards rather than mandatory government standards or regulations would preserve flexibility as technologies and best practices evolve. While green standards may not immediately shift hyperscale demand, they improve the bankability of data center projects and enhance access to ESG-linked financing by reducing long-term regulatory and operating risk.

CONSTRAINT 4. Overlapping and incomplete data localization rules and the absence of a clear cross-border data transfer framework create legal uncertainty that raises compliance costs. While Indonesia's Personal Data Protection (PDP) Law⁸⁰ was enacted in October 2022, implementing regulations and the establishment of the supervisory authority are still pending. Both are critical to clarify enforcement responsibilities, define risk management requirements, and specify practical mechanisms for cross-border transfers, including safeguards such as standard contractual clauses (SCCs) or equivalent protections. Without this clarity, the PDP Law overlaps with other frameworks, such as the Electronic Information and Transactions Law and sector-specific data localization rules in banking, health care, and other sectors, creating compliance challenges. Companies operating across multiple sectors must comply with all rules simultaneously, driving up costs and complexity for both operators and customers. Cross-border data transfers are restricted by conditions such as prior regulatory approval and proof of equivalent safeguards in the destination jurisdiction. As a result, international operators face a compliance environment significantly more complex than in Malaysia, Singapore, or Thailand, deterring the large-scale, regionally oriented investments that Indonesia's market size and geographic position could otherwise attract.

RECOMMENDATION 4. Issue implementing regulations for the PDP Law to establish an independent data protection authority and to adopt a risk-based framework to enable cross-border data flows, including the use of SCCs and binding corporate rules (BCRs). Issuing the implementing regulations would clarify enforcement roles and enable trusted cross-border data flows, including using safeguards like SCCs, BCRs, and equivalent protections as lawful bases for cross-border transfers. A risk-based framework would further clarify which categories of data can be transferred offshore and under what conditions, improving predictability and reducing reliance on case-by-case approvals and fragmented regulation. This would reduce legal uncertainty, align with global norms, and strengthen Indonesia's ability to serve regional markets.

CONSTRAINT 5. Restrictions on the use of commercial cloud and colocation services limit the public sector's ability to pool data infrastructure needs into predictable demand that can anchor private investment in data centers. Komdigi Ministerial Regulation No. 5 of 2025 specifies that government data must be stored in national data centers (PDNs) or government agency infrastructure, with few exceptions. One exception allows third-party cloud services when they are part of the PDN framework, effectively

creating an ecosystem approach. However, the governance and operating model for this framework has not been clearly defined or operationalized, and implementing guidance for agencies remain unclear, including on how data classification should be conducted and documented and the conditions under which commercial cloud services may be integrated into the PDN ecosystem while meeting applicable requirements for data sovereignty, security, interoperability, and service continuity. In addition, as a ministerial-level regulation, it does not provide a sufficiently authoritative basis for government-wide adoption of commercial cloud solutions. From an investor perspective, government agencies are among the largest, most stable, and longest-term sources of demand for data center and cloud capacity. In many markets, government adoption of commercial cloud signals confidence and helps create predictable baseline demand that supports private investment. In Indonesia, directing most public sector demand into government facilities limits participation by commercial providers and weakens incentives to invest at scale. Enabling appropriate government use of certified commercial services would allow public demand to crowd in private capital while maintaining strong data protection.

RECOMMENDATION 5. Issue a presidential regulation to operationalize a risk-based cloud policy that enables government agencies to store and process nonsensitive and limited-classification data and applications on certified commercial cloud platforms. To operationalize Government Regulation No. 71/2019 and Ministerial Regulation No. 5/2025, the regulation should provide clear data-classification and workload-placement guidelines, streamlined approval processes, an accreditation scheme for cloud service providers, and security standards for public and hybrid cloud use. It should also define Komdigi's governance role within the PDN ecosystem to ensure integration rather than fragmentation of the government's digital infrastructure. Enabling government demand to flow to certified commercial cloud and colocation providers would allow the public sector to act as an anchor client, creating predictable baseline demand that reduces investment risk and crowds in private capital for large-scale data center and cloud infrastructure. This approach would improve scalability and cost efficiency for government digital systems while strengthening Indonesia's attractiveness as an investment destination for data center development, aligning with practices adopted by leading digital economies and regional peers.

CONSTRAINT 6. Excluding Greater Jakarta from new international submarine cable landings raises connectivity costs, weakens network resilience, and constrains the scalability of data center investment. Indonesia's Ministry of Marine Affairs and Fisheries Decree No. 14/2021 (Kepmen KP No. 14/2021) restricts new international submarine cable landings to four designated sites: Batam, Kupang, Manado, and Jayapura. This excludes Greater Jakarta, where most of Indonesia's data center capacity and enterprise demand are concentrated. While some international cables, such as Echo, Bifrost, and Apricot, have landed near Greater Jakarta since 2021, they were previously approved

under earlier regulations or subsequently granted exceptional approvals. Under the current framework, no clearly defined, predictable process exists for approving future cable landings outside the four designated locations, creating regulatory uncertainty that undermines investor confidence.

RECOMMENDATION 6. Amend Kepmen KP No. 14/2021 to expand designated submarine cable landing sites to include Jakarta and Surabaya. Expanding designated landing sites would improve international connectivity to major data center and commercial zones. Criteria for identifying suitable landing locations could include market demand, including proximity to data centers, internet exchanges, and enterprise customers; access to backbone and backhaul networks; coastline, seabed, and land suitability; exposure to natural hazards; compatibility with marine spatial plans; access to reliable power; and the predictability and cost of securing land and regulatory approvals.

CONSTRAINT 7. Restrictions on the use of foreign-flagged vessels for submarine cable installation and repair increase downtime risk and deter data center investment. Indonesia's cabotage provision under Shipping Law No. 17/2008 requires vessels that lay, maintain, or repair submarine cables in Indonesian waters to be Indonesian flagged and crewed. This raises costs, extends repair times, and increases operational risks for cable owners and data center investors. It also reduces network resilience and discourages new investment in submarine cable infrastructure. For example, repairs to the SEA-ME-WE 5 cable in April 2024 were delayed for several weeks due to cabotage restrictions, despite initial estimates of just two to three days of repair time. For hyperscale and cloud-driven data center investments, prolonged cable outages increase service-level agreement risk and insurance costs, directly affecting project bankability and site selection. Although exemptions are possible, industry feedback points to unclear approval criteria and lengthy processing timelines.

RECOMMENDATION 7. Grant exemptions under the cabotage provision in Shipping Law No. 17/2008 to allow foreign-flagged vessels to undertake submarine cable repair and maintenance. This would reduce outage duration and commercial risk for data center operators while ensuring faster service restoration and higher network reliability.

4.3

Expected Impact on Private Investment and Jobs

Targeted reforms could remove impediments to private investment in data centers. The report considers three reform scenarios: (1) allowing the public sector to use commercial cloud platforms; (2) removing high import tariffs and nontariff barriers on critical IT and cooling equipment, while reducing permitting complexity and land-acquisition hurdles across multiagency approvals; and (3) a comprehensive reform scenario combining

Scenarios 1 and 2. Using the government’s target of 2,000 MW of installed capacity by 2029 as a benchmark, reforms could help catalyze additional private investment ranging from US\$4.1 billion under appropriate public sector cloud adoption, to US\$9.7 billion from reduced import barriers and regulatory complexity, and up to US\$13.8 billion if Scenarios 1 and 2 are combined.

The boost in private investment would have a substantial impact on jobs. Reforms to enable private capital could generate as many as 143,000 new direct and indirect jobs.

Table 4.1

Priority Policy Actions to Remove Impediments to Private Investment in Data Centers

Constraint	Recommended actions
1. Complex and time-consuming permitting processes, resulting from inadequate business classification of data centers, increase costs and reduce predictability for investors.	1. Integrate all data center permitting and approval processes under the new risk-based licensing framework, Government Regulation No. 28/2025, by mapping, simplifying, and sequencing all relevant permits into a unified process within the OSS system. <i>Responsible government entities:</i> Lead—Komdigi, Ministry of Investment/BKPM, and Central Statistics Agency (BPS); others—CMEA
2. Nontariff measures and local content requirements, especially for specialized and proprietary equipment, increase operating costs.	2. Issue a government regulation on data centers, coordinated by CMEA, to (i) establish a fast-track mechanism for importing specialized data center equipment through simplified import and customs procedures; (ii) remove TKDN requirements for specialized data center equipment not available domestically; and (iii) accelerate Masterlist approvals and customs clearance. <i>Responsible government entities:</i> Lead—CMEA; supporting—Ministry of Finance (Kemenkeu), Ministry of Industry/Kemenperin (TKDN), BKPM (facilitation), and Komdigi
3. The absence of green standards discourages sustainable data center investment.	3. Officially recognize industry-led green data center standards aligned with international benchmarks, such as ISO/IEC 30134, including power usage effectiveness and water usage effectiveness; ISO 50001; ISO 14001; LEED; and the Uptime Institute’s sustainability rating. <i>Responsible government entities:</i> Lead—MEMR and Komdigi; others—PLN, Ministry of Environment and Forestry/KLHK (standards/environment), Ministry of Investment/BKPM (permits) and IDPRO (green DC standards)

(Table continues next page)

Table 4.1

Priority Policy Actions to Remove Impediments to Private Investment in Data Centers *(continued)*

Constraint	Recommended actions
4. Overlapping and incomplete data localization rules and the absence of a clear cross-border data transfer framework create legal uncertainty and raise compliance costs.	4. Issue implementing regulations for Personal Data Protection Law No. 27/2022 to establish an independent data protection authority and adopt a risk-based framework to enable cross-border data flows, including the use of standard contractual clauses and binding corporate rules. <i>Responsible government entities:</i> Lead—Komdigi; others—Ministry of Investment /BKPM, Coordinating Ministry for Economic Affairs (CMEA), Ministry of Law and Human Rights, and future data protection authority.
5. Restrictions on the use of commercial cloud and colocation services limit the public sector's ability to pool data infrastructure needs into predictable demand that can anchor private investment in data centers.	5. Issue a presidential regulation to operationalize a risk-based cloud policy that enables government agencies to store and process nonsensitive and limited-classification data on certified commercial cloud platforms. <i>Responsible government entities:</i> Lead—Komdigi; others—Coordinating Ministry for Economic Affairs (CMEA), and Ministry of Law.
6. Excluding Greater Jakarta from new international submarine cable landings raises connectivity costs, weakens network resilience, and constrains the scalability of data center investment.	6. Amend Kepmen KP No. 14/2021 to expand designated submarine cable landing sites to include Jakarta and Surabaya. <i>Responsible government entities:</i> Lead—Ministry of Marine Affairs and Fisheries (KKP) and Ministry of Transportation (Kemenhub); others—Komdigi and CMEA
7. Restrictions on the use of foreign-flagged vessels for submarine cable installation and repair increase downtime risk and deter data center investment.	7. Grant exemptions under the cabotage provision in Shipping Law No. 17/2008 to allow foreign-flagged vessels to undertake submarine cable repair and maintenance. <i>Responsible government entities:</i> Lead—Ministry of Marine Affairs and Fisheries (KKP) and Ministry of Transportation (Kemenhub); others—Komdigi and CMEA

Note: BKPM = Ministry of Investment/Investment Coordinating Board; BPS = Central Statistics Agency; CMEA = Coordinating Ministry for Economic Affairs; IDPRO = Indonesia Data Center Provider Organization; ISO = International Organization for Standardization; Komdigi = Ministry of Communication and Digital Affairs; KP = Marine Affairs and Fisheries; LEED = Leadership in Energy and Environmental Design; OSS = online single submission; PLN = Perusahaan Listrik Negara; TKDN = tingkat komponen dalam negeri (local content requirement).



