



INDUSTRIAL PARKS IN INDONESIA:

Challenges and Opportunities for Sustainable Industrial Development



SCHOOL OF
PUBLIC POLICY

CENTER FOR GLOBAL
SUSTAINABILITY

KEY TAKEAWAYS

- 01** As Indonesia has prioritized downstreaming since 2014, Chinese investment has contributed to the development of a new wave of industrial parks focused on the processing of nickel, aluminum, and other key commodities

- 02** Based on the 79 industrial parks with reported electricity capacity, industrial parks source 6.20 GW exclusively from PLN, and 6.85 GW exclusively from captive coal

- 03** The 13 industrial parks focused on nickel processing have 10.91 GW of electricity capacity, almost half of the total 23.07 GW of electricity capacity accounted for in the dataset

- 04** Twenty-one industrial parks use or plan to use solar PV as one of their electricity sources, and 9 industrial parks have involved bioenergy in their energy mix

- 05** The dataset also tracks the cost of quick, large-scale industrial development, documenting 18 industrial parks with negative environmental impacts, 15 instances of disputes between industrial park companies and local residents, and 10 land acquisition disputes

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LIST OF ABBREVIATIONS

AMDAL: Analisis Mengenai Dampak Lingkungan (Environmental Impact Assessment Process)
BDMA: Business Development and Management Agency
BUMN: Badan Usaha Milik Negara (state-owned enterprise)
CIPP: Comprehensive Investment and Policy Plan
EFI: Kawasan Industri Emerald Ferrochromium Industry
EV: Electric Vehicle
GEIPP: Global Eco-Industrial Parks Programme
GEM: Global Energy Monitor
GOI: Government of Indonesia
GW: Gigawatt
IDR: Indonesian Rupiah
IPP: Independent Power Producer
IMIP: Indonesia Morowali Industrial Park
IUPTL: Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Umum (Electricity Supply Business License)
IUPTLS: Izin Usaha Penyediaan Tenaga Listrik untuk Kepentingan Sendiri (Captive Power Supply Business Permit)
IWIP: Indonesia Weda Bay Industrial Park
JETP: Just Energy Transition Partnership
JIEP: Jakarta Industrial Estate Pulogadung
JIIPE: Java Integrated Industrial and Port Estate
JIEP: Jakarta Industrial Estate Pulogadung
KEK: Kawasan Ekonomi Khusus (Special Economic Zones)
KIHI: Kawasan Industri Hijau Indonesia
KIPI: Kalimantan Industrial Park Indonesia
KPPIP: Komite Percepatan Penyediaan Infrastruktur Prioritas (Committee for the Acceleration of Priority Infrastructure Delivery)
MoU: Memorandum of Understanding
MT: Megaton
MW: Megawatt
MWp: Megawatt
PLN: PT Perusahaan Listrik Negara (Indonesia's state-owned electricity company)
PP: Peraturan Pemerintah (Government Regulation)
PSN: Proyek Nasional Strategis (National Strategic Projects)
PT: Perseroan Terbatas (Limited Liability Company)
PV: Solar Photovoltaic
RE: Renewable Energy
RPJPN: Rencana Pembangunan Jangka Panjang Nasional (National Long-Term Development Plan)
RIPIN: Rencana Induk Pembangunan Industri Nasional (Master Plan of National Industry Development)
RUPTL: Rencana Usaha Penyediaan Tenaga Listrik (Electricity Supply Business Plan)
SIER: Surabaya Industrial Estate Rungkut
SLO: Sertifikat Laik Operasi (Certificate of Operational Worthiness)
TIIP: Takalar Integrated Industrial Park
UN: United Nations
UNIDO: UN Industrial Development Organization
UU: Undang-Undang (national law)



Introduction:

01

According to the United Nations Industrial Development Organization (UNIDO), industrial parks are a strategic industrial policy tool crafted by the government to drive economic growth and development (UNIDO, 2022). These parks often receive special legal statuses, such as tax benefits and relaxed regulations, to attract both domestic and foreign investors and simplify the investment process by streamlining permitting and infrastructure development. Typically, the company serving as the manager of an industrial park builds and manages infrastructure including factory spaces, roadways and sometimes residential facilities, and then rents plots of land or factory space to tenant companies. Consequently, industrial parks contribute to the economy by significantly increasing employment, exports, manufacturing efficiency and adjacent development. (UNIDO, 2022).

In Indonesia, Presidential Decree 41/1996 defines industrial estates as “a center for industrial activities with provisions of infrastructure and supporting facilities, which is developed and operated by a licensed industrial estate company” (Republic of Indonesia, 1996). Starting from the 1970s, industrial estates in Indonesia evolved from government-managed and owned *zona industri* (industrial zones) to *kawasan industri* (industrial estates) developed managed by private companies and state-owned enterprises (*badan usaha milik negara*, or BUMN).¹

Indonesia has leveraged industrial estates to secure foreign direct investment, develop industrial clusters outside of Java and major cities, and promote domestic manufacturing and processing of key commodities such as palm oil, nickel, and copper. Some industrial parks support a variety of manufacturing sectors, such as automotives, electronics, and food products. Meanwhile, industrial parks focusing on extractive industries, such as chemicals, oil and gas, palm oil, or metal processing typically specialize in one major industry.

Alongside the economic effects of industrial parks, industrial parks have varying impacts on local communities. Negative environmental impacts, ongoing issues with land acquisition, protests from local community members, and labor issues occur at many industrial parks, displaying conflict between industrial development goals and the protection of local land management rights and livelihoods. In particular, newer nickel industrial parks support the government’s focus on increasing Indonesia’s downstream capabilities, but greatly change the local environment and economy. Nickel industrial parks are also driving Indonesia’s new captive coal power plant builds. Through this dataset of industrial parks in Indonesia, we hope to capture changes in Indonesia’s industrial policy, identify the major power sources of industrial parks, and analyze the impact of industrial parks on local communities.

¹ The terms “industrial park” and “industrial estate” are both used to refer to *kawasan industri* in Indonesia; we use both phrases interchangeably.

Background, Policy Context, and Recent Developments

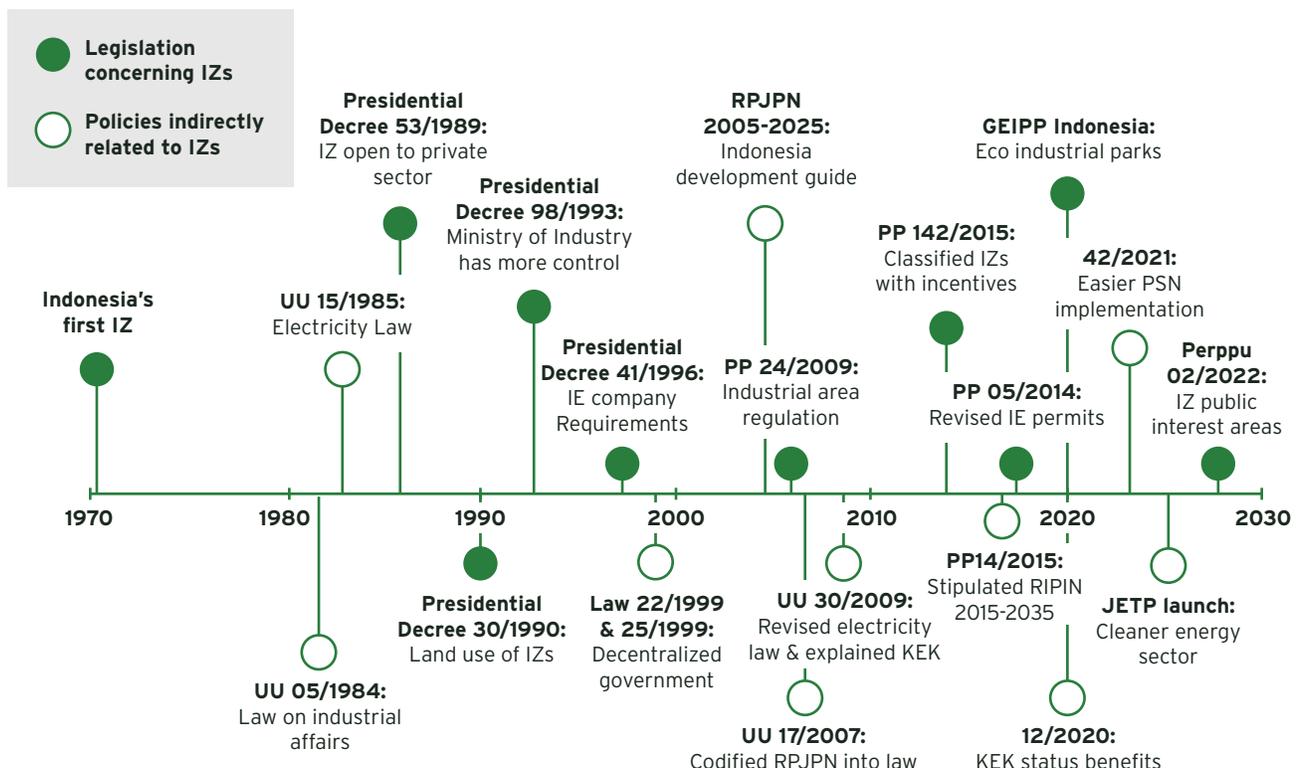
02

2.1 History of Industrial Estates

The Indonesian government began supporting the concentration of industrial activities within industrial zones (*zona industri*) in the late 1960s under Suharto's New Order Regime (Figure 1). However, these industrial zones were characterized by a concentration of industrial activities without planned and adequate infrastructure and facilities. Consequently, local planned or adequate labor-intensive industries often settled in these unplanned industrial areas, leading to negative environmental impacts on nearby residential areas (Hudalah et al., 2013; Kwanda, 2000). In response to these challenges, in the

1970s, the government initiated the development of industrial estates (*kawasan industri* through BUMN) with shared infrastructure and supporting facilities to improve upon the limitations of industrial zones. Several industrial estates established in the 1970s and 1980s by BUMN continue to operate to this day, including Jakarta Industrial Estate Pulogadung (JIEP), Surabaya Industrial Estate Rungkut (SIER), Kawasan Industri Cilacap, Kawasan Industri Medan, Kawasan Industri Makassar, and Kawasan Industri Lampung (Kwanda, 2000).

FIGURE 1. TIMELINE OF THE EVOLUTION OF THE INDUSTRIAL PARK RELATED POLICIES.



In the 1980s, the government published several national laws that impacted the rise of industrial estates, such as Undang-Undang (UU) 05/1984 and UU 15/1985. UU 05/1984 focused on industry affairs, including improving industrial development to foster healthy competition, natural resource preservation, appropriate licensing regulations, and technology. This legislation further established industrial development as a priority for the Government of Indonesia (GOI), supporting the rise of industrial parks (Republic of Indonesia, 1984). The Electricity Law UU 15/1985 emphasized making electricity more accessible, sustainably developed, and responsibly managed for the welfare of Indonesia (Republic of Indonesia, 1985). It also initiated the inclusion of independent power producers (IPPs) in the electricity sector (IEA, 2015). The introduction of IPPs has been crucial for providing captive power generation to industrial facilities, thus driving industrial growth.

In 1989, to increase foreign direct investment in Indonesian manufacturing and accelerate industrial development, the government issued Presidential Decree No. 53 (1989) which opened industrial land development and management to private and foreign companies (Hudalah, 2017). This decree defined industrial estates as areas supported by essential infrastructure and facilities, and operated by licensed industrial estate companies (Hudalah, 2017; Republic of Indonesia, 1996). Additionally, a 1989 Ministry of Industry decree (291/M/SK/10/1989) specified technical requirements for land use, infrastructure and facilities at industrial estates (Kwanda, 2000). It further indicated that industrial plots should not exceed 70% of an industrial estate's area, 20% should be dedicated to infrastructure and facilities for workers, and 10% reserved for green open spaces. Required infrastructure included road networks, clean water, electricity, wastewater management, and telecommunication networks. Possible facilities for employees included canteens, accommodations, and places of worship (Kwanda, 2000).

Further regulation in the 1990s set more requirements on companies engaging in industrial estate development and management. Presidential Decree No. 33 (1990) on land use of industrial estates directs that industrial estate development must take place in accordance with existing regional spatial planning documents, and that location and land acquisition permits cannot be granted to industrial estate companies for the development of agricultural areas, production forest areas, or protected areas

(Republic of Indonesia, 1990). Presidential Decree No. 98 (1993) amended Presidential Decree No. 53 (1989) to grant the Ministry of Industry the authority to coordinate land allocation, construction planning, and service provision. It also allowed companies that already owned land in designated industrial areas to be licensed as industrial estate companies. Finally, Presidential Decree No. 41 (1996) replaced the original Presidential Decree No. 53 (1989), rearranged the articles within the decree, and set the licensing, permit and environmental requirements for companies operating inside of industrial estates.

The late 1990s also saw the Asian financial crisis in 1997, widespread protests and civil unrest, and the fall of the Suharto regime in 1998. According to Firman (2000), the Asian financial crisis stalled many industrial estate construction projects, resulting in thousands of hectares of idle industrial estate land in Jakarta, some of which the original residents reoccupied. In 1999, at the beginning of the reform era, the government passed sweeping decentralization policies (Law 22 of 1999 and Law 25 of 1999) granting expanded political control to local governments, including over land use and infrastructure development, and gave local governments the ability to earn tax revenue (Hudalah, 2017). These policies increased uncertainty in and variance among regulations at the national and local level for industrial actors.