5 Temperature-Controlled Logistics

AT A GLANCE

- Indonesia's temperature-controlled logistics (TCL) sector offers private investment potential, driven by rising demand for temperature-sensitive products, expanding e-commerce, and a large population. The gap between demand and installed capacity is greatest outside Greater Java region.
- Investors are discouraged by unreliable electricity, poor interisland transport and logistics infrastructure, fragmented regulations, high minimum investment requirements for foreign firms, and tariffs and nontariff measures for imported cold chain equipment. Skills shortages, foreign worker restrictions, and the lack of a national coordinating agency further discourage investment.
- Unlocking private investment will require a digital marketplace to address regional logistics imbalances, better access to reefer container plugs, streamlined business regulations, lower minimum capital requirements for foreign investors, easier hiring of specialized professionals, including foreign workers, and removal of nontariff restrictions on critical TCL equipment imports.
- Reforms could attract US\$244 million–US\$489 million in private investment by 2031 and create 17,500–70,000 direct and indirect jobs.

Sector Context and Private Investment Potential

A growing gap between demand for TCL services and installed capacity creates opportunities for private investment. Indonesia's large population, rapid urbanization, rising e-commerce market, and evolving consumer lifestyles are fueling demand for temperature-sensitive products.⁸¹ TCL play a vital role in safeguarding the quality and delivery of such goods across the supply chain, including warehousing, trucking, reefer load and containers, and reefer plugs. The industry contributed 14.1 percent of the overall logistics sector's gross domestic product in 2020.⁸² In 2024, the TCL market reached US\$11.6 billion and is projected to reach US\$16.9 billion by 2031, implying a compound annual growth rate of 5.5 percent.

Development of Indonesia's TCL sector would boost competitiveness in industries where production and demand are geographically dispersed. Improved TCL would reduce spoilage, extend shelf life, and ensure reliable delivery, supporting sectors like fisheries, meat, horticulture, processed foods, pharmaceuticals, cosmetics, and agriculture. This would help Indonesia strengthen supply chains and shift from commodity exports to higher-value, time- and temperature-sensitive products, expanding access to more distant markets and strengthening its position in global supply chains.

Installed TCL infrastructure falls short of demand for TCL services. Required TCL warehouse capacity is estimated at 4.2 million pallet positions, while installed infrastructure can supply only 3.9 million.⁸³ The sector also faces supply gaps of 1,268 trucks,⁸⁴ 707 reefer containers,⁸⁵ and 240 reefer plugs.⁸⁶

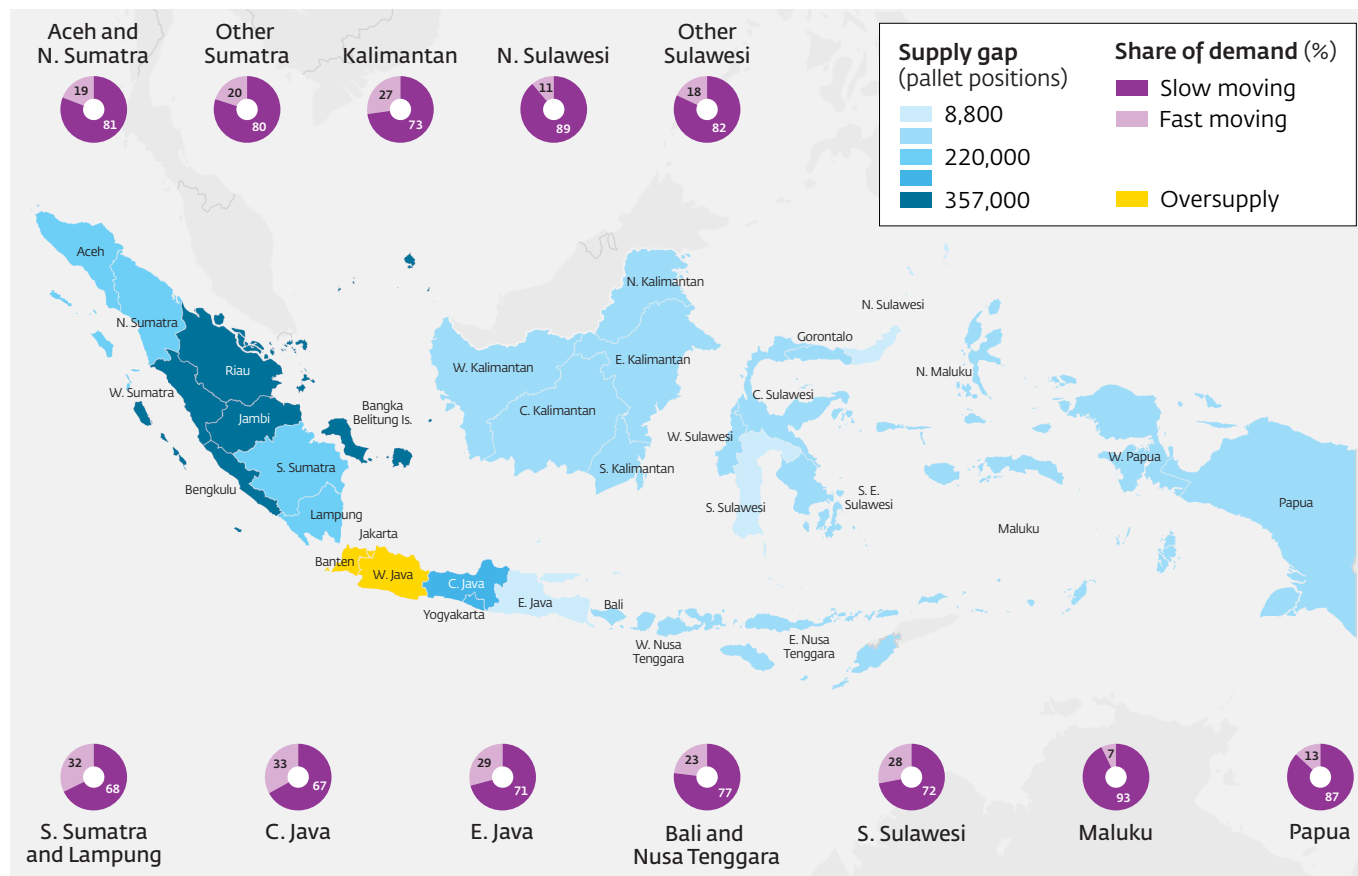
Investment in TCL is heavily concentrated in Java metropolitan areas, leaving the rest of the country poorly served (figure 5.1). Indonesia's fragmented geography and tropical climate create considerable challenges for TCL service providers. Java accounted for 63 percent of the TCL market in 2024,⁸⁷ and about 77 percent of TCL warehouse infrastructure capacity is concentrated on the island. Outside Java, investment in TCL infrastructure meets only 14 percent of demand.⁸⁸ In 2024, TCL warehouses outside Java could supply only 900,000 pallet positions,⁸⁹ leaving a supply gap of around 335,000 pallet positions.⁹⁰

Disparities between Java and other regions stem from differences in supporting infrastructure and the commercial viability of projects outside Java. The supply gap is expected to widen in the coming years as warehouse demand grows through 2031. To encourage private investment in TCL beyond Java, the public sector will need to invest in interisland transport and logistics infrastructure to help close regional TCL infrastructure gaps and support more balanced development throughout Indonesia.

Figure 5.1

TCL Supply Gaps are widespread in Indonesia, except in DKI Jakarta and West Java, Driving Investment Potential

Supply gap in pallet positions, by province



Source: ARPI; Ministry of Marine Affairs and Fisheries; Ministry of Industry; National Food Agency; Statistics Indonesia.

Note: DKI = Daerah Khusus Ibukota; TCL = temperature-controlled logistics. Demand for TCL is categorized into fast and slow-moving goods, based on the holding period or the duration of products stored in the warehouse. Fast-moving goods include vegetables, ice cream, fruit, poultry, and beverages. Slow-moving goods include milk, meat and processed meat, pharmaceuticals, and fisheries. Supply gap indicates where demand for cold storage space exceeds available warehouse capacity. Oversupply refers to where available cold storage capacity is greater than the existing demand.

Several challenges constrain the government's ability to diversify TCL activities beyond Greater Java.

Although the government has a clear ambition to expand TCL activities beyond the Java region, both central and regional governments face significant implementation challenges that create uncertainty for private investors. These include weak and uneven institutional capacity at the local and subnational levels and limited coordination between central and local governments.⁹¹ Lack of reliable electricity, poor road transport infrastructure and interisland connectivity, complex bureaucratic processes within state-owned enterprises (SOEs) involved in the TCL market, regulatory constraints,

import tariffs, and nontariff measures (NTMs) also discourage private investors from engaging in TCL supply chains across the country.⁹²

Unreliable electricity supply outside Java is a significant barrier to private investment in Indonesia's TCL sector. TCL operations depend on uninterrupted power to maintain product quality, yet electricity reliability varies widely across the archipelago. Indonesia's nationwide annual interruption duration of 5.3 hours⁹³ is higher than in peer countries, such as Viet Nam, at 3.3 hours,⁹⁴ and Thailand, at 15 minutes.⁹⁵ Areas beyond Java experience average annual outages of 9.2 hours, compared with just 2.6 hours in Java; Gorontalo and North and Central Sulawesi face blackouts totaling 19.5 hours,⁹⁶ while West Kalimantan has the most frequent outages, at 11.4 incidents per year.⁹⁷ As a result, TCL services, such as refrigerated warehouses, reefer containers, and cold transport, are concentrated in Jakarta and West Java, leaving regions like Sulawesi, Kalimantan, Maluku, and Papua underserved despite their strong potential in fisheries and agriculture. Stakeholders interviewed for this report noted that unreliable electricity supply outside Java diverts TCL investment toward Java, where grid stability ensures uninterrupted operations.

Alternative electricity sources, such as renewable energy and solar photovoltaic (PV), are limited by government quotas that do not match regional TCL energy needs.

Installing solar PV systems on cold storage rooftops and installing battery energy storage system can mitigate energy reliability issues and reduce overall energy consumption by up to 20 percent.⁹⁸ In line with the commercial and industrial solar PV distributed generation section of this report, adjusting quotas to better reflect regional demand would facilitate broader adoption of solar energy, decrease reliance on high-cost diesel generators, and improve energy efficiency.

Poor road conditions and interisland connectivity discourage private investment in TCL supply chains. As an archipelagic country, Indonesia faces inherent challenges in linking production and consumption centers across regions. Maintaining quality road infrastructure across this fragmented geography is difficult. In 2024, the share of roads considered moderately to heavily damaged was significant: 54 percent in Maluku and Papua, 36 percent in Kalimantan, 30 percent in Sulawesi, and 25 percent in Sumatera, compared with only 14 percent in Java.⁹⁹ These infrastructure constraints heighten the risk of product spoilage and reduce food supply chain efficiency.

Most raw materials and equipment required by the TCL industry are imported and subject to tariffs and NTMs. The most favored nation import tariff on freezers (Harmonized System [HS] code 84186910) was 15 percent in 2023, compared with zero in Singapore and 10 percent in Thailand and the Philippines.¹⁰⁰ Imports of essential equipment

for TCL business operations, including combined refrigerator-freezers with separate external doors (HS code 841810) and other refrigerating or freezing equipment (HS code 841869), are also subject to multiple NTMs. These include inspection requirements (NTM code B85), preshipment inspection (NTM code C1), and requirements to pass through specified customs ports (NTM code C3). Comparable capital goods imports face a lighter NTM burden in neighboring countries such as the Lao People's Democratic Republic and Malaysia.

Regulatory complexity is a major challenge to private investment in the TCL sector.

Licensing, permits, and product quality standards create significant barriers for new investors entering the market and for existing investors expanding operations. While Indonesia has made significant progress in digitizing business licensing through an online single submission (OSS) system, the World Bank Business Ready (B-READY) 2025 report points to persistent regulatory challenges, particularly when compared with Association of Southeast Asian Nations peers. Indonesia's score of 66.51 in the quality of regulations for business entry lags Singapore, at 94.44; Malaysia, at 79.76; the Philippines, at 72.82; and Viet Nam, at 68.61. This gap is most evident in specialized infrastructure, including cold storage, where the transition from registration to operation is hindered by prerequisites such as building construction permits (*persetujuan bangunan gedung*) and certificates of proper function (*sertifikat laik fungsi*). These processes require certified third-party technical experts and intensive coordination with local governments, elements that are not yet fully integrated into the OSS platform. This creates a reliance on intermediaries and extends the actual timeline for investment realization, despite the existence of an automated registration system.

Contrary to good practice, Indonesia lacks a national agency capable of harmonizing and streamlining processes across the complex TCL network. Managing the national logistics supply chain, including TCL, requires coordination among 15 ministries and 13 agencies. International good practice illustrates that high-performing TCL ecosystems often benefit from a national coordinating agency or council. Such a central body, like India's National Centre for Cold-Chain Development, can harmonize standards, investment incentives, and regulations across sectors, reducing policy fragmentation. Coordination aligns priorities among ministries, streamlines investment planning, and provides the private sector with clear guidance and efficient access to policy support. In Indonesia, no primary government agency is responsible for coordinating logistics providers and government institutions or for harmonizing systems, regulations, and business processes. This creates bottlenecks, as seen in 2024, when thousands of import containers were stranded at ports after a new Ministry of Trade regulation mandated technical approval from the Ministry of Industry, leading to customs delays.¹⁰¹ Following this incident, several logistics associations and the Indonesia Chamber of Commerce and Industry (*Kamar Dagang dan Industri Indonesia*) urged the establishment of a national logistics agency to prevent future bottlenecks. Government initiatives such as the National Logistics Ecosystem (NLE) and

Sislognas, the National Logistics System, are perceived by logistics associations and experts as unable to operate optimally without a dedicated coordinating body. According to firms in the TCL industry, Indonesia's 2024 container crisis and the drop in Logistics Performance Index rankings in 2023 show that digital tools such as the NLE are insufficient without an NLA empowered to resolve conflicting ministerial regulations.

Government agencies face challenges in effectively enforcing product safety standards among TCL operators, particularly outside the Java region. The national regulatory framework, which includes veterinary control number certification (nomor kontrol veteriner; NKV), good distribution practices (cara distribusi obat yang baik), and food safety guidelines, is comprehensive and aligned with international benchmarks, including World Health Organization guidance, International Organization for Standardization standards, and Hazard Analysis and Critical Control Point principles. However, practical implementation of these standards by TCL firms outside Java remains poor. This disparity is reflected in certification rates: NKV certification¹⁰² among cold storage facilities outside Java stands at only 49 percent, significantly lower than the 67 percent compliance rate observed in Java.¹⁰³ Lack of certification on safety standards is often evident among smaller TCL entities that do not meet the fundamental hygiene and sanitation requirements, including automatic temperature monitoring and alarm system.

SOEs play a significant role in the TCL industry, and their involvement has impacted the sector's overall efficiency and constrained private investment. Feedback from consultations for this report indicates that private investors are concerned about complex bureaucratic processes within SOEs, often exacerbated by frequent changes in SOE boards of directors that can result in decisions made by previous boards being overturned.

5.2

Constraints to Private Investment and Recommendations

Targeted policy actions can unlock additional private investment in the TCL value chain, especially in regions outside Jakarta and West Java.

CONSTRAINT 1. Reefer container imbalances between the western and eastern parts of Indonesia, for both outbound and return shipments, raise logistics costs in eastern Indonesia relative to other areas. Logistics costs to and from eastern Indonesia are, on average, twice as high as in the western part of the country.¹⁰⁴ Three out of ten TCL reefer containers returning from the eastern region to Java are empty,¹⁰⁵ indicating that limited supply constrains commercial trade. Although many regions in eastern Indonesia produce temperature-controlled goods, certain parts of the supply chain lack the volume needed to fill individual TCL container shipments efficiently, leading to significant losses.

For instance, in the fisheries sector, fluctuations in fish production for domestic and export markets, especially during the east monsoon or dry season, create unpredictable demand for TCL services. During peak seasons, demand for refrigerated storage for fishery products surges in these regions, but drops sharply in off-peak periods. This mismatch results in an estimated 22 percent production loss during distribution and marketing stages, which in turn creates uncertainty and gaps in demand for TCL services.¹⁰⁶

RECOMMENDATION 1. Create a digital marketplace platform under a national logistics agency as a designated national aggregator to enable “buy-and-bid” mechanisms. The platform would serve as a centralized marketplace for TCL products, allowing cold storage operators to bid on products demanded. It would help mitigate regional demand imbalances for refrigerated products, strengthen resilience to seasonal and geographic fluctuations, and improve capacity utilization. The platform would collect and publish production data from small and large producers and connect them with cold storage operators. It would also help private firms pool smaller volumes into larger, consolidated shipments, allowing them to meet shipping-size requirements and benefit from economies of scale. Through the “buy-and-bid” process, operators could secure guaranteed minimum volumes for storage and transport, reducing uncertainty and improving planning. Acting as consolidation hubs, cold storage facilities would facilitate efficient transfer to reefer containers and trucks, maximizing utilization and mitigating seasonal risks. India’s National Agriculture Market (eNAM) offers an example of a government-led electronic trading portal used to create networks, improve access, and establish a digital market. Indonesia’s existing Inaportnet or National Logistics Ecosystems could potentially play such a role.

CONSTRAINT 2. Access to reefer container plugs is inadequate in container ports. Reefer containers must be plugged into reefer plugs to receive electrical power and prevent temperature fluctuations before transfer to the next mode of transport. In Indonesia, commercial ports are operated directly or indirectly through concession by SOE PT Pelabuhan Indonesia (Pelindo), which is responsible for providing reefer container plugs.¹⁰⁷ An assessment of 36 main commercial ports found that more than 40 percent face shortages of reefer plugs, especially in the eastern parts of the country.¹⁰⁸ While the government already operates Inaportnet and the NLE, neither platform provides data on reefer plug availability. Integrating these platforms could create a much-needed unified database to identify and manage loanable reefer plugs.

RECOMMENDATION 2. Update the National Logistics Dashboard, including Indonesia National Single Window and Inaportnet, to provide real-time data on reefer container plug capacity, availability, and occupancy. Detailed real-time data on reefer plug use and availability at each port would expand product distribution reach while preserving quality during transport. Reefer container investors would have greater

certainty that investments in new facilities would be promptly utilized and generate revenue. Access to real-time data through the National Logistics Dashboard would support more informed decision-making, lower risks for TCL investors, and help identify potential areas for further investment.

CONSTRAINT 3. Single-purpose regulation prevents freight forwarding companies from expanding into related logistics business lines. Despite clear market demand for integrated cold logistics services, the regulatory and licensing environment creates significant barriers to business expansion. Government Regulation No. 31/2021 on Shipping requires freight forwarding companies to operate as single-purpose entities. Under this requirement, no other business activities may be carried out under the same entity, preventing companies from undertaking additional activities, such as warehousing or trucking, within the same corporate structure. The single-purpose rule, often enforced through Klasifikasi Baku Lapangan Usaha Indonesia (KBLI) and OSS licensing restrictions, means that a company registered as a freight forwarder under KBLI 52291 is restricted from acting as a carrier or combining freight forwarding with trucking or warehousing in the same legal entity.

This also hinders firms' ability to comply with key international standards, including the International Federation of Freight Forwarders Associations (Fédération Internationale des Associations de Transitaires et Assimilés; FIATA) Multimodal Transport Bill of Lading (FBL), Uniform Customs and Practice for Documentary Credits 600, and SOLAS (safety of life at sea) Verified Gross Mass.¹⁰⁹ To issue a FIATA FBL, for instance, a forwarder must act as the principal, or carrier, assuming full responsibility for the entire transportation process from pickup to final delivery. Because of regulatory restrictions, Indonesian forwarders can function only as agents, or intermediaries, rather than carriers. As a result, they cannot issue the international documents required for global trade. This regulatory silo hinders the ability of firms to scale and support integrated logistics operations, thereby constraining private investment.

RECOMMENDATION 3. Establish an integrated logistics category within the OSS system, encompassing storage, transportation, freight forwarding, and handling under a single business activity classification (KBLI). This new five-digit KBLI category should facilitate the seamless integration of existing licenses, enabling businesses to consolidate multiple logistics functions without unnecessary administrative barriers. Introducing a unified logistics business activity would require removing the single-purpose entity requirement for freight forwarding companies stipulated in Government Regulation No. 31/2021. Amendments to Ministry of Transportation Regulation No. 59/2021 would also be needed.