Industrial development continued to shape Indonesian legislation in the next few decades, and remained the focus of several policies in the 2000s. The National Long-Term Development Plan (RPJPN) for 2005-2025 was established as a comprehensive framework to advance Indonesia's democracy, prosperity, culture, and stability, and balance independence and international engagement (CSID, 2021). The RPJPN 2005-2025 highlighted the crucial role of industrial areas in spearheading economic growth in the next twenty years. The plan's intermediate strategies focused on revitalizing industrial growth centers (i.e. industrial parks), by increasing investment, infrastructure, and support for public welfare (Aggarwal, 2022). This plan was later codified into national law via UU 17/2007 (CSID, 2021). Industrial estate management was further expanded upon by Government Regulation (Peraturan Pemerintah, or PP) 24/2009, a.k.a. the "Industrial Area Regulation." This regulation details the specifications for industrial areas, license requirements, and development standards. This includes minimum land areas for

estates (5 hectares for micro to small industries, 50 hectares otherwise), an outlined procedure post-license about the preparation of the estate, and obtaining a location and building permit (Shalmont and Leks&Co Lawyers, 2018). PP 24/2009 was issued by the Ministry of Industry to implement Article 20 of UU 05/1984 (Republic of Indonesia, 2009).

Indonesia also ratified UU 30/2009 which replaced UU 15/1985 (FAO, 2023). UU 30/2009 focuses on energy access, pricing, supply, transmission, environmental impact, and government involvement (Asia Pacific Energy Portal, 2022). The 2009 Electricity Law also specifies the management of electricity market rules and providers, granting significant government control over the energy sector by designating Perusahaan Listrik Negara (PLN) as the primary national electricity producer and distributor (IEA, 2022). However, IPPs can participate in the electricity market by either selling to PLN or obtaining an electricity supply business license (IUPTL) to supply electricity directly to the public (IEA, 2015). Indonesian law stipulates that a power plant can be considered “captive” only if it is developed by companies for their exclusive use. Eligible companies must still secure a captive power operation license (IUPTLS) if their installed capacity exceeds 500kW (HHP Law Firm, 2021). Additionally, companies operating captive power must obtain a certificate of operational worthiness (SLO) to ensure safety and proper management (Ong et al., 2021a).

The 2009 Industrial Area Regulation continued to lay the groundwork for subsequent regulations issued by the Ministry of Industry. In 2014, PP 05/2014 revised the procedures for issuing industrial estate permits and expansion permits in accordance with Article 17 of PP 24/2009 (Republic of Indonesia, 2014). Initially, an industrial estate company must secure a business permit to create an industrial area with principle approval. Once the industrial area is approved and established, the company may apply for an expansion permit (Walian, 2014). Further modifications came in 2015 with PP 142/2015, which aimed to promote industrial estate growth by classifying them into four categories based on regional development and potential tax incentives: (1) developed estates in Java, (2) developing estates in southern Sulawesi, eastern Kalimantan, and Sumatra, (3) potential estates in northern Sulawesi, western Kalimantan, Bali, and Nusa Tenggara, and (4) potential estates in Papua (Johnson, 2016; Nanti and Beekelar, 2016). Incentives include tax exemptions,

allowances, and reduced tariffs and regional taxes in less developed areas to strengthen industry outside of Java (Amin, 2015; 2016).

In 2015, another major advancement was marked by the enactment of PP 14/2015, which set forth the 2015-2035 National Industrial Development Master Plan (RIPIN). This comprehensive plan is pivotal as it delineates strategies for prioritizing industrial estate needs, including land allocation for industrial parks and restriction of exporting crucial natural resources. RIPIN 2015-2035 was then prepared according to the government’s commitment to advancing industry by encouraging fair competition, employment, prosperity, and ensuring equitable distribution throughout the country (Republic of Indonesia, 2015).





2.2 Special Economic Zones (KEKs) and National Strategic Projects (PSN)

Another status closely related to industrial estates are special economic zones, known locally as *kawasan ekonomi khusus* (KEK). The GOI began establishing KEKs in 2009 to boost investment in target industries and enhance tourism. Law No. 30/2009 lays out the legal framework for KEKs, including a national KEK council, provincial-level KEK councils, a local KEK administrator, and a Business Development and Management Agency (BDMA) (Hidayat and Negara, 2020). The KEK administrator, chaired by a local government official, is responsible for issuing business licenses and permits to investors and monitoring KEK performance. The BDMA, which can be composed of a state-owned enterprise, region-owned enterprise, private company, or joint venture, manages the daily operations of the KEK. The central government determines the location of KEKs based on proposals from business entities and regional governments (Hidayat and Negara, 2020). Industrial estates can apply to become KEKs.² For example, the Java Integrated Industrial and Port Estate (JIPE), established in 2013, was later designated as a Technology and Manufacturing Special Economic Zone in 2021, granting the industrial estate more government support and more benefits for investors (PT AKR Corporindo Tbk, 2022). KEK status offers several advantages as outlined in Government Regulation No. 12/2020, including reduction in corporate income taxes based on investment size, luxury tax, customs duty and excise, and streamlined administrative processes for import/export, expatriate employment, immigration, and licensing (U.S. Department of State, 2022).

Industrial estates can also be designated as national strategic projects (*proyek nasional strategis*, PSN), receiving additional fiscal and government support. First established by President Joko "Jokowi" Widodo in Presidential Regulation No. 3 of 2016, a PSN is a project carried out by a government or private entity that contributes to infrastructure development, job creation, or public welfare and is accelerated by the government (Ong et al., 2021b). Government Regulation No. 42 of 2021 aimed to make the process of implementing PSNs easier, offering easier permitting and financial support to projects on the list (Ong et al., 2021b). PSNs are selected, coordinated, and supported by the Committee for the Acceleration of Priority Infrastructure Delivery (Komite Percepatan Penyediaan Infrastruktur Prioritas, KPPIP), which was formed by Presidential Regulation No. 75/2014 (KPPIP, 2017; Salim and Negara, 2018). At its most recent update in 2022, the PSN list included 200 projects and 12 programs (Nasution, 2022). Several industrial estates in our dataset, including Kawasan Industri Terpadu Wilmar, Takalar Integrated Industrial Park (TIIP), Kalimantan Industrial Park Indonesia (KIPI), Kawasan Industri Teluk Bintuni, and Kawasan Industri Motui, are listed as PSNs. In May 2024, Jokowi's Coordinating Minister for Economic Affairs announced that 16 PSNs were approved to continue under Prabowo Subianto's government, though they would not be funded under the state revenue and expenditure budget (CNN Indonesia, 2024).

² Due to the operational similarities and overlap between industrial estates and KEKs, several industrial KEKs have been included in our dataset.

2.3 Policy Context and Recent Developments

2.3.1. Downstreaming

The GOI's more recent focus on "commodity downstreaming" has resulted in new trends in industrial park development. In 2014, Indonesia first banned the export of nickel and bauxite in an effort to promote investment in domestic processing capabilities (Reuters, 2014). This two-year long ban resulted in the construction of aluminum smelters at Indonesian industrial parks (Medina, 2021). Since then, bans on bauxite, coal, palm oil, and nickel ore have been implemented for variable periods of time. In January 2020, Indonesia reaffirmed the export ban on nickel ore, aiming to stimulate further domestic refinement of nickel into class 1 quality suitable for EV batteries (ASEAN, 2023). Foreign investors (specifically Chinese investors) have responded to these bans by constructing local smelters and refineries in industrial parks and increasing foreign direct investment (Daga, 2024; Morse, 2022). With policy mechanisms already in-place to streamline foreign investment into industrial parks, KEKs, and PSNs, Indonesia has seen a rapid increase in the development of large-scale metal industrial parks.

2.3.2. Omnibus Law

On November 2, 2020, Jokowi signed Law No. 11 of 2020 on Job Creation, commonly referred to as the Law." This comprehensive legislation amends various existing laws related to job creation and employment regulations. Government officials promoted the Omnibus Law as a means of stimulating economic growth and employment opportunities by streamlining business licensing and centralizing permit management (Juniarto and Juniarto, 2020; Simatupang et al., 2023). However, hundreds of thousands of Indonesians protested in the weeks leading up to its passage over fears that it would harm worker's rights and the environment (Wijaya, 2020). Despite its enactment, protests continued as numerous rights groups raised concerns about certain portions of the Omnibus law, specifically changes to the environmental impact assessment process (Amdal). The Omnibus Law restricted community participation in the Amdal process to those "directly impacted" by proposed projects and completely revoked a community's right to file objections to

an approved Amdal assessment (Jong, 2020a). Previously, all business projects were required to obtain an environmental permit via a locally administered Amdal process before being eligible for business permit, and any public group could raise concerns about potential effects of business activities. After the passage of the Omnibus Law, only "high risk" projects require an environmental assessment, which are conducted within a smaller time frame by the central government and are based on compliance declarations self-reported by companies. When siting business activities in previously undeveloped areas, as is the case with many industrial parks, environmental impact data often does not exist, and the new permitting process does not allow time for proper data collection, evaluation, or for environmentalist groups to educate community members on how these activities may impact their livelihood (Jong, 2020b, 2020a).

Almost exactly a year after its original passage, courts declared the Omnibus law unconstitutional due to insufficient public consultation, prompting a two-year deadline for government revision (IndustriALL, 2023). In December of 2022, the government responded by introducing Government Regulation in Lieu of Law No. 2 of 2022 on Job Creation (Perppu 2/2022), which effectively replaced the Omnibus law and bypassed the mandated review process (Chung, 2023). Formalized in March 2023, this regulation expanded on several aspects of the Omnibus law. Notably, it designated KEKs and industrial areas as of public interest, simplifying the land acquisition process and weakening land security for individuals, especially those with customary or informal land rights (Guild, 2019). It also expanded the range of activities included in the KEK categorization to include distribution, education, and health sector businesses. Lastly, the Perppu adds a provision that allows KEK's to bypass local government approval and propose business projects directly to the National Council (USAID, 2023). The Perppu law is more comprehensive and far-reaching than the Omnibus, continuing to relax licensing and permitting regulations to stimulate the economy –a move the government justified as a necessary response to prevent an economic downturn amid challenging global conditions (Widi, 2023). Nevertheless, the Perppu continues to face harsh backlash from groups

who claim that these amendments were rushed into law without proper debate to satisfy economic interest at the risk of worker and environmental protection (Suroyo and Sulaiman, 2022).



2.3.3. Green Industrial Parks

Indonesia has several ongoing programs to promote sustainable industrial development. In 2020, the Indonesian Ministry of Industry partnered with UNIDO to join UNIDO's Global Eco-Industrial Parks Programme (GEIPP). GEIPP promotes eco-industrial parks that include environmentally-conscious initiatives in their design, including reducing landfill waste, incentivizing recycling and wastewater treatment, reliance on clean energy, and efficient electricity usage (UNIDO Indonesia, 2022). In Phase I of GEIPP Indonesia, the Indonesian Cleaner Production Centre worked with MM2100 Industrial Town, Batamindo Industrial Park, and Karawang International City to implement energy saving measures, reduce resource consumption and greenhouse gas emissions, and adopt solar PV systems. In November 2022, the Indonesian Minister of Industry issued Decree Number 3174 in order to support GEIPP's Indonesia program and establish an Inter-Ministerial Forum to accelerate and coordinate the development of eco-industrial parks at the national level. Phase II of GEIPP Indonesia launched January 1, 2024, and for the next 5 years will provide technical assistant to Greenland International Industrial Center and Kawasan Industri Medan, in addition to participating industrial parks from Phase I (UNIDO and Indonesia Ministry of Industry, 2023).

2.3.4. Renewable Energy Goals and Legislation

After three years of development and delays, Indonesia released Presidential Regulation No. 112 of 2022 on the Acceleration of Renewable Energy Development for the Supply of Power on September 13, 2022. This release directly preceded the launch of Indonesia's Just Energy Transition Partnership (JETP) in November 2022, and aimed to provide a "renewed regulatory framework for the development of renewable energy projects" (Oentoeng Suria & Partners and Ashurst, 2022). For industrial park development, the most significant aspect of this regulation is that it prohibits PLN from developing new coal-fired power plants, except for those included in the latest Energy Business Supply Plan (RUPTL) 2021-2030, or a special category of plants permitted to operate until 2050. This category includes (1) captive coal plants that directly supply to industry and contribute towards enhancing the value of natural resources, (2) plants listed as PSN, and (3) plants committed to reducing greenhouse gas emissions (Anindarini, 2022; Oentoeng Suria & Partners and Ashurst, 2022). Consequently, the regulation directs most new coal power plant development towards industrial parks, as many plants within parks fulfill these criteria.