CONSTRAINT 4. High minimum investment requirements for foreign direct investment (FDI) are a costly entry barrier for foreign firms seeking to operate integrated logistics operations. Presidential Decree No. 49/2021 and its implementing regulation, Ministry of Investment (Badan Koordinasi Penanaman Modal; BKPM) Regulation No. 5/2025, stipulate that FDI companies must maintain minimum capital of Rp 10 billion, approximately US\$615,000, for each proposed business activity defined by a five-digit KBLI code, excluding land and buildings. This further restricts the operation of integrated logistics services. For instance, a single cold chain solution covering warehousing (KBLI 52120), trucking (KBLI 49439), and freight forwarding (KBLI 52291) would require an investor to commit over Rp 30 billion, or about US\$1,845,000, in minimum capital, excluding land and buildings. This requirement is much higher than in regional peers, such as Thailand, where the minimum is B 2 million, or about US\$61,000. Malaysia and Viet Nam do not set a minimum foreign capital requirement for investment in integrated logistics services. Presidential Decree No. 49/2021 also retains a 49 percent foreign equity cap in parts of the logistics sector, including container ships, general cargo, and roll-on/roll-off vessels, deterring foreign investment.

RECOMMENDATION 4. Amend Presidential Decree No. 49/2021 and BKPM Regulation No. 5/2025 to streamline the minimum capital requirement for foreign investment in the TCL sector by adopting a “single-sector” approach. The government should extend to the TCL sector the same treatment granted to the food and beverage sector.¹¹⁰ Instead of requiring Rp 10 billion, or about US\$615,000, in minimum capital for each individual business line, such as cold storage, trucking, and freight forwarding, foreign investors should be required to fulfil a single Rp 10 billion capital injection for all integrated activities within the logistics aggregate sector. This reform would lower entry barriers and encourage the development of seamless end-to-end cold chain infrastructure in Indonesia.

CONSTRAINT 5. Indonesia faces a shortage of professionals with the skills required to operate modern TCL technologies. TCL companies often rely on foreign expertise. Consultations with current TCL companies point to intense competition for skilled workers, particularly at the specialist and managerial levels. Interviews indicated that the shortage of skilled workers has contributed to Indonesia’s low rank in the Logistics Competence and Quality Score:¹¹¹ 68 out of 139 countries in 2023, far behind Malaysia, ranked 30th, and Thailand, ranked 39th. However, under articles 17 and 21 of Government Regulation No. 34/2021, foreign workers outside special economic zones (SEZ) may be employed for only up to four years, while foreign workers in SEZ may work for up to 10 years.¹¹² In peer countries, such as Malaysia, Singapore, and Thailand, work permits are generally longer term and based on the ongoing business needs and continued economic contribution.¹¹³

RECOMMENDATION 5. Amend Government Regulation No. 34/2021 to extend the duration of work permits by five years for specialized foreign professionals in the TCL

sector, in line with international practices. For foreign workers with specific expertise essential for TCL technology transfer, work permits could be made renewable beyond the existing time limit, as in other countries such as Malaysia and Singapore, to help secure the skilled workers TCL companies need. Easing specialized skill shortages would improve the profitability of TCL operations, making investment in the sector more attractive.¹¹⁴

CONSTRAINT 6. Indonesia imposes restrictive NTMs on imports of critical TCL equipment, such as advanced refrigerating appliances and automated cold storage machinery. Consultations with public and private stakeholders indicate that although the government exempts companies from value added tax on imported capital goods, import requirements inflate capital expenditures for logistics providers. These requirements include technical recommendations (Pertimbangan Teknis or Pertek) from the Ministry of Industry, import approvals, preshipment surveyor reports, and Indonesia National Standard (Standar Nasional Indonesia; SNI) local factory testing. Streamlining these NTMs would reduce equipment procurement costs and accelerate the adoption of advanced cold chain infrastructure.

RECOMMENDATION 6A. Amend Ministry of Trade and Ministry of Industry import policies to establish a specialized “green lane” or Masterlist exemption for advanced TCL equipment and essential cold chain components.

RECOMMENDATION 6B. Expand mutual recognition agreements through the National Standardization Agency (Badan Standardisasi Nasional) to allow international safety and energy testing standards, such as International Electrotechnical Committee certificates for commercial refrigeration, to be accepted in lieu of redundant SNI domestic laboratory testing.

5.3 Expected Impact on Private Investment and Jobs

Targeted reforms to remove impediments to private investment in the TCL sector could help increase cumulative private investment by US\$244 million–US\$489 million by 2031 and generate 17,500–70,000 new jobs.

Table 5.1

Priority Policy Actions to Remove Impediments to Private Investment in TCL

Constraints	Recommended actions
1. Reefer container imbalances between the western and eastern parts of Indonesia, for both outbound and return shipments, raise logistics costs in eastern Indonesia relative to other areas.	1. Create a digital marketplace platform under a national logistics agency as a designated national aggregator to enable “buy-and-bid” mechanisms. <i>Responsible government entities:</i> Ministry of National Development Planning, Ministry of Marine Affairs and Fisheries, Ministry of Transportation, Directorate General of Customs and Excise.
2. Access to reefer container plugs is inadequate in container ports.	2. Update the National Logistics Dashboard, including INSW and Inaportnet, to provide real-time data on reefer container plug capacity, availability, and occupancy. <i>Responsible government entities:</i> Ministry of Transportation, Coordinating Ministry of Infrastructure and Regional Development, National Single Window Agency (LNSW) of Ministry of Finance.
3. Single-purpose regulation prevents freight forwarding companies from expanding into related logistics business lines.	3. Establish an “integrated logistics” category within the online single submission system, encompassing storage, transportation, freight forwarding, and handling under a single business activity classification (KBLI). <i>Responsible government entities:</i> Coordinating Ministry for Economic Affairs, Ministry of Investment and Downstream Industry (BKPM), Ministry of National Development Planning.
4. High minimum investment requirements for foreign direct investment are a costly entry barrier for foreign firms seeking to operate integrated logistics operations.	4. Amend Presidential Decree No. 49/2021 and BKPM Regulation No. 5/2025 to streamline the minimum capital requirement for foreign investment in the TCL sector by adopting a “single-sector” approach. <i>Responsible government entities:</i> Coordinating Ministry for Economic Affairs, Ministry of Investment (BKPM), Ministry of National Development Planning.

(Table continues next page)

Table ES.4

Priority Policy Actions to Remove Impediments to Private Investment in TCL (*continued*)

Constraints	Recommended actions
5. Indonesia faces a shortage of professionals with the skills required to operate modern TCL technologies.	5. Amend Government Regulation No. 34/2021 to extend the duration of work permits by five years for specialized foreign professionals in the TCL sector, in line with international practices. <i>Responsible government entities:</i> Ministry of Manpower, Ministry of Law and Human Rights, Ministry of Transportation.
6. Indonesia imposes restrictive nontariff measures on imports of critical TCL equipment, such as advanced refrigerating appliances and automated cold storage machinery.	6a. Amend Ministry of Trade and Ministry of Industry import policies to establish a specialized “green lane” or Masterlist exemption for advanced TCL equipment and essential cold chain components. 6b. Expand mutual recognition agreements through the National Standardization Agency (BSN) to allow international safety and energy testing standards, such as IEC certificates for commercial refrigeration, to be accepted in lieu of redundant SNI domestic laboratory testing. <i>Responsible government entities:</i> Ministry of Trade and Ministry of Industry.

Note: BKPM = Badan Koordinasi Penanaman Modal (Ministry of Investment); BSN = Badan Standardisasi Nasional; IEC = International Electrotechnical Committee; INSW = Indonesia National Single Window; LNSW = Lembaga Nasional Single Window; KBLI = Klasifikasi Baku Lapangan Usaha Indonesia; SNI = Standar Nasional Indonesia (Indonesia National Standard); TCL = temperature-controlled logistics.

Appendix

Appendix A

Estimates of Potential Increases in Private Investment and Employment

A.1. Business Solar

A.1.1 *Approach and Methodology*

- The analysis presents illustrative estimates of private investment, job creation, and carbon-dioxide-equivalent emissions avoided from solar photovoltaic (PV) power generation that the recommended policy reforms could help realize, enabling firms to produce low-carbon exports. Estimates are presented in real 2025 prices.
- Two scenarios are compared throughout: a without-reform baseline and a with-reform scenario based on CPSD recommendations.
- Point estimates are derived from direct calculations using specific technical and financial parameters.
- A sensitivity analysis tests five key parameters—investment cost overruns, capacity changes, weighted average cost of capital, exchange rates, and inflation—against outcomes such as investment, levelized cost of electricity (LCOE), jobs, and capacity.
- Monte Carlo risk simulations of 10,000 trials are run to generate a distribution of outcomes. Outcomes in which the LCOE exceeds the electricity tariff are excluded, retaining only scenarios in which solar PV is cost competitive. Results are presented at the 50th and 80th percentiles to reflect the range of likely profitable outcomes.

A tornado analysis ranks the assumptions with the greatest influence on outcomes, identifying the most impactful variables.

- For job creation, the analysis adopts the most conservative model available, benchmarked against historical investment and employment data from Indonesian special economic zones, to ensure realistic projections.
- The geographic focus is 14 industrial parks across Java, Sumatra, and Sulawesi that have installed or plan to install solar PV systems.

A.1.2

Assumptions

- *Scope*: The study covers 14 industrial parks across three Indonesian islands—Java, Sumatra, and Sulawesi—with existing or planned solar PV installations. These parks host sectors such as automotive, electronics, and information technology.
- *Timeframe*: Reforms are assumed to take time to implement; solar operations are modeled as commencing in 2030 and running over a 25-year economic life. Impact estimates on investment and jobs are assumed to materialize over the medium run (5-10 years), while estimates of avoided carbon dioxide-equivalent emissions cover a plant's economic life over a 25-year horizon.
- *Without-reform scenario*: Only 1.5 gigawatts (GW), or half of Perusahaan Listrik Negara's (PLN) 3 GW quota, is assumed to be achievable, reflecting existing implementation delays and barriers.
- *With-reform scenario*: Full implementation of CPSD recommendations unlocks the remaining 1.5 GW, bringing total installed capacity to the full 3 GW quota.
- *Capital cost*: Capital cost is assumed at US\$479 per kilowatt, inclusive of 11 percent value added tax. Additional contingencies for local and foreign cost components and physical factors yield a total estimated investment cost of approximately US\$900 million for the 1.5 GW of incremental capacity.
- *Technical parameters*: The analysis assumes a capacity factor of 17 percent, an alternating-current-to direct-current derate factor of 82 percent, and annual system degradation of 0.5 percent.
- *Economic viability benchmark*: The LCOE is compared with PLN's large-industry consumer tariff of Rp 997 per kilowatt-hour (kWh), energy only and excluding the capacity charge, to assess commercial competitiveness.
- *Job impacts*: Job estimates are assessed from the perspective of the industrial sector, where electricity supply is treated as an indirect input, consistent with International Finance Corporation (IFC) power sector job impact methodology.¹¹⁵ Using IFC's job multiplier approach, based on the number of jobs per US\$1 million of revenue across the 14 parks, the employment multipliers are 19 direct, 19 indirect, and 28 induced

jobs, totaling 67 jobs.¹¹⁶ The job analysis used three approaches—log-log elasticity, linear, and cumulative annual growth rate—and selected the most conservative point estimates of 104,000 jobs.