In November of 2023, collaborators including the GOI, research institutions, and various multilateral organizations released the JETP's Comprehensive Investment and Policy Plan (CIPP) to provide an outline of the major challenges and strategies for Indonesia's energy transition. The CIPP emphasizes the importance of prioritizing environmental goals without compromising economic growth, and lays out three ambitious power sector goals: capping power sector emissions at no more than 250 MT CO₂ by 2030, achieving a 44% share of renewables in the energy mix by 2030, and reaching net-zero emissions in the power sector by 2050 (JETP Secretariat, 2023).

However, the CIPP primarily focuses on on-grid power systems and does not provide a financial scheme or implementation strategy for phasing out captive plants operated by industrial estates (Suroyo et al., 2023). It acknowledges that including such off-grid systems would make achieving the set emission reduction targets and capacity goals significantly

more challenging (JETP Secretariat, 2023). Thus, the emergence of captive coal plants presents a special challenge to Indonesia's environmental aspirations, especially when it comes to properly and effectively formulating energy transition frameworks such as the CIPP. Although the CIPP highlights the role of industrial zones in boosting regional economies, distributing industrial development more evenly across Indonesia, and supporting the growth of the EV industry, the emergence of captive coal plants continues to pose a dilemma. Many industrial areas rely on captive coal power due to inadequate or cost-ineffective on-grid supplies, which leaves an opportunity to develop renewable energy sources near industrial areas as suggested by the CIPP (JETP Secretariat, 2023).

2.3.5. 2024 Presidential Election

The 2024 presidential election in Indonesia underscored the significance of energy transition and industrial policy to both voters and the long-term national strategy. A spring 2023 survey revealed

that over 80% of respondents supported declaring a climate emergency and around 60% felt that current governmental policies were inadequate in averting a climate crisis (CELIOS, 2023). Especially among young urbanites, environmental protection emerged as a crucial factor in choosing a presidential candidate. During the campaign, president-elect Prabowo Subianto declared his vision of Indonesia as a "green energy superpower" and advocated for the development of energy sources, such as hydropower, bioenergy, and solar to promote self-sufficiency and transition away from coal (Yusgiantoro, 2024). Prabowo also seeks to continue the policies of his predecessor Jokowi, particularly the ban on mineral export and investment into electric vehicle battery production, aiming to bolster downstream industries (Dolven and Willett, 2024; Sengupta, 2024). Throughout the election, industrial policy was a focal point. The voters' interest in industrial parks and Prabowo's campaign statements about them suggest a complex relationship between economic development and environmental goals that will need careful navigation in the coming years.



Methodology

03

Our data collection effort began in October 2022. Using data from the Indonesian Ministry of Industry's list of *kawasan industri* and the EU-Indonesia Business Network Industrial Estate Directory, we began compiling a list of industrial parks and their features (EU-Indonesia Business Network, 2019; Indonesian Ministry of Industry, 2022).³ To improve the comprehensiveness of our dataset, we incorporated additional industrial parks identified through the Batam 2022 Industrial Estate Book and various local news articles (Badan Pengusahaan Batam, 2022). To qualify for inclusion, at least one source classified the location as an industrial park,

industrial estate, *kawasan industri*, or related status, such as a KEK. Our initial dataset comprises 140 industrial parks, allowing us to focus on gathering detailed data across all of our fields of interest, including operational status, main industry, disputes, and electricity source and capacity.⁴

Table 1 provides a description of the data collection process for each group of fields, with field names in bold. Additional information regarding the meaning of different field values ("Status" and "Disputes" values) is included in the Results section.

Table 1. Data Collection Methodology

Field or Field Group	Field Names and Values	Methodology
Basic Information	Park Name Manager Size (ha)	<p>We primarily collected data on industrial park name, manager, location, and size from the Indonesian Ministry of Industry's Kawasan Industri list and the EU-Indonesia Business Network's Industrial Estates directory. Information was supplemented with other publications, such as the Batam 2022 Industrial Estate Book, and news articles.</p> <p>Manager is the company or entity responsible for operations of the industrial park.</p> <p>For size (ha), if sources reported conflicting information, or the industrial park was not included in the Ministry of Industry's list, we included the most commonly reported size.</p>

³ Both web pages are no longer accessible.

⁴ Some of these focus areas, such as electricity source and dispute type, contain non-mutually exclusive categorical data. We represented these field groups using a series of dummy columns (1 for occurrence, 0 for non-occurrence) along with associated "Notes" columns to present details and sources for our findings. To document our sources, we have quoted relevant paragraphs from sources in the "Notes" column, linking all sources located in the "Sources" column.

Table 1. Data Collection Methodology, Continued

Field or Field Group	Field Names and Values	Methodology
Location	Location Regency Province Region Latitude Longitude Location Notes	<p>We gathered location information from the Ministry of Industry, EU-Indonesia Business Network, Batam Industrial Estate Book, company websites and materials, and news articles. We verified locations using Google Maps and use Google Maps' address formatting, minus the Geocode. Latitude and longitude coordinates are also reported from Google Maps. For industrial parks where we could not verify the exact location, further information on the approximate location reported is provided in "Location Notes"</p> <p>Region, compiled based on province, follows Indonesia's geographical unit divisions (Wikipedia, 2024).</p>
Electricity	Electricity Provider Boolean Columns: <i>PLN</i> <i>Captive Coal Power Plant</i> <i>Captive Gas Power Plant</i> <i>Bioenergy</i> <i>Solar</i> <i>Hydropower</i> <i>Electricity Provider Unclear</i> Electricity Capacity Notes Electricity Capacity (MW) GEM	<p>The electricity data used is sourced from industrial park websites and publications, the Batam Industrial Estates book, news articles, and Global Energy Monitor's Global Coal Plant and Global Oil and Gas Plant datasets and wiki. We include excerpts from reports and news articles used to establish an industrial park's electricity sources or capacity in the "Electricity Capacity Notes" column. Electricity capacity is reported in megawatts (MW). For sources that report electricity capacity in other units, a capacity factor of 1 is assumed for conversions to MW. If sources cite different electricity capacities for one industrial park, we conservatively use the lowest, most commonly reported electricity capacity. Many industrial parks only have data on electricity providers, not electricity capacity, especially for industrial parks that source from PLN.</p>
Foreign Company Involvement	Boolean Columns: <i>Foreign Founder or Manager</i> <i>Foreign Tenants</i> <i>China as Founder or Manager</i> <i>China as Tenant</i> Foreign Company Involvement Notes	<p>"Foreign Founder or Manager" lists the nationality of foreign companies that are one of the primary founders, owners, or managers of the industrial park; in some cases, the company is an Indonesian subsidiary of a larger company headquartered in another country. "Foreign Tenants" lists the nationalities of foreign companies that are tenants at the industrial park. We only assessed tenant company nationality for large tenant companies or industrial parks with few tenants. For industrial parks with many tenants, this column is likely missing data. Details regarding the specific foreign companies involved in the industrial park are located in the "Foreign Company Involvement Notes" column.</p>

Table 1. Data Collection Methodology, Continued

Field or Field Group	Field Names and Values	Methodology
Status	<p>Status</p> <p><i>Status Values:</i> <i>Before Construction,</i> <i>Under Construction,</i> <i>Operational,</i> <i>Operational with Continued Construction,</i> <i>Stalled, Unclear</i></p> <p>Status Notes</p>	<p>We report operational status based on company websites, Google Maps, and news articles. On Google Maps, we checked the industrial park location for the presence of tenant companies and reviews indicating the status of the industrial park. For parks with the status of "Stalled" or "Unclear," we viewed Sentinel Imagery to scan for evidence of construction or buildings at the site during June - August 2023. The status of "Before Construction" indicates that the industrial park is planned, but construction has not yet started. A status of "Stalled" indicates that an industrial park was planned or at one point under construction, but reportedly failed to progress. A status of "Unclear" indicates that while the government or other sources claim that an industrial park exists, we could not find evidence to determine the industrial park's status.</p>
Age	<p>Year Operations Began</p> <p>Year Construction Began</p> <p>Year Founded</p> <p>Age</p>	<p>Using company materials and news articles, we tracked the year the industrial park's operations began, construction began, or was founded (the date the industrial park was announced by a company or governmental entity or companies signed an agreement to construct the industrial park). To determine age, we subtracted the oldest reported year from 2024.</p>
Disputes	<p>Boolean columns:</p> <p><i>Legal Dispute with Indonesian Government</i></p> <p><i>Legal dispute with a Company</i></p> <p><i>Dispute with Local Residents</i></p> <p><i>Land Acquisition Issues</i></p> <p><i>Environmental Impact</i></p> <p>Dispute Explanations</p>	<p>We gathered most information on disputes from local news and environmental organizations. The dispute columns present are marked in the dummy columns. Many industrial parks have multiple dispute types present. In the "Dispute Explanations" column, each dispute type present is listed and underlined, with details and corresponding news articles under each dispute type. Some events are counted as multiple dispute types (for example, we categorize local resident protests regarding land acquisition issues as both "Dispute with Local Residents" and "Land Acquisition Issues").</p>
Electric Vehicle (Production Mentioned)	N/A	<p>If an industrial park's materials or news articles mention that the industrial park contributes to electric vehicle supply chains or production, the column has the value 1.</p>
Key Commodities	<p>Boolean Columns:</p> <p><i>Nickel</i></p> <p><i>Aluminum</i></p> <p><i>Copper</i></p> <p><i>Palm Oil</i></p> <p><i>Iron and Steel</i></p>	<p>If an industrial park's materials or news articles mention that the industrial park contributes to electric vehicle supply chains or production, the column has the value 1.</p>

Table 1. Data Collection Methodology, Continued

Field or Field Group	Field Names and Values	Methodology
Industry	Main Industry <i>Main Industry</i> <i>Values: Mixed/General,</i> <i>Manufacturing, IT,</i> <i>Nickel, Aluminum,</i> <i>Other Metals,</i> <i>Chemicals,</i> <i>Petrochemicals,</i> <i>Palm Oil, Coal,</i> <i>Unknown</i> <i>Main Industry</i> Notes	We determined the Main Industry through the industrial park's website, company materials, or the tenant companies located at an industrial park. The "Mixed/General" classification indicates that an industrial park has tenant companies from many different industries, without a focus on any one industry. "Mixed/General" industrial parks typically include food processing, warehousing, or logistics distributors, whereas "Manufacturing" industrial parks focus solely on manufacturing products. If an industrial park is dominated by one industry (multiple industrial parks from the same industry), this industry classification is assigned to the industrial park. We used language from industrial park materials (for example, "Palm Oil Industrial Park") and information on tenant companies (often referenced on Google Maps) to make industry classifications.
Tenants		
List of tenant companies located at an industrial park. Data is not all-encompassing and requires further verification. We collected data from industrial park websites, websites that list companies at industrial parks, the Batam Industrial Estate Book, and Google Maps.		
Sources		
List of references used to collect data for all columns of an industrial park. If a link no longer works, it is marked as "Broken" (text from a broken site has still been documented in a long-text column).		

Results

04

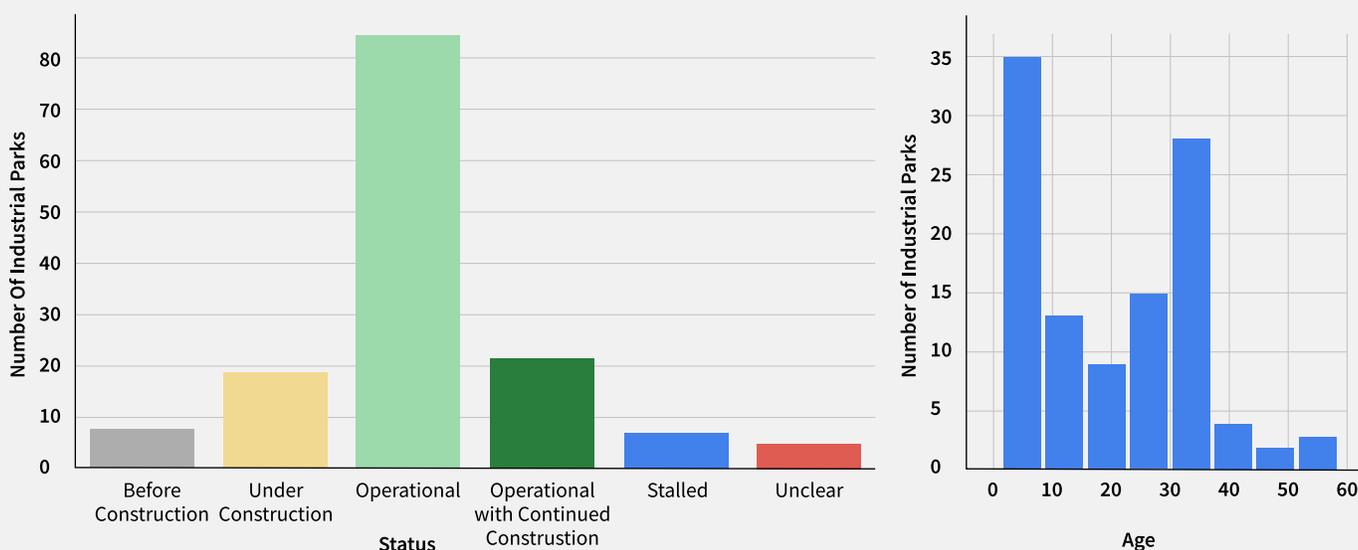
4.1 Status and Age

Of the 140 industrial parks in our the dataset, 5% have the status of “Before Construction,” 12.9 % are “Under Construction,” 60% are “Operational,” 15% are “Operational with Continued Construction,” 4.3% are “Stalled,” and 2.9% are “Unclear.”⁵ The status of “Before Construction” indicates that an industrial park has been announced and is currently in the planning stage, involving activities such as developing a spatial plan, performing land acquisition, and securing investors and tenants. The status of “Under Construction” indicates that construction on the industrial park and/or its facilities has begun, while the status of “Operating with Continued Construction” indicates that the industrial park is still under construction, but some parts of the industrial park are functional and operating. For older industrial parks, such as parks located near Jakarta or Batam City founded in the 1980s and 1990s, this typically indicates that an existing industrial park decided to expand and develop a new wing on adjacent or

nearby land. Krakatau Industrial Estate, which began operating in 1982 in the city of Cilegon in Banten province, previously held 630 hectares across two industrial areas. As of June 2023, reports indicated that 94% of the park’s existing 630 hectares were occupied, with plans to expand into a third industrial area of 420 hectares, aiming to attract new investors by 2025 (D-insights, 2023).

For “Age,” we calculate the number of years from the earliest year reported in the three “Age” columns to 2024 if only one year is known, we use this year to calculate age. In our dataset, 109 industrial parks have at least one value reported for these three columns, and the average age of these 109 industrial parks is 20.3 years.⁶ Figure 2 displays the distribution of operating status and age, with peaks in industrial park development occurring within the last 10 years and 30-40 years ago.

Figure 2: Industrial Parks by Status (left) and Age (right)



⁵ Three parks in the dataset have a status of unclear. Datasets used to create our list of industrial parks (such as the Indonesian Ministry of Industry’s list of industrial parks and the EU-Indonesia Business Network’s Industrial Estate Directory) include these parks, but we were unable to find enough information to verify the park’s current status.

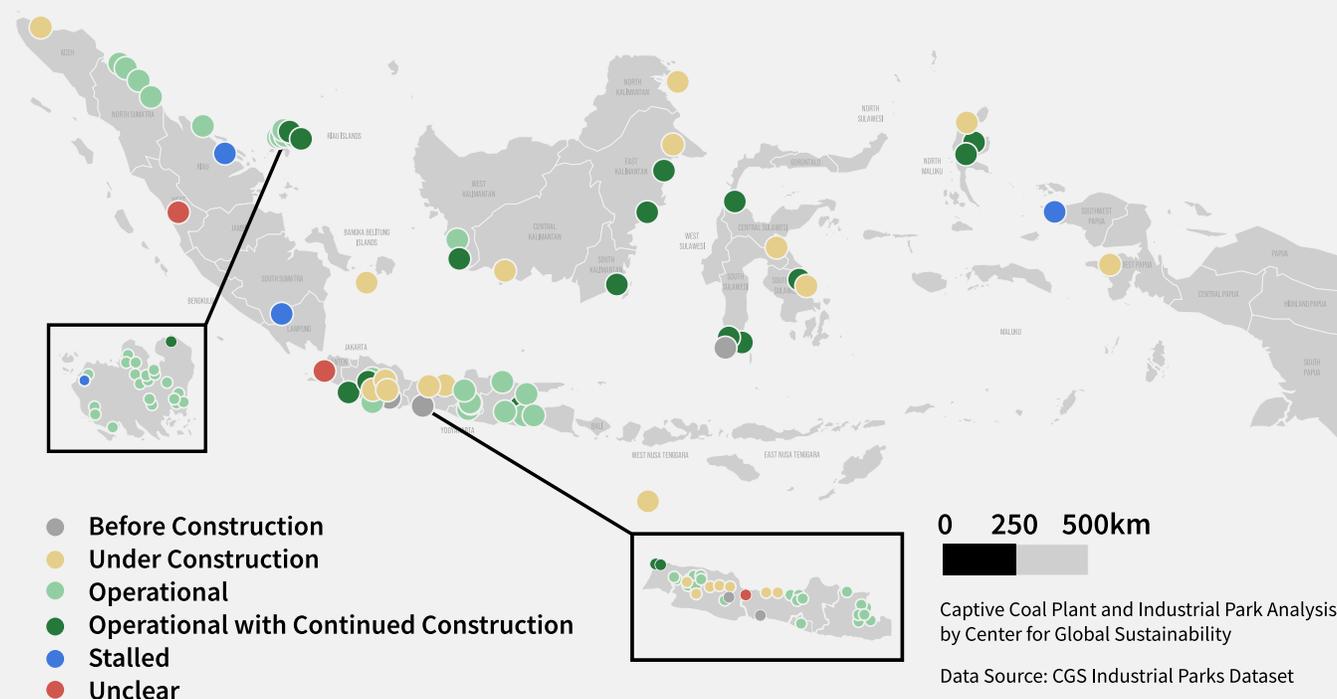
⁶ During our data collection, we also reported the “Year Operations Began,” “Year Construction Began,” and “Year Founded” for any industrial parks where we could discern the information from our sources. “Year Founded” corresponds to when plans for an industrial park were announced or when an industrial park first appears in government planning documents. Founding year precedes the construction year. We determined the “Year Construction Began,” through news reports of groundbreaking celebrations held by industrial parks to mark the beginning of construction, and which are often attended by governmental figures from the regional or national government. For “Year Operations Began,” we report the year that at least some facilities at the industrial park began operating, for any parks where we could determine this date.

For newer industrial parks, especially those with metal smelters, the status of “Operating with Continued Construction” might mean that some segments, such as a tenant’s smelter and power facilities, have been completed and have begun production, while the other parts are still under construction. For example, Indonesia Weda Bay Industrial Park (IWIP) in Central Halmahera, North Maluku, centered around a large nickel reserve, has been under development by Eramet and Tsingshan Group since 2018, with nickel mining operations starting in 2019 and four processing lines operational by 2020.⁷ (Eramet, 2023; NS Energy, 2020). As of October 2023, the park had five captive coal plants operating with an electricity capacity of 1250 MW, and seven under construction, expected to add an additional 2910 MW of capacity (Global Energy Monitor, 2024). Overall, older “Operational” industrial parks are clustered around Java and Sumatra, specifically around Jakarta and Batam (Figure 3). Industrial parks that are “Before Construction,” “Under Construction,” or “Operational with Continued Construction” are

clustered more around Kalimantan, Sulawesi, and the Maluku Islands.

Industrial parks with a status of “Stalled” typically receive formal recognition from the national or regional government as industrial parks, national strategic projects, or special economic zones but struggle to attract investors, resulting in minimal development beyond land acquisition. Some of these parks face the risks of having their legal status revoked by local or regional governments if they do not secure new investors promptly. An example is the Sorong Special Economic Zone in West Papua, which was included in the Regional Midterm Development Plan of 2017-2022 and inaugurated in 2019 to attract investment from nickel and palm oil processing companies (Assegaf, 2019). Despite these efforts, it has failed to attract investors. In April 2023, it was reported that the central government warned the provincial government that the KEK status would be revoked if investment targets were not met by December 2023 (Haryati, 2023).

Figure 3: Map of Industrial Parks by Status



⁷ The French mining company Eramet has owned the site since 2006, but did not begin developing nickel mines until 2018, after forming an agreement with Tsingshan Group, who would develop nickel processing facilities and energy production facilities on site. The first nickel mining operations began in 2019, and four nickel processing production lines began operating in 2020

4.2. Size

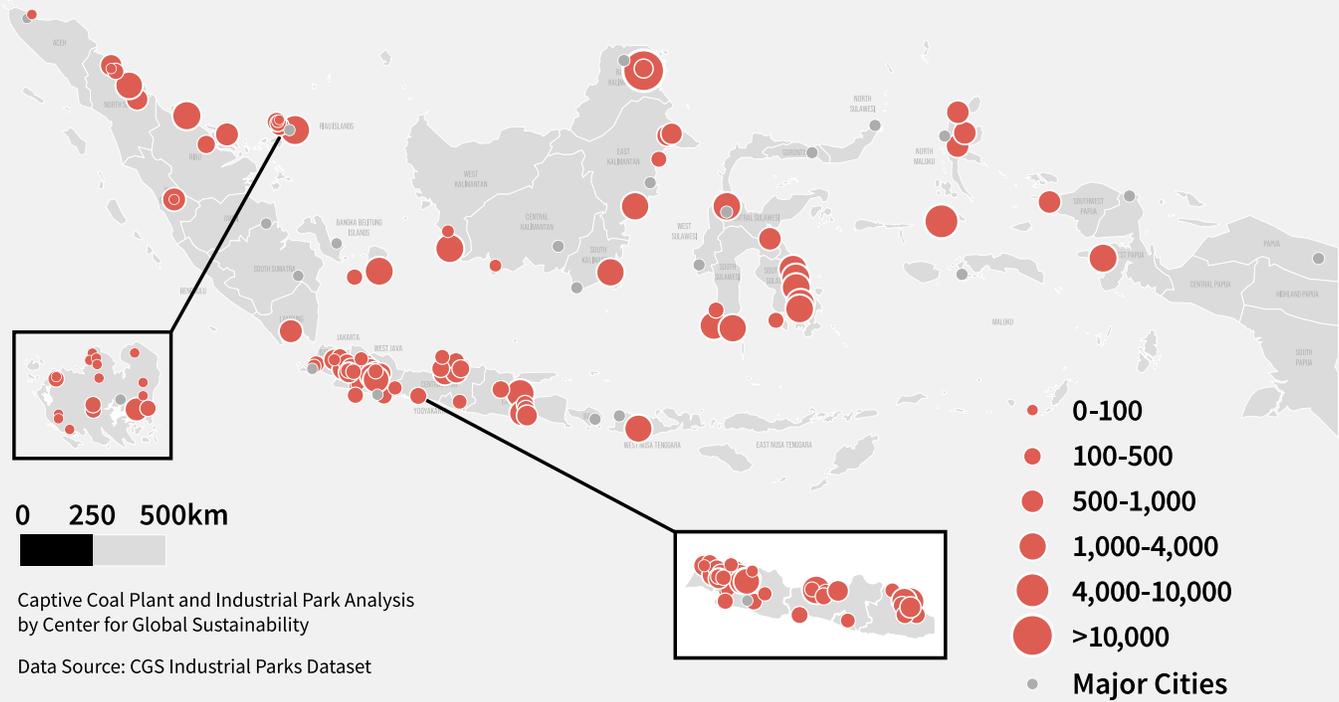
The 140 industrial parks in our dataset encompass over 125,000 hectares. The median size of these industrial parks is 332.0 hectares. While earlier waves of industrial park development occurred in smaller, urban industrial parks, newer industrial parks dedicated to metal processing have larger areas in more remote locations (Figure 4).

The largest is KIPI, which is currently under construction in Tanah Kuning, North Kalimantan, and is planned to occupy 16,412 hectares. Jokowi

has highlighted KIPI as the “largest green industrial park in the world,” aiming to expand it to 30,000 hectares. It is envisioned as a future manufacturing hub for electric vehicle batteries, solar panels, and industrial silicon (Antara, 2023; Koswaraputra, 2023). The smallest industrial park is Mega Cipta Industrial Park in the city of Batam in the Riau Islands, which has an area of five ha and has been operating since 1994 (Badan Pengusahaan Batam, 2022).