A.1.3 *Results*

- *Private investment*: With reforms in place, incremental private investment is projected at US\$610 million–US\$780 million, in real 2025 US dollars.
- *Job creation*: Total employment supported is estimated at 73,000–94,400 jobs, distributed as follows:
 - Direct jobs: 29 percent of total
 - Indirect jobs: 29 percent of total
 - Induced jobs: 42 percent of total
- *Carbon-dioxide-equivalent emissions avoided*: Reforms are projected to generate solar PV power that supports low-carbon exports, avoiding the equivalent of 11 million–14 million metric tons (MT) of carbon dioxide over the 25-year project life, or 0.4 million–0.6 million MT per year, based on grid electricity emissions.
- *Economic viability*: In 8,816 out of 10,000 Monte Carlo simulation trials, the LCOE of commercial and industrial solar remained below PLN's large-industry tariff of Rp 997 per kWh, confirming robust commercial viability under a wide range of conditions.

A.2. *Data Centers*

A.2.1 *Approach and Methodology*

The report estimates the potential private investment and job impacts of data center development in Indonesia under three reform scenarios: (1) allowing the public sector to use commercial cloud platforms; (2) removing high import tariffs and nontariff barriers on critical information technology (IT) and cooling equipment, while reducing permitting complexity and land acquisition hurdles across multiagency approvals; and (3) a comprehensive reform scenario combining Scenarios 1 and 2. All figures are expressed in 2025 US dollars.

A.2.2 *Assumptions*

- *Scenario 1*: Allowing public sector to use commercial cloud platforms: The public sector outsources 50 percent of its cloud service needs to the private sector, equivalent to 110 MW of additional data center capacity by 2030.
- *Scenario 2*: Removing high import tariffs and nontariff barriers on critical IT equipment

and reducing permitting complexity and land acquisition hurdles: The installed capacity forecast is based on estimates of the impact of these reforms produced by Mordor Intelligence (2026).

- *Scenario 3: Comprehensive reforms: Scenarios 1 and 2 combined.*
- The average investment cost through 2030 is assumed to be US\$26.1 million for information and communication technology (ICT) and US\$11.1 million for non-ICT investment per additional 1 MW of installed capacity.
- The data center sector employment multiplier is assumed to be 74 job-years per US\$1 million of total investment.
- *Data sources:* Mordor Intelligence (2026), Cushman and Wakefield (2025), Arizton Advisory and Intelligence (2023), and AWS (2021). Derived metrics are World Bank Group staff calculations based on these sources.

A.2.3 *Results*

- *Scenario 1:* New private investment for 110 MW is estimated at US\$4.1 billion. Job creation relative to the no-reform benchmark is unchanged, because only the source of additional investment changes, from public to private financing.
- *Scenario 2:* Installed capacity reaches 2,260 MW by 2030, and private investment for 260 MW above the baseline is estimated at US\$9.7 billion relative to the no-reform benchmark. Total estimated employment creation is estimated at 143,000 direct and indirect jobs.
- *Scenario 3:* Total capacity remains at 2,260 MW, but the private sector contributes an additional 110 MW. Additional private investment covers 370 MW that would have been publicly financed under the baseline, totaling US\$13.8 billion relative to the no-reform benchmark. Total estimated employment creation is estimated at 143,000 direct and indirect jobs.

A.3. **Temperature-Controlled Logistics**

A.3.1 *Approach and Methodology*

This analysis estimates potential private investment and employment impacts in Indonesia's temperature-controlled logistics (TCL) sector, covering four core subsectors: TCL warehouses, refrigerated (reefer) trucks, reefer containers, and port container reefer plugs. The methodology combines three complementary approaches in sequence: a supply-demand gap analysis to derive investment value, a return on investment framework

to estimate potential revenue, and Global Trade Analysis Project (GTAP) job multipliers to translate revenue into job creation estimates.

A.3.2 *Assumptions*

- *Infrastructure scope*: The demand-supply gap analysis focuses on four TCL infrastructure components: TCL warehouses, measured in square meters; refrigerated (reefer) trucks, measured in vehicles; reefer containers, measured in container units; and port container reefer plugs, measured in onshore installation packages.
- *Investment price assumptions*: Unit prices are sourced from expert consultations, industry associations, and manufacturer data and converted at an exchange rate of US\$1 = Rp 16,500:
 - TCL warehouse: US\$909 per square meter
 - Reefer truck, Colt Diesel Double (CDD): US\$42,309 per unit
 - Reefer container, 20-foot: US\$26,667 per unit
 - Onshore reefer plug package: US\$12,157 per unit
- *Investment scenarios*: Three scenarios are applied based on the extent to which investment addresses the infrastructure gap: optimal, 100 percent coverage; intermediate, 75 percent coverage; and moderate, 50 percent coverage.
- *Revenue potential*: Potential revenue is estimated by applying a return on investment range of 15 percent to 30 percent per year over a five-year horizon, 2026–31, yielding a revenue multiplier of 0.75–1.5 times the total investment value.
- *GTAP job multiplier*: Job creation is estimated by subsector using sector-specific GTAP multipliers applied to potential revenue. Three multipliers are used across the four subsectors:
 - Warehousing and courier: 79 jobs per US\$1 million in revenue, applied to TCL warehouses and container reefer plugs
 - Land transportation: 84 jobs per US\$1 million in revenue, applied to reefer trucks
 - Sea transportation: 75 jobs per US\$1 million in revenue, applied to reefer containers
- *Data sources*: Demand estimation uses national consumption data from the Central Bureau of Statistics (Badan Pusat Statistik), while supply data are synthesized from the Indonesia Cold Chain Association (Asosiasi Rantai Pendingin Indonesia), Pelindo, and Indonesia Container Depots' Association (Asosiasi Depo Kontainer Indonesia).

A.3.3 *Results*

- *Optimal scenario*: Total investment of US\$489 million, generating potential revenue of US\$440 million–US\$879 million and an estimated 34,907–69,814 new jobs.

- *Intermediate scenario*: Total investment of US\$366 million, generating potential revenue of US\$330 million–US\$660 million and an estimated 26,181–52,361 new jobs.
- *Moderate scenario*: Total investment of US\$244 million, generating potential revenue of US\$220 million–US\$440 million and an estimated 17,454–34,907 new jobs.

Notes

1. Sector selection is not intended to be exhaustive or to imply that other sectors lack investment or growth potential. Rather, the focus is on sectors in which constraints to private investment can feasibly be addressed through public policy actions and thereby generate commercially viable opportunities for private investors.
2. World Bank (2026a).
3. Mitsui (2022); Southeast Asia Infrastructure (2024); Sun Energy (2024); UOB (2023).
4. This chapter draws extensively on World Bank Group, Indonesia Growth and Jobs Report (World Bank 2026b).
5. World Bank (2026b).
6. Ibid.
7. Ibid.
8. Ibid.
9. Ibid.
10. Ibid.
11. Ibid.
12. Ibid.
13. The discussion that follows draws extensively on World Bank Group, Indonesia Economic Prospects: People-First Housing—A Roadmap from Homes to Jobs to Prosperity in Indonesia (World Bank Group 2026a).
14. Danantara may initially increase the fiscal deficit by 0.2 percent of GDP. Successful investments could raise tax receipts, but outcomes are uncertain and depend on improved SOE governance.
15. World Bank (2024a).
16. World Bank (2024b).
17. Ibid.
18. World Bank (2026b).
19. World Bank Group (2026a).
20. Patunru (2023).
21. Montfaucon, Lakatos, and Agnimaruto (2023).
22. World Bank (2026b).
23. The survey was conducted in May–June 2025 and included MNCs with and without affiliates in Indonesia.
24. IMF and World Bank (2024).
25. World Bank (2026b).
26. IFC (2017).
27. IMF (2024).
28. Data from CEIC.
29. World Bank (2026b).
30. Ibid.
31. MEMR (2024).
32. Ministry of Energy and Mineral Resources, “2024 Indonesia Statistic of Electricity.”
33. Hasan and Hummer (2026)
34. World Bank (2026b).
35. Ibid.
36. MEMR (2024). Projections also account for annual population growth of 0.7 percent and the country's economic growth target of 5.4–6.4 percent through 2060.
37. RE100, Renewable Energy 100, is a global corporate renewable energy initiative that brings together hundreds of businesses committed to 100 percent renewable electricity (see <https://www.there100.org/about-us>).
38. This report refers to distributed generation as business models in which power is generated at or near the point of consumption, including systems installed on rooftops, ground-mounted, floating on water bodies, and on canopies, such as parking lots.
39. IESR (2024a).
40. Damayanti, Tumiwa, and Citraningrum (2019); Pramadya and Kim (2024); IESR (2022; 2023; 2024a; 2024b).
41. The Lantau Group (2024).
42. IEA (2025a).
43. MEMR Decree No. 267.K/MB.01/MEM.B/2022.
44. MEMR Decree No. 58.K/HK.02/MEM.B/2022.
45. IEA (2025b).
46. World Bank (2025).
47. PwC (2016); Yustika (2025).
48. World Bank (2025).
49. MENTARI (2024).