Figure 4: Industrial Park Size (hectares)

Number of parks: 140 | Total Land Area: 125,145.79 ha



4.3 Industry

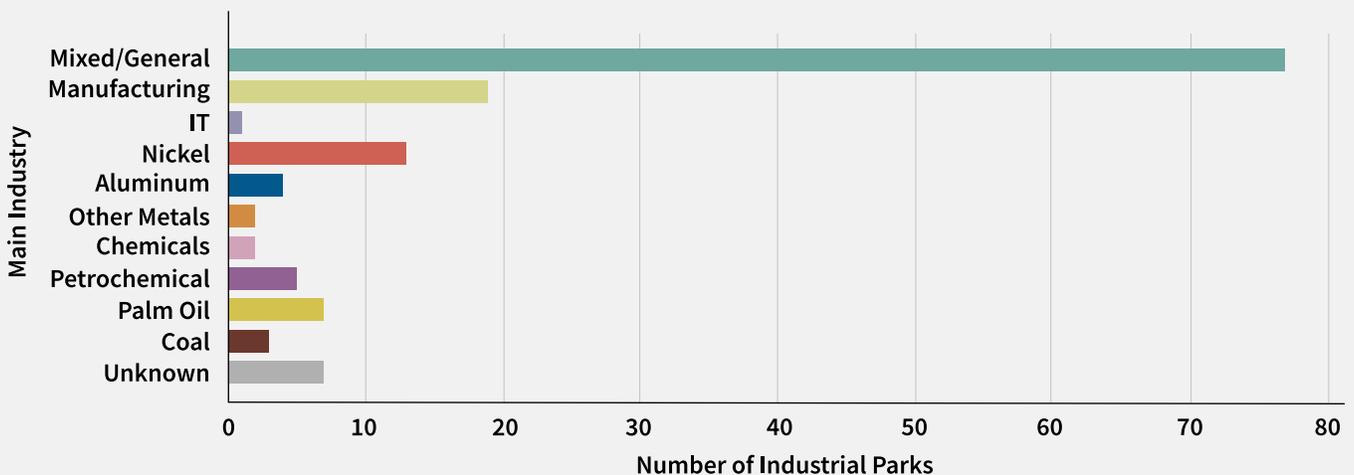
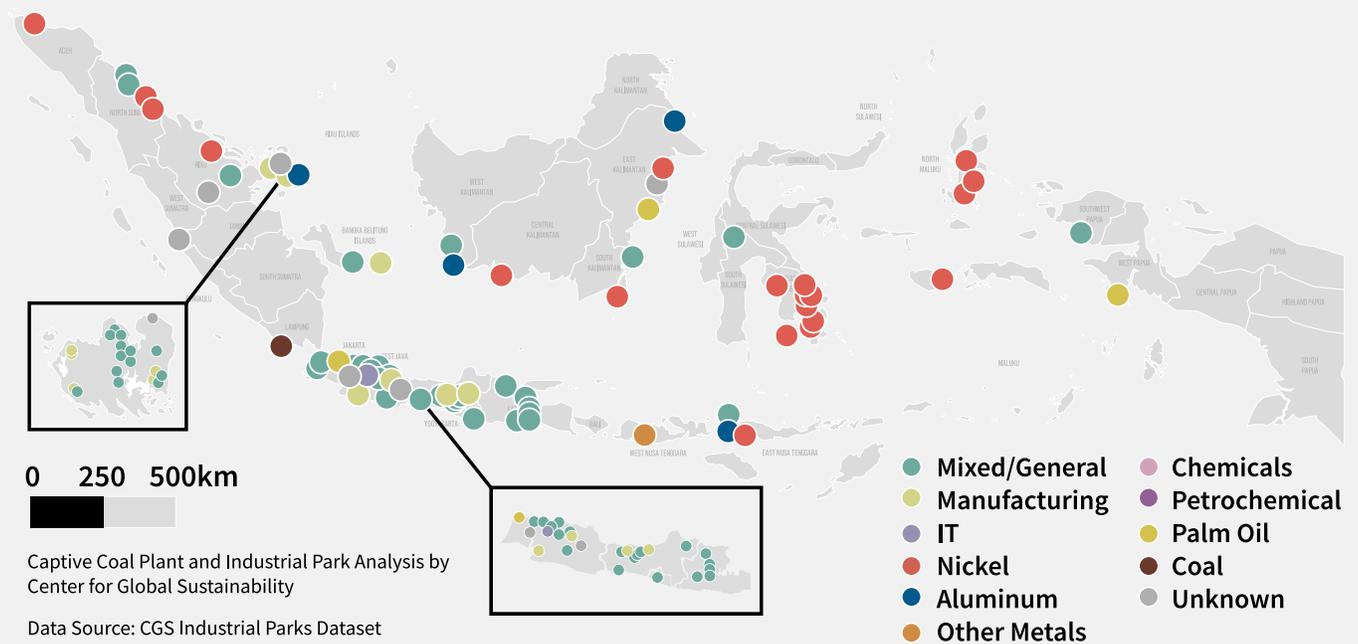
The “Main Industry” column reports the industrial park’s dominant industry. We determined each industrial park’s “Main Industry” using multiple sources, including industrial park websites, local government websites or documents, tenant company

websites, or by looking at the industries of tenant companies located at an industrial park on Google Maps. For industrial parks in Batam City, the 2022 Batam Industrial Estate Profile lists each industrial park’s tenant companies, and each company’s

“Line of Business”. Some industrial parks market themselves towards companies in a certain industry, such as petrochemical companies, while others host many different kinds of companies. Newer metal industrial parks, such as the sixteen nickel industrial parks currently in the dataset, were typically created with the sole purpose of housing mining and smelting operations. “Mixed/General” industrial parks have tenant companies from many different industries, and they do not appear to have one dominant industry among different tenants. “Manufacturing” also

consists of tenants from different industries, such as electronics, automotives, textiles, or plastic parts, but are focused on the manufacture of these goods. The main distinction between “Mixed/General” and “Manufacturing” in our dataset is that “Mixed/General” industrial parks include food processing, warehouses and logistics, and some distribution companies, while “Manufacturing” points solely to the fabrication or building of goods.⁹

Figure 5: Number of Industrial Parks by Sectors (top), and Main Industries of Industrial Parks (bottom)

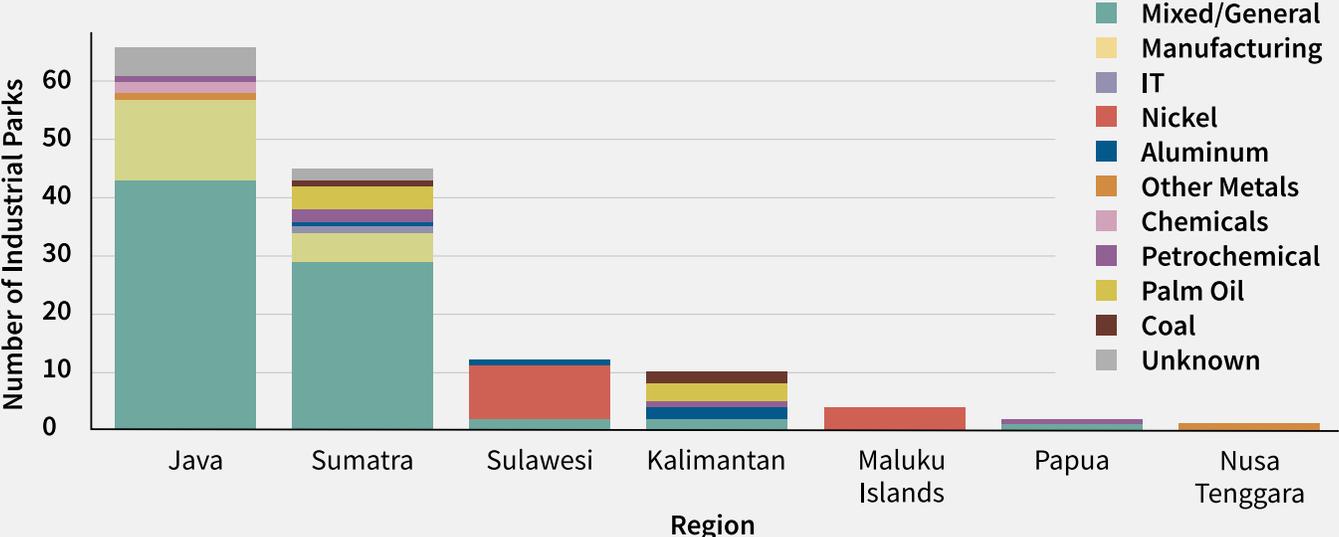
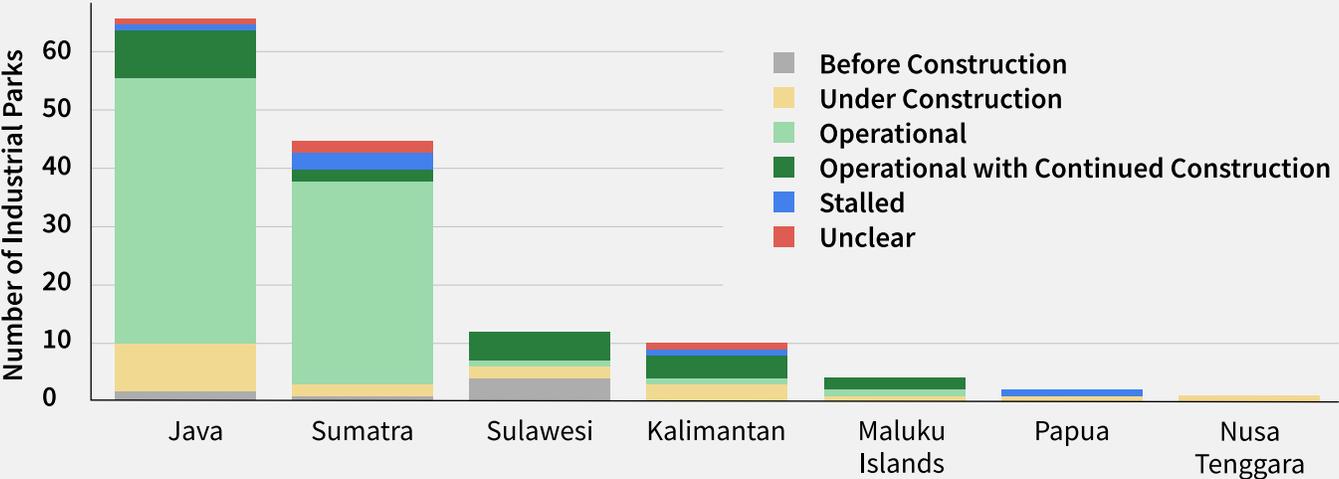


⁹Parks with tenant companies from many different industries were classified as “Mixed/General” or “Manufacturing” accordingly, unless we could identify a dominant industry based on numerous tenant companies belonging to the same industry.

In terms of the spatial distribution of the industrial parks in the dataset, 47% are located on Java, 32.1% are located in Sumatra, 8.6% are located in Sulawesi, 7.1% are in Kalimantan, 2.9% are on the Maluku Islands, 1.4% (two parks) are in Papua, and .7% (one park) is in Nusa Tenggara. In Java and Sumatra, most industrial parks are operational (69.7% and 77.8%, respectively). In Kalimantan, 30.0% of industrial parks are under construction, and 40.0%

of industrial parks are operational with continued construction. In both Sulawesi and the Maluku Islands, 50% of industrial parks are operational with continued construction. In Nusa Tenggara, there is one industrial park, Kawasan Industri Sumbawa Barat, under construction. In Papua, Bintuni Bay Industrial Estate is under construction, and the Sorong Special Economic Zone is stalled.

Figure 6: Industrial Parks by Region and Status (top) and Main Industry (bottom)



Java and Sumatra are both dominated by “Mixed/General” and “Manufacturing” industrial parks. Nine out of Sulawesi’s twelve industrial parks are focused on nickel processing, while all four of the Maluku Islands’ industrial parks are focused on nickel. Kalimantan has two industrial parks focused on aluminum processing, three industrial parks

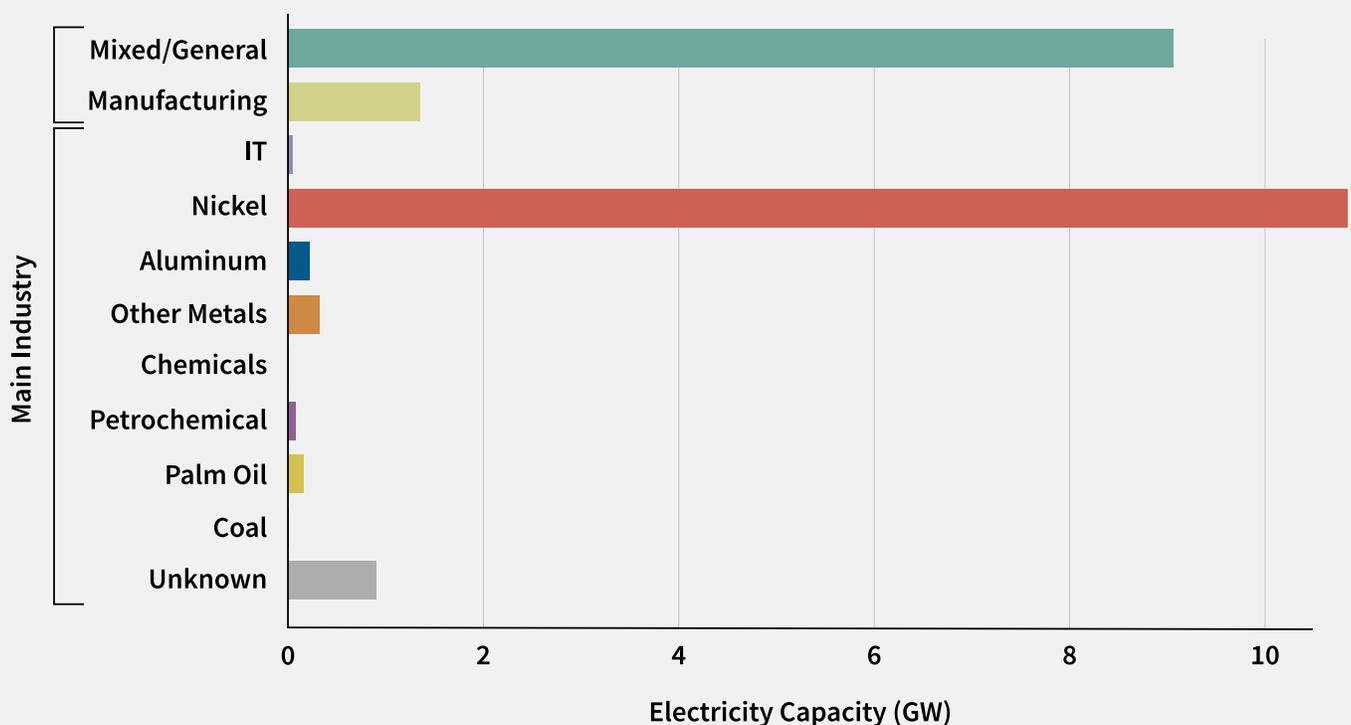
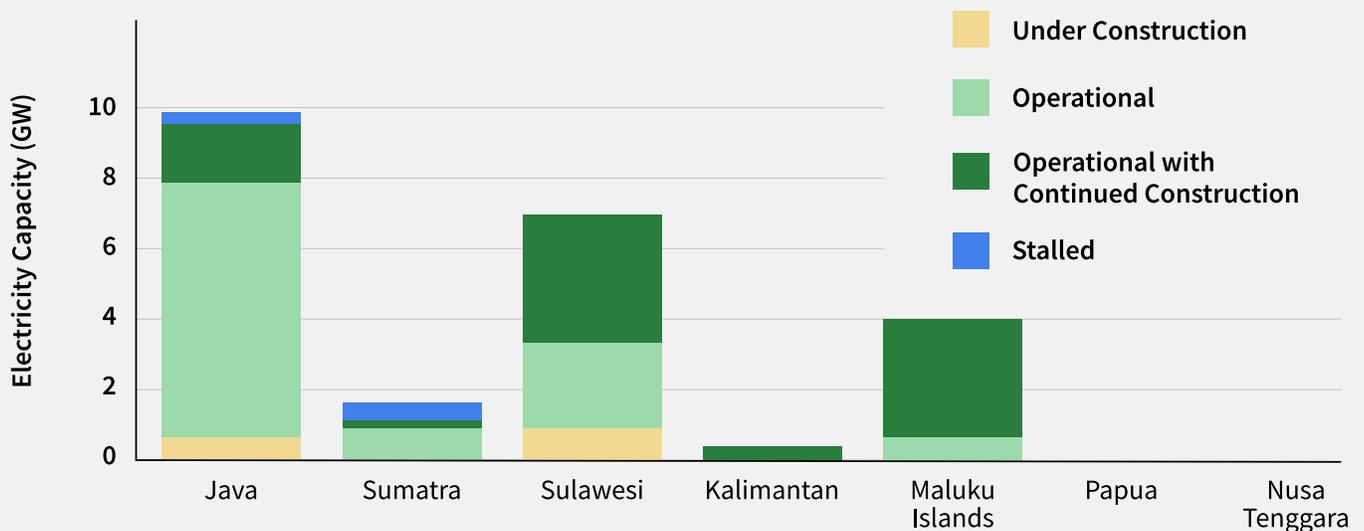
focused on palm oil, and two coal industrial parks. Nusa Tenggara is home to Kawasan Industri Sumbawa Barat, where PT Amman Mineral Nusa Tenggara is currently building a smelter for gold and copper processing (VOI, 2022)