50. World Bank (2025).
51. JETP Indonesia (2023).
52. Ibid.
53. IESR (2024a).
54. Redaputri, Santoso, and Barusman (2024).
55. Purba (2025).
56. World Bank (2025).
57. "Average Monthly Earnings of Employees by Sex and Economic Activity," Indicators and Data Tools, ILOSTAT, https://ilostat ilo.org/data/?cat_mode=subject.
58. There are different types of data center operators serving different market segments. Colocation providers lease rack space and power to multiple tenants, allowing them to host their own IT infrastructure in shared or dedicated environments. Their growth depends heavily on land availability and policies such as data localization. Cloud providers, by contrast, deliver on-demand computing, storage, and networking services at global or regional scale. They prefer liberal regulatory regimes that support cross-border data flows, often leasing space from colocation facilities while building their own facilities as demand grows. Hyperscale operators, such as Amazon Web Services, Microsoft, and Google, run massive, highly standardized facilities designed to support large, scalable workloads and their own cloud services.
59. "Data Center Market Size, Share, and Trends 2026 to 2035," Precedence Research, last updated July 2026, <https://www.precedenceresearch.com/data-center-market>.
60. Maybank Research (2024).
61. The Economist (2025).
62. Google, Temasek, and Bain and Company (2024).
63. BPS (2025).
64. "Matriks Pembangunan: Rencana Pembangunan Jangka Menengah Nasional Tahun 2025–2029," Appendix II, Regulation of the President of the Republic of Indonesia No. 12 of 2025, <https://jdih.kemenkoinfra.go.id/cfind/source/files/perpres/2025/perpres-nomor-12-tahun-2025/lampiran-ii-perpres-nomor-12-tahun-2025.pdf>.
65. DatacenterMap; Telegeography.
66. Lai (2024).
67. MIDA (2024).
68. Li (2025).
69. Yong (2025).
70. The Nation (2025).
71. KWM (2025).
72. Based on figures for Greater Jakarta, which accounts for 90 percent of Indonesia's data center capacity (Cushman and Wakefield 2025).
73. Cory and Dascoli (2021).
74. Cushman and Wakefield (2025).
75. Yong (2025).
76. Darussalam et al. (2024).
77. Indonesia's local content policy for ICT and data center projects is governed by Permen Kominfo No. 12/2019, which defines how TKDN is calculated and reported, including a counting rule under which telecommunications components with at least 50 percent local content are counted as 100 percent local. However, the regulation does not impose minimum thresholds for equipment or services. Actual TKDN thresholds are set by other ministries. For equipment, public procurement triggers apply when TKDN is at least 25 percent and TKDN plus BMP is at least 40 percent, under Government Regulation No. 29/2018, article 61(1)–(2). For construction services, TKDN must be at least 45 percent, and for consultancy services, at least 60 percent, under Kepmen PUPR No. 602/KPTS/M/2023. These thresholds formally apply to APBN-funded projects but may be referenced by other agencies and regions (Diktum Kedelapan). Imports may be permitted if no domestic product meets the required TKDN threshold, subject to verification.
78. The Greenship Data Center certification scheme administered by the Green Building Council Indonesia assesses sustainability dimensions such as energy efficiency, water use, and building management. It has been applied to selected facilities, including Indonesia's National Data Center, which achieved Greenship Data Center Platinum certification (see GBC Indonesia 2024).
79. The Indonesia Data Center Provider Organization is a voluntary industry initiative to promote sustainability in the country's data center sector. It aims to establish green standards aligned with international benchmarks like ISO/IEC 30134, focusing on energy efficiency, environmental protection, and ESG practices. The initiative includes workshops, white papers, and stakeholder consultations to develop a national certification framework, but uptake has

been limited due to the absence of formal regulatory support and incentives.

80. Personal Data Protection Law No. 27/2022.
81. Temperature-sensitive products include fresh and frozen food and beverages, horticulture products, pharmaceuticals, and fishery products. In 2024, total national production of such products was estimated at 5.6 million tons, with fishery products accounting for 29 percent, horticultural products for 21 percent, pharmaceutical products for 20 percent, processed food for 14 percent, and other products for the remaining 16 percent (ARPI; Ministry of Marine Affairs and Fisheries; Ministry of Industry; National Food Agency; "GDP by Industry-Statistical Data," Statistics Indonesia, <https://www.bps.go.id/en/statistics-table/2/NjUjMg==/gdp-by-industry--2010-100---billion-rupiahs-.html>. While accelerating growth in temperature-sensitive products may require broader policy and regulatory reforms, this report focuses on the logistics dimension: temperature-controlled logistics.
82. Based on "Domestic Transactions Based on Base Prices 2020 Data," Statistics Indonesia, <https://www.bps.go.id/en/statistics-table/1/Mjl2OSMx/tabel-input-output-indonesia-transaksi-domestik-atas-dasar-harga-dasar--17-produk---2020--juta-rupiah-.html>.
83. Calculated by SIRI using data from ARPI; Ministry of Marine Affairs and Fisheries; Ministry of Industry; National Food Agency; Statistics Indonesia.
84. The supply of TCL trucks is sourced from ARPI. Demand for TCL trucks is calculated based on the number of trucks required to transport goods according to the warehouse supply-demand mapping in figure 5.1.
85. Data on reefer container supply are sourced from ARPI, whereas demand data are calculated based on data obtained from Inaportnet.
86. A reefer plug is an electrical socket used to power reefer containers. The supply of reefer plugs is derived from data reported in the Indonesia Port Corporation (*Pelindo*) Annual Report, and demand is estimated based on the number of plugs required to support reefer container throughput as recorded in Inaportnet.
87. Mordor Intelligence (2025).
88. Makreo (2024); WFLO (2021).
89. ARPI; Ministry of Marine Affairs and Fisheries; Ministry of Industry; National Food Agency; Statistics Indonesia.
90. Calculated by SIRI using data from ARPI; Ministry of Marine Affairs and Fisheries; Ministry of Industry; National Food Agency; Statistics Indonesia.
91. IBC (2024).
92. Marketwide Research (2025).
93. PLN (2024)
94. MEA (2024).
95. Vietnam Electricity (2024).
96. Numbers are taken from 2024 System Average Interruption Duration Index; PLN (2024).
97. Numbers are taken from 2024 System Average Interruption Frequency Index PLN Statistics (2024).
98. Yatim et al. (2022); CPSD consultations.
99. "Stability of Provincial Roads," Ministry of Public Works, <https://data.pu.go.id/dataset/kemantapan-jalan-provinsi>.
100. "Applied Duties and Taxes," Tariff and Import Notifications (IDB), Tariff Line, World Trade Organization, <https://ttd.wto.org/en/data/idb/applied-duties?member=C458&product=8418109100&year=2023>.
101. To address import licensing issues and container backlogs at ports, the government has issued Minister of Trade Regulation No. 8 of 2024 (Coordinating Ministry for Economic Affairs 2024).
102. The veterinary control number certificate (NKV) serves as valid written proof of compliance with hygiene and sanitation requirements, guaranteeing the safety of animal products at animal product business units, including production, warehousing, distribution, and sales facilities.
103. Ministry of Agriculture (2024); Ministry of Marine Affairs and Fisheries (2024).
104. Logistics costs are calculated by aggregating total expenditures across key supply chain functions, including freight rates for trucking and shipping, warehousing, and shipment-related administration.
105. Stated by the Coordinating Ministry of Infrastructure and Regional Development during CPSD consultations.
106. Ministry of National Development Planning (2021).
107. Some of these ports are not operated by *Pelindo* but by the Ministry of Transportation or private entities, such as private terminals for specific cargo industries like palm oil.
108. "Vessel Visit Data," Inaportnet, <https://monitoring-inaportnet.dephub.go.id/>. During CPSD consultations,

- the Coordinating Ministry of Infrastructure and Regional Development stated that the ministry and *Pelindo* have procured an additional 127 reefer plug units for Teluk Lamong Terminal, which is still insufficient to meet the country's needs.
109. These international standards require freight forwarders to coordinate with various carrier and terminal networks.
 110. BKPM Regulation No. 5/2025 grants an exemption to the food and beverage sector, under which the Rp 10 billion minimum capital requirement applies collectively to all activities under the same two-digit KBLI code in one location.
 111. World Bank (2023). Logistics Competence and Quality Score assess countries' competence and quality of logistics services, such as transport operators and customs brokers.
 112. An SEZ is a designated area established to carry out economic activities and attract investment. SEZs typically offer fiscal benefits, favorable tax treatment, streamlined customs procedures, and nonfiscal advantages, such as simplified bureaucracy, specialized employment and immigration arrangements, efficient services, and overall orderliness.
 113. Foreign workers in Malaysia and Thailand may be employed for up to 10 years (Immigration Department of Malaysia 2025; Thailand Board of Investment 2025). In Singapore, work permits for high-skilled foreign workers may be renewed indefinitely, subject to eligibility (Ministry of Manpower of Singapore 2025).
 114. Longer-term solutions to skills shortages in the sector could include measures to facilitate skills transfer and targeted vocational training.
 115. Burgi, Hovhannisyan, and Mondragon-Velez (n.d.).
 116. These multipliers are derived from value added multipliers and employment elasticities obtained from Burgi, Hovhannisyan, and Mondragon-Velez (n.d.). The value added multipliers are estimated using a social accounting matrix multiplier approach, which relies on the latest version of the Global Trade Analysis Project database for 2017. They include estimates of direct and indirect jobs created. Direct jobs reflect the direct contribution of investment in the sector. Indirect jobs can be divided into (i) backward supply chain linkages, which increase employment in other sectors through higher domestic demand for intermediate inputs; and (ii) consumption spillovers, or induced employment, which result from higher household income triggered by increases in direct and supply chain employment and income.

Abbreviations and Acronyms

AI	artificial intelligence	IT	information technology
APBN	Anggaran Pendapatan dan Belanja Negara (Indonesia's Annual State Budget Plan)	IUPTLU	Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Umum (Electricity Supply Business License for Public Interest)
ARPI	Indonesia Cold Chain Association	JAMALI	Jawa-Madura-Bali
B	Thai baht	KBLI	Klasifikasi Baku Lapangan Usaha Indonesia (Indonesian Business Classification)
BCR	binding corporate rules	KKP	Kementerian Kelautan dan Perikanan (Ministry of Marine Affairs and Fisheries)
BKPM	<i>Badan Koordinasi Penanaman Modal</i> (Ministry of Investment and Downstream Industry)	LCOE	levelized cost of electricity
BMP	<i>Bobot Manfaat Perusahaan</i> (Company Benefit Weight, used in granting incentives to companies that meet certain local content requirements)	LNSW	Lembaga National Single Window (National Single Window Agency)
BPS	<i>Badan Pusat Statistik Indonesia</i> (Statistics Indonesia)	MEMR	Ministry of Energy and Mineral Resources
BSN	Badan Standardisasi Nasional (National Standardization Agency)	MNC	multinational corporation
C&I	commercial and industrial	MT	metric ton
CAGR	compound annual growth rate	MW	megawatt
CEPA	comprehensive economic partnership agreement	NKV	nomor kontrol veteriner (veterinary control number)
CMEA	Coordinating Ministry for Economic Affairs	NLE	National Logistics Ecosystem
CPSD	Country Private Sector Diagnostic	NTM	nontariff measure
ESG	environmental, social, and governance	OSS	online single submission
EU	European Union	PDN	pusat data nasional (national data centers)
FDI	foreign direct investment	PDP	Personal Data Protection
FIATA	Fédération Internationale des Associations de Transitaires et Assimilés (International Federation of Freight Forwarders Associations)	Pelindo	PT Pelabuhan Indonesia (Indonesian Ports Company)
GDP	gross domestic product	PLN	Perusahaan Listrik Negara
GTAP	Global Trade Analysis Project	PPA	power purchase agreement
GW	gigawatt	PSO	public service obligations
HS	Harmonized System	PV	photovoltaic
ICT	information and communication technology	Rp	Indonesian rupiah
IEC	International Electrotechnical Committee	SCC	standard contractual clauses
IFC	International Finance Corporation	SEZ	special economic zones
IMF	International Monetary Fund	SLO	sertifikat laik operasi (operational feasibility certificates)
INSW	Indonesia National Single Window	SME	small and medium enterprises
IPPs	independent power producers	SNI	Standar Nasional Indonesia (Indonesia National Standard)
ISO	International Organization for Standardization	SOE	state-owned enterprise
		SWF	sovereign wealth fund

TCL	temperature-controlled logistics
TKDN	tingkat komponen dalam negeri (local content requirements)
UMIC	upper-middle-income country

References

- Arizton Advisory and Intelligence. 2023. "Indonesia Data Center Market – Investment Analysis and Growth Opportunities 2023–2028." Arizton Advisory and Intelligence, Chicago.
- ARPI (Asosiasi Rantai Pendingin Indonesia; Indonesian Cold Chain Association). 2019. "Indonesia Cold Chain Outlook." ARPI, Jakarta.
- ARPI (Asosiasi Rantai Pendingin Indonesia; Indonesian Cold Chain Association). 2025. "Cold Chain Infrastructure of Indonesia." ARPI, Jakarta.
- AWS (Amazon Web Services). 2021. "AWS Launches AWS Asia Pacific (Jakarta) Region in Indonesia." AWS News, December 14, 2021. <https://www.aboutamazon.sg/news/aws/aws-launches-aws-asia-pacific-jakarta-region-in-indonesia>.
- BPS (Badan Pusat Statistik Indonesia; Statistics Indonesia). 2024. "Average Weekly Per Capita Consumption by Other Food and Beverage Group Per Regency/City (Commodity Unit)." BPS, Jakarta. <https://www.bps.go.id/id/statistics-table/2/MjEwNyMy/rata-rata-konsumsi-perkapita-seminggu-menurut-kelompok-makanan-dan-minuman-jadi-per-kabupaten-kota.html>.
- . 2024. "Mid-Year Population - Statistical Data." BPS, Jakarta. <https://www.bps.go.id/en/statistics-table/2/MTk3NSMy/jumlah-penduduk-pertengahan-tahun--ribu-jiwa-.html>.
- . 2025. *Statistik Telekomunikasi Indonesia 2024: Telecommunication Statistics in Indonesia*. Volume 13. Jakarta: BPS. https://www.bps.go.id/id/publication/2025/08/29/beaa2be400eda6ce6c636ef8/statistik-telekomunikasi-indonesia-2024.html?__cf_chl_f_tk=0e0B6RIB87Dn12UDWdMk6VrWtq98LhvtYQQ2BWSis-1783450188-1.0.1.1-MDAgcJFDDJ0_Kvjx2KDnJGhUhnjJLGo7liPPLVEQFo.
- Burgi, Constantin, Shoghik Hovhannisyan, and Camilo Mondragon-Velez. n.d. "GDP-Employment Elasticities across Developing Economies." Mimeo. International Finance Corporation, Washington, DC.
- Coordinating Ministry for Economic Affairs. 2024. Minister of Trade Regulation No. 8 of 2024. <https://www.ekon.go.id/publikasi/detail/5779/atasi-kendala-perizinan-impor-serta-penumpukan-kontainer-di-pelabuhan-pemerintah-berlakukan-permendag-nomor-8-tahun-2024#>.
- Cory, Nigel, and Luke Dascoli. 2021. "How Barriers to Cross-Border Data Flows Are Spreading Globally, What They Cost, and How to Address Them." Information Technology and Innovation Foundation. Information Technology and Innovation Foundation, Washington, DC. <https://itif.org/publications/2021/07/19/how-barriers-cross-border-data-flows-are-spreading-globally-what-they-cost/>.
- Cushman and Wakefield. 2025. "Asia Pacific Data Centre Construction Cost Guide 2025." Cushman and Wakefield, Chicago. <https://digital.cushmanwakefield.com/asiapacificdatacentreconstructioncostguide-01-2025-apac-regional-en-content-datacentres/6/>.
- Damayanti, Hapsari, Fabby Tumiwa, and Marlistya Citraningrum. 2019. *Residential Rooftop Solar Technical and Market Potential in 34 Provinces in Indonesia*. Jakarta: Institute for Essential Services Reform.
- Darussalam, Danny Septriadi, B. Bawono Kristiaji, Made Astrin Dwi K., and N. Daniel Sohilit. 2024. *Guidelines for Tax Incentives in Indonesia 2024/2025*. Jakarta: DDTC (PT Dimensi International Tax). <https://ddtc.co.id/uploads/pdf/book/Guidelines-for-Tax-Incentives-in-Indonesia-2024-2025.pdf>.
- GBC (Green Building Council) Indonesia. 2024. "GREENSHIP Gala: Celebrating Innovation and Dedication Towards Sustainability." GBC Indonesia, Jakarta. <https://www.gbcindonesia.org/read/dBG0p6JSL6wOjtTcofOn5TrpzCSlcoun1162d-75b8e844398aac44653673cbaa33DH6yxRQa-9F?utm>.
- Google, Temasek, and Bain and Company. 2025. "E-Conomy SEA 2025: From Digital Decade to AI Reality: Accelerating the future in ASEAN." Google, Temasek, and Bain and Company, Mountain View, Singapore, and Boston. <https://www.temasek.com>.

- sg/content/dam/temasek-corporate/news-and-views/resources/reports/e-economy-sea-2025-report.pdf.
- Hasan, Katherine, and Lucy Hummer. 2026. *Out of Sight, out of Control: 31 GW of Captive Coal Is Jeopardizing Indonesia's Economic and Emissions Goals*. Helsinki and San Francisco: Centre for Research on Energy and Clean Air and Global Energy Monitor.
- IBC (Indonesian Business Council). 2024. "Advancing Indonesia's Governance Reform Towards Achieving Indonesia's Emas 2045' Vision: Strategic Policy Recommendations and Actions." White Paper, IBC, Jakarta.
- IEA (International Energy Agency). 2025a. "Coal 2025 Analysis and Forecast to 2030." IEA, Paris.
- . 2025b. "Indonesia." IEA, Paris <https://www.iea.org/countries/indonesia>.
- IESR (Institute for Essential Services Reform). 2022. *Indonesia Solar Energy Outlook 2023*. Jakarta: IESR.
- . 2023. *Indonesia Energy Transition Outlook 2024: Peaking Indonesia's Energy Sector Emission by 2030—The Beginning or The End of Energy Transition Promise*. Jakarta: IESR.
- . 2024a. *Indonesia Solar Energy Outlook 2025*. Jakarta: IESR.
- . 2024b. *Indonesia Energy Transition Outlook 2025: Navigating Indonesia's Energy Transition at the Crossroads—A Pivotal Moment for Redefining the Future*. Jakarta: IESR.
- IFC (International Finance Corporation). 2017. "MSME Finance Gap: Assessment of the Shortfalls and Opportunities in Financing Micro, Small and Medium Enterprises in Emerging Markets." IFC, Washington, DC.
- IMF (International Monetary Fund) and World Bank. 2024. "Indonesia Financial Sector Assessment Program." IMF and World Bank, Washington, DC.
- . 2024. "Indonesia: Selected Issues." IMF Country Report No. 24/271, IMF, Washington, DC. <https://doi.org/10.5089/9798400284663.002>.
- Immigration Department of Malaysia. 2025. "Requirements for Hiring Foreign Workers." <https://www.imi.gov.my/index.php/en/main-services/foreign-worker/>.
- IRENA (International Renewable Energy Agency). 2024. "Decentralised Solar PV: A Gender Perspective." IRENA, Abu Dhabi.
- JETP (Just Energy Transition Partnership) Indonesia. 2023. "Just Energy Transition Partnership (JETP) Indonesia Comprehensive Investment and Policy Plan."
- KNIC (Karawang New Industry City). 2025. "Projection and Development Strategy of Indonesia's Industrial Zones 2025–2029." KNIC, Karawang. <https://knic.co.id/index.php/projection-and-development-strategy-of-indonesias-industrial-zones-2025-2029>.
- Kuiper, Gabrielle. 2025. "The Revolution Will Be in Distribution: Faster, Cheaper Decarbonisation through Integrating Distributed Energy Resources (DER)." Engineers Australia, Canberra.
- KWM (King and Wood Mallesons). 2025. *KWM Digital Economy: Data Centers APAC Regulatory Guide*. Beijing: KWM. <https://www.kingandwood.com/global/en/insights/latest-thinking/navigating-data-centre-opportunities-across-apac-thailand.html>.
- Lai, J. 2024. "Due Diligence Study for Data Centre Development in Malaysia." IPM Professional Services, Penang. <https://ipm.my/wp-content/uploads/2024/07/Due-Diligence-Study-for-Data-Centre-Development-in-Malaysia.pdf>.
- Li, C. 2025. "The Rise of Data Centres: Powering Asia-Pacific's Digital Future." *Knight Frank Horizon* (blog), January 23, 2025. <https://apac.knightfrank.com/horizon/content/the-rise-of-data-centres>.
- Makreo Research. 2024. "Indonesia Logistics and Warehousing Market Forecast (2018–2028)." Makreo Research, Mumbai.
- Marketwide Research. 2025. "Indonesia Cold Chain Logistics Market Analysis – Industry Size, Share, Research Report, Insights, COVID-19 Impact, Statistics, Trends, Growth & Forecast 2025–2034."
- Maybank Research. 2024. *ASEAN Data Centre: Ride The Multi-Year Data Center Wave*. Singapore: Maybank Research. <https://mkefactsettd.maybank-ke.com/PDFS/407187.pdf>.
- MEA (Metropolitan Electricity Authority). 2024. "MEA Affirms Readiness! Stable and Safe Electrical System to Handle Peak Demand in the Summer of 2025." Announcement, MEA, March 21, 2025. <https://www.mea.or.th/en/public-relations/corporate-news-activities/announcement/mea-stableandsafe-electricalsystem-peakdemand-summer-2025>.
- MEMR (Ministry of Energy and Mineral Resources of Indonesia). 2024. *National Generation Plan for Electricity (Rencana Umum Ketenagalistrikan Nasional) 2024–2060*. Jakarta: MEMR.
- . 2025. *Electricity Statistics Book No. 38–2024*. Directorate General of Electricity, Ministry of Energy