4.4 Electricity Capacity and Source

Among the 79 industrial parks with documented electricity capacity, the total electricity capacity reaches 23.066 gigawatts (GW). The majority of this electricity capacity is concentrated in industrial parks with a status of “Operational” (11.14 GW)

or “Operational with Continued Construction” (9.34GW). In terms of industry-specific capacity, the 13 nickel industrial parks have the highest electricity capacity at 10.914 GW, representing nearly half of total capacity.

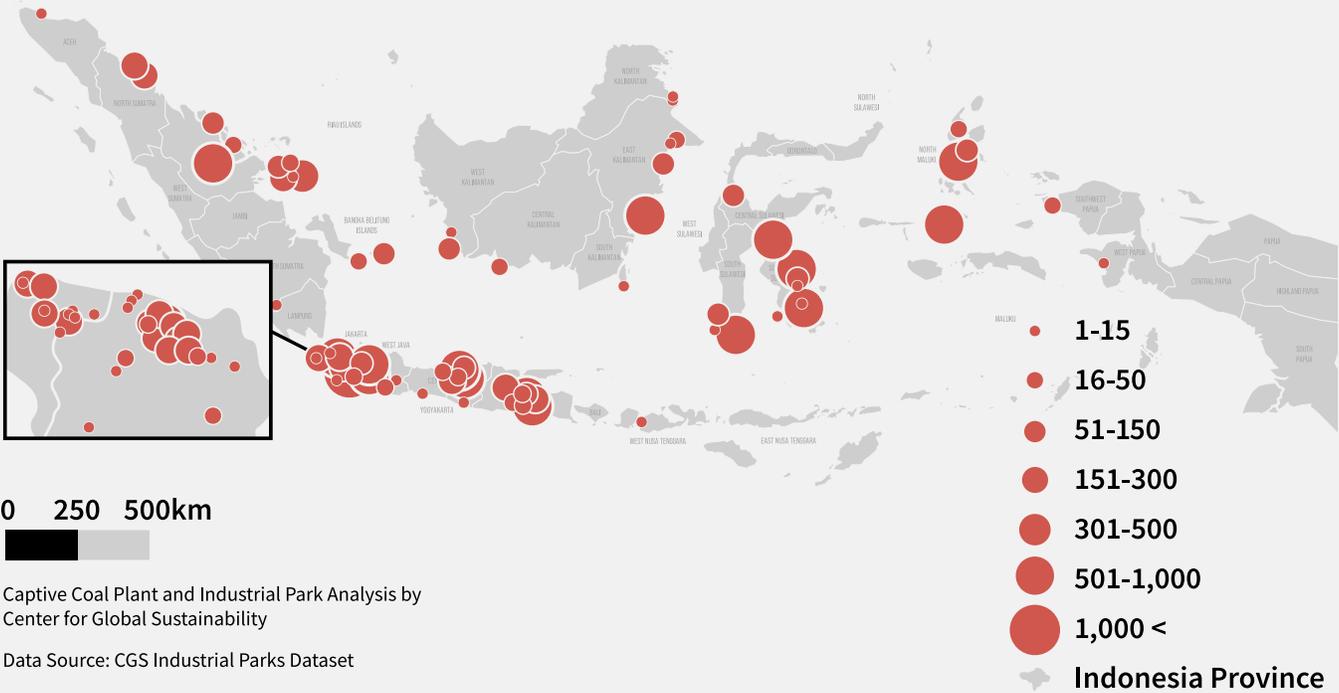
Figure 7: Electricity Capacity (GW) of Industrial Parks by Region and Operating Status (top) and Main Industry (bottom)



Java holds the greatest share of this electricity capacity (9.897 GW). Meanwhile, the electricity capacity in Sulawesi (6.975 GW) and the Maluku

Islands (4.039 GW), is primarily driven by newer nickel industrial parks that are “Operational with Continued Construction.”

Figure 8: Industrial Park Electricity Capacity (MW)



Overall, 61 industrial parks source electricity exclusively from PLN, while 25 industrial parks source electricity from PLN and other sources. Although many industrial parks advertise PLN power availability to tenants, they often do not specify the total electricity PLN provides, leading to its underrepresentation in our reporting. The total documented electricity capacity for industrial parks exclusively sourced from PLN is 6.20 GW. Industrial parks in Indonesia commonly source electricity from a mix of sources, often supplementing electricity

power from PLN with captive coal or captive gas power plants. Eighteen industrial parks use captive coal power plants as one of their energy sources, with five of these industrial parks exclusively sourcing power from captive coal plants. Similarly, 22 industrial parks use captive gas power plants as one of their energy sources, with five sourcing power solely from captive gas power plants. Table 2 provides a complete list of the electricity source combinations for industrial parks in the dataset.¹²

¹⁰ We used Global Energy Monitor’s (GEM) Global Coal Plant and Global Oil and Gas Plant Trackers for data on the location, electricity capacity, and ownership of captive power plants in Indonesia. In order to establish links between captive power plants and industrial parks, we mapped the location of industrial parks and GEM’s Global Coal Plant and Global Oil and Gas Plant trackers; for industrial parks with nearby captive power plants, we verified the relationship between the industrial park and captive power plants through GEM’s Wikis and further research. We report corresponding linkages in the “GEM” column of our dataset.

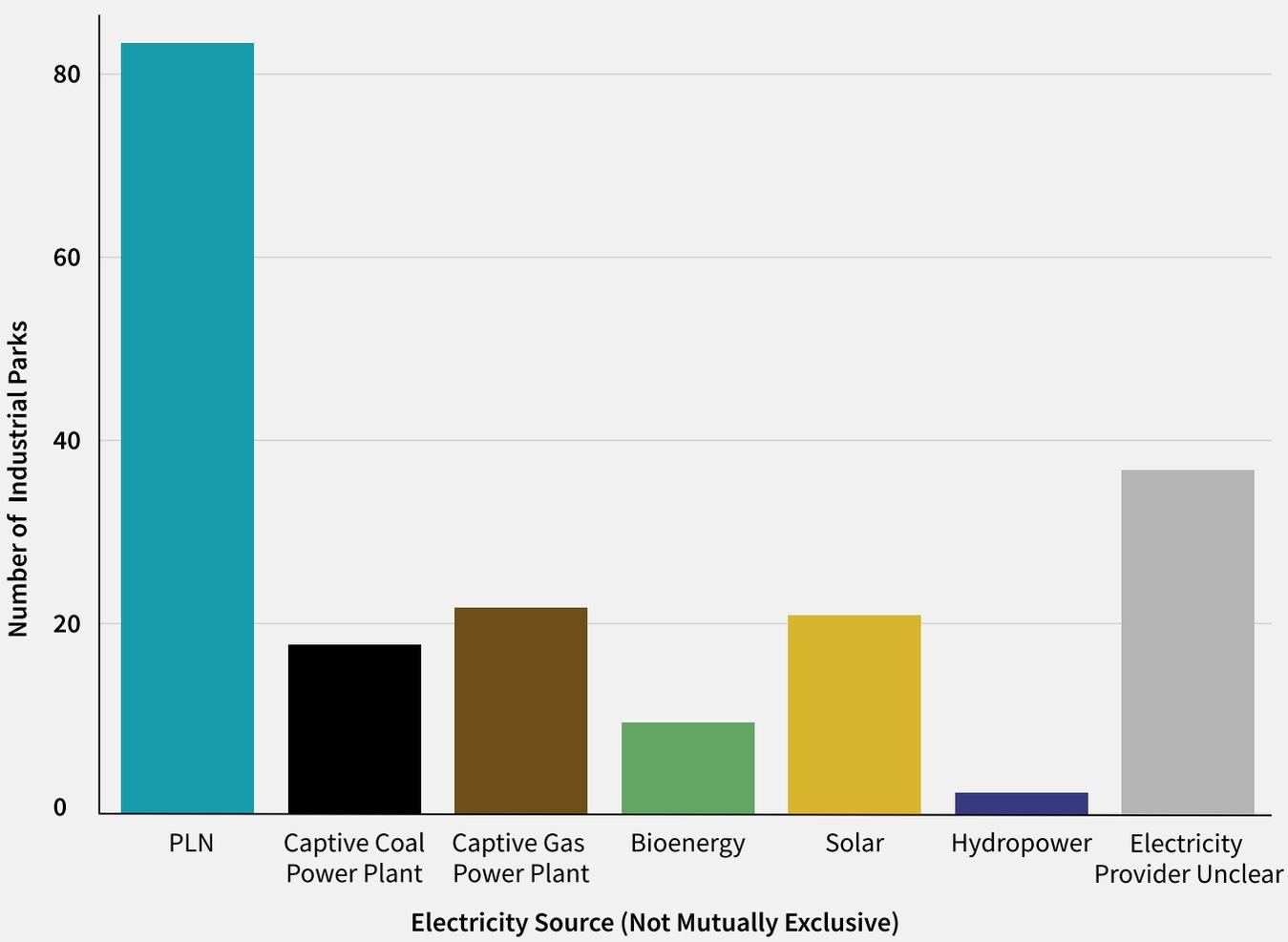
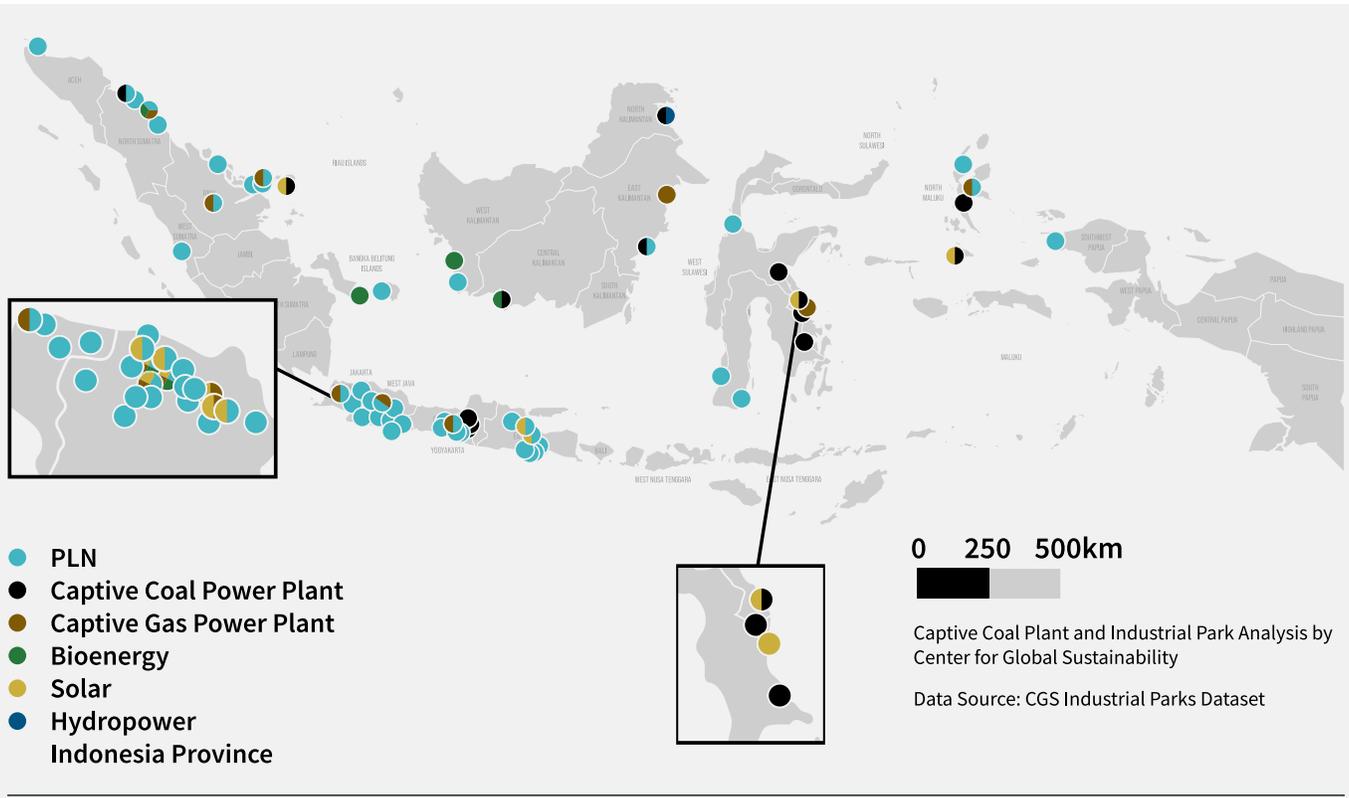
¹¹ While we keep track of the electricity capacity and electricity sources for each industrial park, in most cases it was not possible to attribute a specific electricity capacity to each electricity source. If the specific electricity capacity from each source is known, it is included in the “Electricity Capacity Notes” column.

¹² In the dataset, this electricity capacity has been evenly divided between the parks that are served by Cikarang Listrindo in order to avoid overcounting.

Table 2: Electricity Capacity (MW) and Count of Industrial Parks by Electricity Source

Electricity Type	Electricity Capacity (MW)	Count
Captive Coal	6845	5
PLN	6204.517	61
Captive Coal, Solar	3664	2
PLN, Captive Gas	1286	7
PLN, Solar	1111.539	7
PLN, Captive Coal, Captive Gas, Bioenergy, Solar	941.34	4
PLN, Captive Gas, Solar	813.4	2
Electricity Provider Unclear	662	35
PLN, Captive Coal	530	2
Captive Gas, Solar	300.472	2
Captive Coal, Captive Gas, Bioenergy, Solar, Hydropower	231.3	1
PLN, Captive Coal, Solar	180	1
Captive Coal, Captive Gas, Bioenergy, Solar	115.65	1
Captive Gas	101	5
PLN, Bioenergy, Solar	64.4	1
Captive Coal, Bioenergy	15	1
PLN, Captive Coal, Hydropower	0	1
Bioenergy, Electricity Provider Unclear	0	2

Figure 9: Electricity Source of Industrial Parks



Our dataset also tracks the utilization of bioenergy, solar power, and hydropower as energy sources within industrial parks. Twenty-one industrial parks incorporate solar energy in their power mix, predominantly in the form of rooftop solar photovoltaics (PV), with several planning future installations. For example, Batamindo Industrial Park in Batam City began constructing a 472 kW capacity rooftop solar system through its participation in GEIPP, and the system has been active since April 2022 (United Nations Industrial Development Organization and Global Eco-Industrial Parks Programme, 2022). At Karawang International Industrial City, SUN Energy installed a 115.2 kWp ballast-mounted solar system on top of the industrial park's wastewater treatment facility (SUN Energy, 2024). Plans for larger-scale solar projects are also underway. At Kota Bukit Indah Industrial City, PLN and PT Aruna Cahaya Pratama are setting up a 100 MWp solar power plant, with ground-mounted PV modules across five locations within the industrial park (Hanani, 2023). Since 2022, Indonesia Morowali Industrial Park and KEK Palu have also memorandums of understanding (MoUs) develop solar power plants with greater than 200 MWp (Da Costa, 2022; Husain, 2023). Ten industrial parks have at some point used or plan to use bioenergy in their energy mix, with Kawasan Industri Sei Mangkei using palm oil liquid waste to power a biogas power plant in North Sumatra (Antara, 2021).

KIPI, also known as Kawasan Industri Hijau Indonesia (KIHI), is the only park in our dataset planning to develop hydropower plants as its electricity source. Positioned as the “Green Industrial Park” in North Kalimantan, KIPI aims to primarily utilize hydropower supplemented by solar energy, although it is currently constructing 1.1 GW of coal power plants in the interim. KIPI will depend on two major hydroelectric projects: the Mentarang Induk Hydroelectric Power Plant and the Kayan Cascade Hydroelectric Power Plant. The Mentarang Induk Hydroelectric Power Plant, which broke ground on March 3, 2023, is a joint

venture between Adaro Energy, Sarawak Energy, and PT Kayan Patria Pratama. The Mentarang Induk Hydroelectric Power Plant has a planned electricity capacity of 1,375 MW, with construction anticipated to last 6-7 years (Nangoy, 2023).

Additionally, the Kayan Cascade Hydroelectric Power Plant, which plans to supply around 9,000 MW to KIPI, has been in the pre-construction phase since at least 2019, holding a principal permit for the project since 2011. However, the project faced significant delays due to the region's challenging terrain, inadequate infrastructure, and extensive bureaucratic hurdles, particularly in securing various environmental and construction permits after North Kalimantan became a separate province in 2012 (Maulia, 2022b).¹³ In October 2022, PT Kayan Hydro Energy announced a collaboration with Japan's Sumitomo corporation to accelerate the project's development (Maulia, 2022). Earlier, in 2018, they signed an MOU with PowerChina,¹⁴ involving PowerChina Huadong and Sinohydro in design, engineering and construction (TanahAir, 2023). Construction is expected to begin in 2024, and involves building five dams along the Kayan river and installing five to six units of power plant turbines.¹⁵ The first phase of construction is expected to be complete by 2026, providing 900 MW of electricity capacity, with a long-term goal of reaching 9,000 MW across five phases.¹⁶



¹³ In September 2022, the Nikkei Asia reported that “... the work has been hit with delays including the region's difficult terrain, poor basic infrastructure and bureaucratic hurdles. Suryali said it took 10 years to obtain dozens of permits after North Kalimantan split from East Kalimantan to become a new province in 2012. These include permits for forest land use, environmental impact analysis and construction of the dams.”

¹⁴ PowerChina first began studying the hydropower potential of the Kayan River in 2008.

¹⁵ On May 16, 2023, Kayan Hydro Energy announced it was resuming development of the project, after delays due to a legal dispute over conflicting permits to develop the hydropower project (TanahAir, 2023)

¹⁶ Dialogue Earth documented the potential impacts of the project on indigenous people, including the residents of Long Lejuh, who were told they would be relocated to a new town, but have not heard of any follow up since 2012 (Isabella, 2023).

4.5 Foreign Ownership and Tenants

The foreign ownership fields track the involvement of foreign companies in industrial parks at the level of founder or manager and at the level of tenant companies. Due to the large number of tenant companies across the industrial parks, the data is more complete at the level of founder or manager. We only assessed large tenant companies highlighted by company materials and news articles or industrial parks with few tenant companies for tenant company nationality. Among the founders or managers, the most common country of origin is China, represented in 17 industrial parks, followed by Japan in eight industrial parks and Singapore at six industrial parks. Similarly, the most common tenant company countries of origin are China with 11 industrial parks, Japan with eight industrial parks, and Singapore with six industrial parks.

Several companies have multiple industrial park projects throughout Indonesia. One of the most active

foreign investors in Indonesia's mineral processing industry is Chinese-owned Tsingshan Holding Group, a giant in the stainless steel and ferronickel production industries (Tritto, 2023). Shanghai Decent, a subsidiary of Tsingshan group, owns 49.7% of shares in Indonesia Morowali Industrial Park (IMIP), which has become Indonesia's largest nickel processor (Rushdi et al., 2020). Tsingshan is also involved as a tenant of the park through Indonesia Tsingshan Stainless Steel. Another subsidiary of Tsingshan group, Perlus Technologies, has a similarly large shareholding in Weda Bay Industrial park (40%). Operating within the park is PT Weda Bay Nickel, a mining company that Tsingshan owns 67% of (EJ Atlas, 2023a). Tsingshan was also heavily involved in the funding and development of both Indonesia Konawe Industrial Park and Kalimantan Industrial Park Indonesia (Damayanti and Maulia, 2023; Reuters, 2021).

Table 3: Foreign Company Involvement as a Founder/Manager and Tenant at Industrial Parks

Founder Company Countries of Origin	Count of Industrial Parks	Tenant Company Countries of Origin	Count
China	17	China	11
Japan	8	Japan	9
Singapore	6	South Korea	9
Taiwan	3	Taiwan	7
Malaysia	3	United States	6
France	2	Singapore	4
South Korea	2	Netherlands	3
Canada	1	Germany	3
Germany	1	India	3

Note:

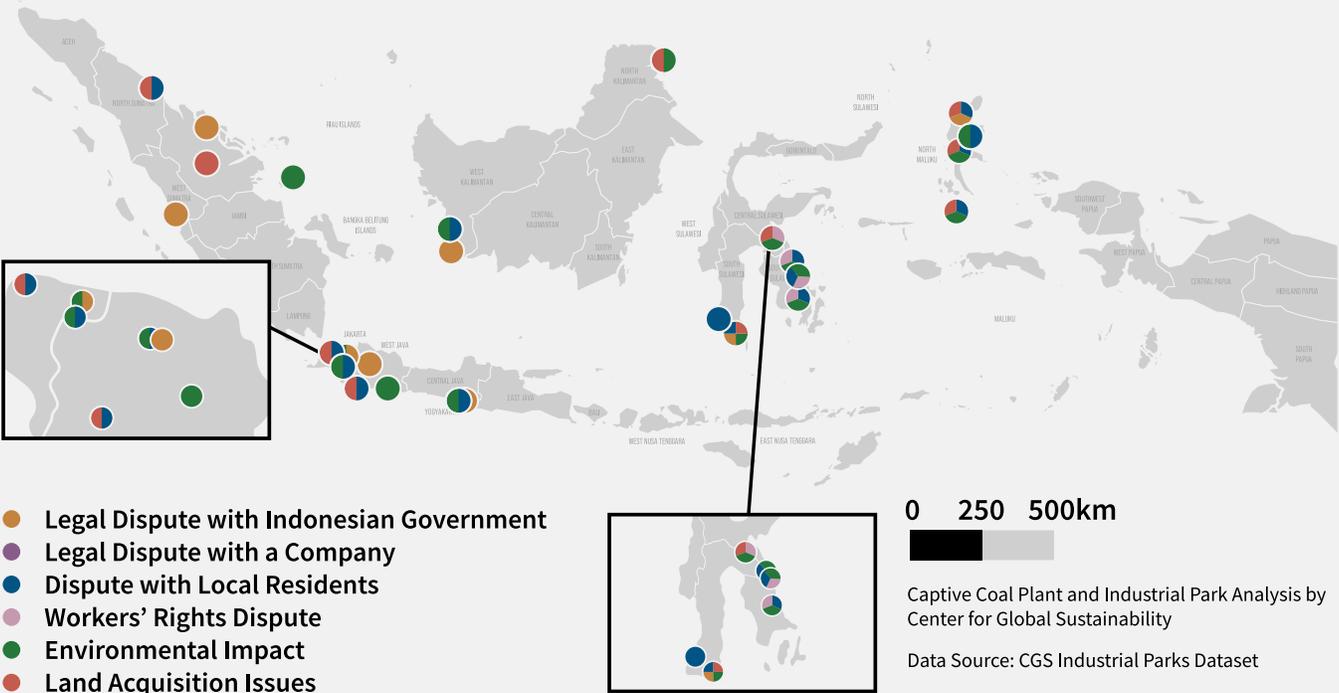
“Founder Company” Countries of Origin includes all nine countries noted as founders in the dataset; “Tenant Company” Countries of Origin lists top nine tenant countries in the dataset.

4.6. Disputes

The industrial parks dataset also captures social, political, and environmental issues occurring at industrial parks. We classify incidents at industrial parks as “Legal Dispute with Indonesian Government,” “Legal Dispute with a Company,” “Dispute with Local Residents,” “Workers’ Rights Dispute,” “Environmental Impact,” and “Land Acquisition Issues.” While many industrial parks have multiple types of disputes, in some cases we count the same incident as multiple dispute types. For example, reports of environmental degradation (“Environmental Impact”) often lead to local resident protests (“Dispute with Local Residents”). Boolean columns denote the presence of a dispute type at an industrial park, while further details regarding the dispute are in the “Dispute Explanations” column. We used news articles from environmental or local news organizations to identify and report on disputes; the disputes fields likely miss events that were not widely reported on. Land acquisition and environmental impact issues that occurred during the early development stages of older industrial parks (1970s - 2000) are less represented in this dataset due to less online coverage of these events.