- and Mineral Resources, Indonesia.
- MENTARI (Menuju Transisi Energi Rendah Karbon Indonesia). 2024. *Local Content Requirement Study: Market Analysis and Supply Chain Assessment for Domestic Manufacturers of Solar Photovoltaic Modules and Batteries*. Jakarta: MENTARI.
- MIDA (Malaysian Investment Development Authority). 2024. "What Are Data Centers, and How Come Malaysia Is Able to Attract Billions in Tech Investments for Them?" MIDA, October 14, 2024. <https://www.mida.gov.my/mida-news/what-are-data-centres-and-how-come-malaysia-is-able-to-attract-billions-in-tech-investments-for-them/>.
- Ministry of Agriculture. 2024. "National Information System Veterinary Control Number Certification (Sisnas NKV)." https://sisnasnkv.ditjenpkh.pertanian.go.id/site/front-end?sort=-id_provinsi&page=6.
- Ministry of Manpower of Singapore. 2025. "Work Passes." <https://www.mom.gov.sg/passes-and-permits>.
- Ministry of Marine Affairs and Fisheries. 2024. "Cold Storage Distribution in Indonesia." <https://portaldata.kkp.go.id/portals/data-statistik/cold-storage/tbl-dinamis>.
- Ministry of National Development Planning. 2021. "Study Report: Food Loss and Waste in Indonesia."
- Mitsui. 2022. "Investment in Indonesian Distributed Solar Power Generation Operator Xurya." Topics, Mitsui, September 28, 2022. https://www.mitsui.com/jp/en/topics/2022/1244857_13410.html.
- Montfaucon, Angella, Csilla Lakatos, and Bayu Agnimaruto. 2023. "Trading in Green: Policy Notes on Climate Change and Trade in Indonesia." World Bank, Washington, DC.
- Mordor Intelligence. 2025. "Indonesia Cold Chain Logistics Market Size & Share Analysis - Growth Trends and Forecast (2025 - 2030)." <https://www.mordorintelligence.com/industry-reports/indonesia-cold-chain-logistics-market>.
- . 2026. "Indonesia Data Center Market Size and Share Analysis: Growth Trends and Forecast (2026–2031)." Mordor Intelligence, Hyderabad. <https://www.mordorintelligence.com/industry-reports/indonesia-data-center-market>.
- National Electric Energy Agency. n.d. "Sandboxes Tarifários (Sandboxes Tariffs). Ministry of Mines and Energy, Brazil. <https://www.gov.br/aneel/pt-br/empreendedores/sandboxes-tarifarios>.
- Ofgem (Office of Gas and Electricity Markets). 2019. "Ofgem's Future Insights Series Flexibility Platforms in Electricity Markets." Ofgem, London.
- Patunru, A. A. 2023. "Trade Policy in Indonesia: Between Ambivalence, Pragmatism and Nationalism." *Bulletin of Indonesian Economic Studies* 59 (3): 311–340. <https://doi.org/10.1080/00074918.2023.2282821>.
- Pelindo (PT Pelabuhan Indonesia; Indonesia Ports Corporation). 2023. *Annual Report 2023*. Jakarta: Pelindo.
- PLN (Perusahaan Listrik Negara; National Electricity Company). 2024. "PLN Statistics Report." PLN, Jakarta.
- Pramadya, Fazri Aditya, and Kyung Nam Kim. 2024. "Promoting Residential Rooftop Solar Photovoltaics in Indonesia: Net-Metering or Installation Incentives?" *Renewable Energy* 222 (February): 119901. <https://www.sciencedirect.com/science/article/pii/S0960148123018165>.
- Purba, Calvin. 2025. "PLN Set to Open Rooftop Solar Quota Applications." *Petrimondo*, June 5, 2025. <https://www.petrimondo.com/news/article/pln-set-to-open-rooftop-solar-quota-applications>.
- PwC (PricewaterhouseCoopers). 2016. "Supplying and Financing Coal-Fired Power Plants in the 35 GW Programme." PwC, London.
- Redaputri, Appin Purisky, Claudius Budi Santoso, and Yusuf S. M. Barusman. 2024. "Photovoltaics Rooftop Regulations and Their Connection to Pro-Environment Consumer Behavior in Indonesia." *Journal of Environment and Sustainability* 8 (2): 262–274.
- Rutovitz, J., R. Langdon, C. Briggs, F. Mey, and E. Dom. 2025. "Updated Employment Factors and Occupational Shares for the Energy Transition." *Renewable and Sustainable Energy Reviews* 212 (April): 115339. <https://www.sciencedirect.com/science/article/pii/S1364032125000127>.
- Sabino, Marlla. 2025. "Power Sector Could See New Rush for Subsidies, Warns Regulatory Agency." *Valor International*, August 19, 2025. <https://valorinternational.globo.com/economy/news/2025/08/19/power-sector-could-see-new-rush-for-subsidies-warns-regulatory-agency.ghtml>.
- Saravanan, M. 2025. "MSME Associations Urge TN to Revise Network Charges for Rooftop Solar Systems." *New Indian Express*, September 15, 2025. <https://www.newindianexpress.com/states/tamil-nadu/2024/Sep/16/msme-associations-urge-tn-to-revise-network-charges-for-rooftop-solar-systems>.

- Schreier, Molly, Jiehong Lou, Aboli Dahiwadkar, Audrey Rader, and Claire Squire. 2024. "Industrial Parks Dashboard." Center for Global Sustainability, University of Maryland, College Park. <https://cgsindustrialparks.org/>.
- Sun Energy. 2024. "SUN Energy Secures Rp 500 Billion Project Financing Facility from PermataBank." Sun Energy, February 24, 2024. <https://sunenergy.id/sun-energy-secures-rp500-billion-project-financing-facility-from-permatabank>.
- Thailand Board of Investment. 2025. Long-Term Residents Visa Thailand. <https://ltr.boi.go.th/>.
- The Economist. (2025). "South-East Asia Makes an AI Power Grab." *The Economist*, July 29, 2025. <https://www.economist.com/asia/2025/07/29/south-east-asia-makes-an-ai-power-grab>.
- The Lantau Group. 2024. "IFC C&I Rooftop Solar SEA 2024." Confidential. The Lantau Group Limited and International Finance Corporation, Hong Kong SAR, China and Washington, DC.
- The Nation. 2025. "Global Tech Giants Double Down on Thailand Data Center Boom." *The Nation*, May 16, 2025. <https://www.nationthailand.com/business/tech/40050061>.
- UOB. 2023. "UOB Indonesia Launches U-Solar 2.0 to Support the Value Chain of Indonesia's Solar Industry." 25 de July. <https://www.uob.co.id/about-en/company-information/newsroom-and-awards/newsroom/2023/uob-indonesia-launched-u-solar.page>.
- Vietnam Electricity. 2024. "EVN's Business and Customer Service Activities in 2024 Achieve Many Positive Outcomes." News, Vietnam Electricity, December 17, 2024, <https://en.evn.com.vn/d/en-US/news/EVNs-business-and-customer-service-activities-in-2024-achieve-many-positive-outcomes-60-204-500388>.
- WFLO (World Food Logistics Organization). 2021. "Indonesia Cold Chain Market Assessment." Global Cold Chain Alliance, Arlington.
- World Bank. 2023. *Connecting to Compete 2023: Trade Logistics in an Uncertain Global Economy - The Logistics Performance Index and Its Indicators*. Washington, DC: World Bank.
- . 2024a. *Business Ready 2024*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/entities/publication/717d6abc-91cc-4a0b-9f5a-6f59e4b626bb>.
- . 2024b. *Indonesia Economic Prospects: Unleashing Indonesia's Business Potential*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/entities/publication/f63e05af-f133-4da5-a38d-3b8c235fa7b1>.
- . 2025. "Indonesia - Electricity Network Transformation (I-ENET) Program (P180992)." Program Appraisal Document. World Bank Group, Washington, DC.
- . 2026a. *Reforms for a Formal and Prosperous Indonesia*. Washington, DC: World Bank.
- . 2026b. *Running Faster, for Longer: Indonesia's Structural Transformation for Productivity Growth and Good Jobs*. Country Growth and Jobs Report. Washington, DC: World Bank Group.
- World Bank Group. 2020. "Doing Business Indonesia."
- . 2023. Logistics Performance Index. <https://lpi.worldbank.org/international/scorecard/radar/C/IDN/2023>.
- . 2025. "Climate Risk Country Profile: Indonesia." https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/17254-WB_Indonesia-Country%20Profile-WEB.pdf.
- . 2026a. *Indonesia Economic Prospects: People-First Housing—A Roadmap from Homes to Jobs to Prosperity in Indonesia*. Washington, DC: World Bank.
- . 2026b. "Macro Poverty Outlook: April 2026." World Bank Group, Washington, DC.
- Yatim, Ardiyansyah, Muhammad Kautsar, RP Bugie Pudjotomo, Hasanuddin Yasni, and Faturrahman Nugraha. 2022. "Analisis Potensi Penghematan Energi dan Penurunan Emisi Gas Rumah Kaca pada Gudang Beku di Sektor Perikanan Indonesia." Paper presented at the 20th Seminar Nasional Tahunan Teknik Mesin, October 13–14, 2022.
- Yong, J. 2025. "Southeast Asia's Uneven Data Center Growth Amid Supply Shortage: CBRE." *Wmedia*, June 12, 2025. <https://w.media/southeast-asias-uneven-data-center-growth-amid-supply-shortage-cbre/>.
- Yustika, Mutya. 2025. *Transforming Indonesia's Coal Dependence into Clean Energy Opportunities*. Valley City: Institute for Energy Economics and Financial Analysis.

© International Finance Corporation 2026. All rights reserved.
2121 Pennsylvania Avenue, N.W.
Washington, D.C. 20433
Internet: www.ifc.org

The material in this work is copyrighted. Copying and/or transmitting portions or all of this work without permission may be a violation of applicable law. IFC does not guarantee the accuracy, reliability or completeness of the content included in this work, or for the conclusions or judgments described herein, and accepts no responsibility or liability for any omissions or errors (including, without limitation, typographical errors and technical errors) in the content whatsoever or for reliance thereon.

Photo credits: Cover: Alamy/Abaca Press; *page 1*: AdobeStock/D. Marti; *page 18*: Shutterstock/Dani Daniar; *page 22*: Shutterstock/Pande Putu Hadi Wiguna; *page 34*: Shutterstock/Adjitw; *page 49*: Shutterstock/Faira Media.

Interior design: Patrick Ibay, <https://www.designed-for-humans.com/>.



SCAN TO
DOWNLOAD



WORLD BANK GROUP

THE WORLD BANK
IBRD • IDA

IFC

International
Finance Corporation

MIGA

Multilateral Investment
Guarantee Agency