“Environmental Impact” disputes capture many cases of runoff, pollution, or deforestation from industrial parks that hurt local communities. “Environmental Impact” disputes are the most common dispute type in the dataset, found at 18 industrial parks throughout Indonesia. For example, at Kawasan Industri Candi, tenant PT Focon set up a factory a mere two meters from a residential area instead of the mandated two kilometers. Soon, the majority of residents began experiencing respiratory symptoms, with the most vulnerable individuals requiring treatment at the hospital. Semarang City Environmental Service stepped in to conduct a full mediation process after direct talks between residents and PT Focon failed, and halted all operations until a review could be completed (Qudstia, 2023). Those living next to Obi Island Industrial Estate have also had serious concerns about the environmental and health impacts of tenants’ business activities, which include massive nickel mining operations. Operations have resulted in contaminated water supply, decreased fish catch, and increased respiratory infections. Further, increased landslides and flooding from deforestation for mines has induced food insecurity

Figure 10: Disputes at Industrial Parks



from crop damage. The joint owners of the nickel processing plant, Indonesian firm Harita Group and Chinese firm Lygend Resources, acknowledge that their waste storage method is dangerous, but deny any responsibility for the water pollution that downstream residents face (EJ Atlas, 2023b; T a n et al., 2023).

The “Disputes with Local Residents” indicate that local community members have publicly spoken out against an industrial park and/or requested action from the company or local government to remedy an issue. Fifteen industrial parks have some form of dispute with the local community. In some cases, concerns over land use and degradation have morphed into lengthy disputes between local residents and companies hosted by industrial parks. PT Irama Gemilang Lestari (PT IGL), a tenant of Kawasan Industri Sumber Rezeki, faced extensive backlash from residents of the Cileles village in Tangerang Regency, who claim that their industrial development activity has negatively impacted the rice harvests used to sustain their families. Despite PT IGL receiving an Amdal permit in 2018, residents claim that industrial activity collapsed the Muhara River’s banks, which led to intense flooding and crop failure in nearby rice paddies. These residents filed complaints with their village and subdistrict heads and are seeking resolution through the deliberation processes, although PT IGL has not yet been ordered to halt industrial activity or provide compensation to residents (Nawacitalink, 2022; Tangeks, 2022). In another case, demonstrations and protests erupted in the area surrounding Kawasan Industri Buli due to unresolved disputes between residents and tenant PT Aneka Tambang, a state-owned mining company that locals say is irresponsibly dumping mining waste and causing a meters-high build up of toxic sediment. Locals say that thick mud with a high nickel content is seeping into the bay and making fish unfit for consumption. After After months of unresolved complaints and protests, Antam took responsibility for the pollution and promised up to Rp 500 million in aid to local fishermen (Armein, 2021; Tandaseru, 2021).

Land acquisition disputes between local governments, companies, and community members are also common across Indonesia, occurring at 10 industrial parks in the dataset. While control over land governance is split between several national agencies and local governments, local governments have the ability to issue many types of business licenses to companies for land use. Local governments must follow national land management laws that guarantee

fair compensation to local land-users, however, these practices are sometimes ignored in favor of business dealings or bribes from corporations (Tresya et al., 2021). At Kawasan Industri Emerald Ferrochromium Industry (EFI), there has been an ongoing dispute over PT. EFI’s land acquisition practices since at least 2020. PT. EFI has been accused of destroying residents’ land without any compensation, unfair land compensation prices, failing to pay agreed upon land compensation, and bribing a judge during a case regarding the low land compensation price EFI paid to residents (Harian Halmahera, 2020a, 2020b; Muhammad, 2021). At IWIP, the forced displacement of the nomadic indigenous O Hongana Manyaway people, who remain voluntarily uncontacted, has prompted protests and opposition from community and environmental groups since 2010. Many residents of the area were forced to sell their land at prices far below market value and relocate, while others have refused to sell their land (Belseran, 2023; Brook, 2023; EJ Atlas, 2023a).

The “Workers’ Rights” dispute section documents organized and unorganized protests by workers against entire industrial parks or individual companies over pay, working conditions, and treatment. Currently, three instances of “Workers rights” disputes are identified in the dataset, occurring at Kawasan Industri VDNI, IWIP, and Kawasan Industri PT. Stardust Investment Estate, all located in Southeast and Central Sulawesi. Disputes within IMIP highlight the unhealthy working conditions and labor malpractices faced by Indonesian and foreign workers alike. Chinese workers described long hours, withheld passports, and severe respiratory problems, while local workers perceived favorable pay and treatment towards their Chinese counterparts by their Chinese-owned company, resulting in conflict among workers (EJ Atlas, 2022; Woro Yuniar, 2023). After talks failed between unionized workers and the company over salary and safety concerns, a riot broke out, resulting in two worker’s deaths and the destruction of company equipment (McBeth, 2023). Similar issues of worker mistreatment and conflict emerged at Kawasan Industri PT. Stardust Investment Estate, where Chinese company PT GNI built a smelter and power plant. Indonesian workers allege their Chinese co-workers receive higher wages and better living facilities, and multiple employees died from explosions and equipment malfunctions in the workplace. Disputes over unsafe conditions and unfair treatment evolved into a riot, which killed an additional three workers. These riots were harshly put down by National Police with dozens of arrests,

but the government has yet to address the root cause of these disputes (JATAM, 2023).

In cases of “Legal Disputes with the Indonesian Government,” we identified eight instances where local government organizations or court systems have investigated or charged industrial park companies with wrongdoing. At Bekasi International Industrial Estate, investigations found that tenant PT Hyundai Inti Development, the manager of the industrial estate, dumped waste into the surrounding waterways despite having an expired waste permit and exceeding the quality standard threshold for waste. After Hyundai refused to pay the 16 billion IDR demanded by the government in out-of-court negotiations, parties reached a settlement amount of IDR two billion. (Klik Bekasi, 2015). One legal dispute between industrial park companies was also documented as a “Legal Dispute with a Company.” In 2022, PT Mega Nur undertook a legal complaint against neighboring PT Anugrah Tambang, located at Kawasan Industri Anugrah Tambang industrial estate. PT Mega Nur claims that PT Anugrah Tambang conducted activities that hindered its own operations, like mining and the construction of a jetty, without giving notice or receiving consent. However, PT Mega Nur’s arguments lost some credibility when investigations revealed that they had only been partially operational for years (Duta Info, 2022).

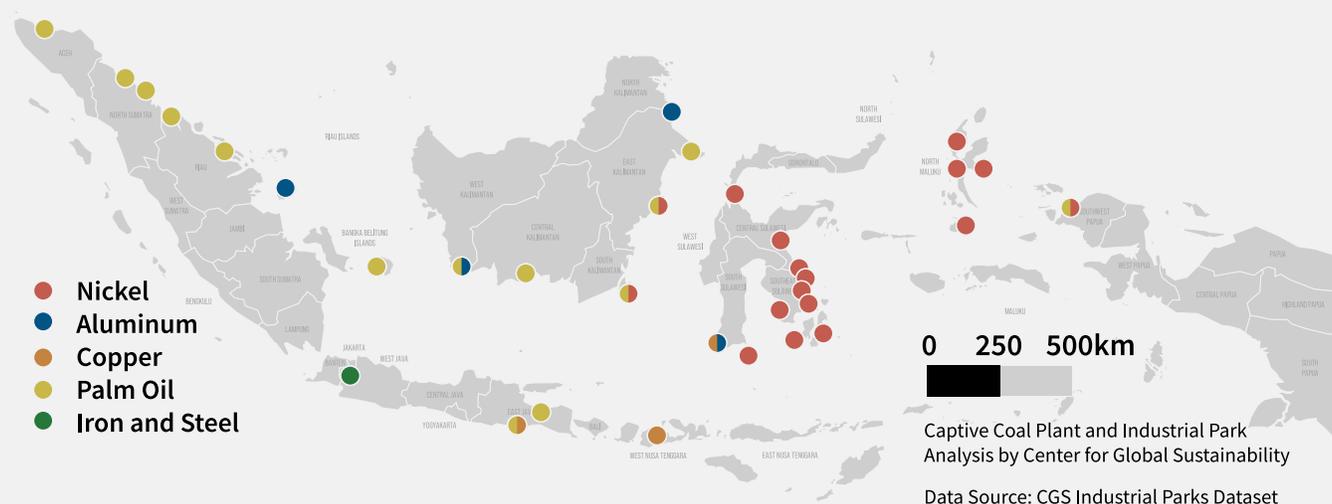
4.7. Key Commodities

We track production or processing of nickel, aluminum, copper, palm oil, and iron and steel at industrial parks noting that nickel processing is clustered around Kalimantan, Sulawesi, and the North Maluku Islands, as shown in Figure 11.¹⁷ Increasing domestic processing of commodities at industrial parks is key to Jokowi's downstreaming strategy, which has vastly increased nickel production but resulted in environmental damage and a global oversupply of nickel (Nangoy, 2024). Sixteen industrial parks are involved in the nickel industry, with most nickel processing occurring in Kalimantan, Sulawesi, the Maluku Islands, and West Papua.¹⁸ Kawasan Industri VDNI, also known as Delong Industrial Park, is a large ferronickel and stainless steel industrial park developed by Chinese company Jiangsu Delong Nickel Co., Ltd. as part of the Belt and Road Initiative. The park processes 13 million tonnes of nickel ore annually and has a ferronickel production capacity of 1.8 million tonnes (EJ Atlas, 2023c). In 2021, the park deemed the total value of its 618,117 metric tons of Nickel Pig Iron export volume to be \$1.21 billion USD (Besalicto, 2021). The GOI provided preferential provisions enabling project construction, including tax exemption licenses, principal licensing for ore processing, and environmental permits (Shanghai Metals Market, 2021). IMIP is Indonesia's largest nickel-based industrial area, with approximately 4,000 hectares of land, 97,000 workers, and over \$20 billion USD in investments by both the GOI and

foreign banks (Citra Rahayu, 2023; EJ Atlas, 2022). In 2009, the GOI granted the establishing companies extraction rights to 47,040 hectares of laterite nickel ore mining land, and investment allowed IMIP to grow into a self-sustaining compound, with captive coal plants, residential areas, a seaport and airport, and factories for supporting materials (EJ Atlas, 2022; IMIP, 2022). However, this expansion has led to significant ecological issues such as water and air pollution, deforestation, militarization, labor concerns, and hardships for local agricultural communities (Ginting and Moore, 2021).

We find aluminum processing at four industrial parks in the dataset, with large-scale aluminum processing at KEK Galang Batang. The total annual smelter capacity of Chinese tenant Shandong Nanshan at KEK Galang Batang is expected to reach three million tonnes by 2028 (Aizhu et al., 2023). Aluminum powder is exported to China, India, and Malaysia, with plans to expand into the production of aluminum bars and aluminum ingots for EVs and airplanes (Aizhu et al., 2023; Nasution, 2022). The Adaro Aluminum Smelters under construction at KIPI in North Kalimantan plan to produce 250,000 tons of aluminum ingots by the third quarter of 2024, reaching full production capacity in 2026 (Chakraborty, 2024). Beyond aluminum, our dataset also tracks copper, iron and steel, and palm oil industries across industrial parks.

Figure 11: Industrial Parks with Key Commodity Production



¹⁷ The Key Commodities columns also provide supplementary information to the Main Industry column. In some cases, the Main Industry is marked as "General/Mixed," but if a specific commodity like palm oil is produced at the industrial park, it is recorded in the Key Commodities columns.

¹⁸ While 13 industrial parks are solely focused on nickel processing, an additional three industrial parks have other "Main Industry" classifications, with planned or ongoing construction of nickel smelters.

Conclusion

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The Industrial Parks dataset provides a comprehensive overview of available information on areas deemed industrial parks, industrial zones, special economic zones, or other related development sites. The dataset includes basic data on size, age, status, location, tenants, main industry, and key commodity production, as well as insights on foreign ownership, electricity source, and disputes within the park, whether legal, environmental, worker's rights, or otherwise. Our dataset is not exhaustive, and is meant to be updated and refined as industrial parks are built and modified, or as more complete data is uncovered. The trends within the dataset should be understood within the greater context of Indonesia's industrial policies, economic growth goals, and recent decarbonization promises. While some aspects of

industrial park development challenge environmental and energy goals, recent trends in renewable energy use provide an opportunity to lead in industrial decarbonization. For example, the use of or planned use of solar at 21 industrial parks and bioenergy projects at 10 industrial parks highlight innovative efforts to incorporate renewable energy sources into industrial processes. As newer, large-scale industrial parks are built, they have the opportunity to incorporate renewable energy power sources from their founding, rather than retrofitting old systems. We hope this dataset provides a window into the many challenges and opportunities Indonesia faces in its energy transition at both a local and national scale.

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