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Just Energy Transition in Indonesia's Coal Sector

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May 2025, Microeconomics Dashboard

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What is Energy Transition?

The Government of Indonesia (GoI) has committed to adopting more ambitious greenhouse gas (GHG) reduction targets and net zero emissions by 2060 or earlier (Ministry of Environment and Forestry, 2022). To achieve these targets, GoI and the International Partners Group (IPG) launched the Just Energy Transition Partnership (JETP) for Indonesia in November 16, 2022 to accelerate the energy transition with funding of US$ 20 billion. This initiative aligns with LTS-LCCR 2050 and Long-Term National Development Plan for 2025-2045.

Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR) 2050 which require to cut GHG emissions by 31.89% by 2030 from the 2010 Business-as-usual (BAU) baseline, and by 43.2% with the support of international assistance.

Long-Term National Development Plan (Rencana Pembangunan Jangka Panjang Nasional/RPJPN) for 2025-2045 has committed to managing coal phase-out as a critical component of its broader climate strategy, including the effort to reduce GHGs, improve energy efficiency, and accelerate new and renewable energy in all economic sectors.

- 1st phase (2024-2029) → Focus on limiting the construction of new coal-fired power plants (CFPPs).
- 2nd phase (2030-2035) → Prioritize existing CFPPs.
- 3rd phase (2035-2039) and 4th phase (2040-2050) → Concentrate on continuing and expanding coal-fired power plants (CFPPs) retirements.

Photo Source: businessindonesia

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Regulations on Coal Retirement in Indonesia

Law No. 30/2007

on Energy which mandates the strategy to transition away from coal and develop new and renewable energy sources to reduce reliance on fossil fuels.

Government Regulation No. 79/2014

on The National Energy Policy (*Kebijakan Energi Nasional*/KEN) sets targets for coal's share in the energy mix, requiring it to account for at least 30% by 2025 and a minimum of 25% by 2050.

Presidential Regulation No. 22/2017

on The National Energy General Plan (Rencana Umum Energi Nasional/RUEN) limits annual coal production to 400 million tons starting in 2019 and mandates a gradual reduction in exports, targeting a complete phase-out by 2046 to prioritize domestic energy needs.

Presidential Regulation No. 112/2022

accelerates the development of renewable energy for electricity supply by phasing out coal-fired power plants (*Pembangkit Listrik Tenaga Uap*/PLTUs) early and restricting the construction of new PLTUs.

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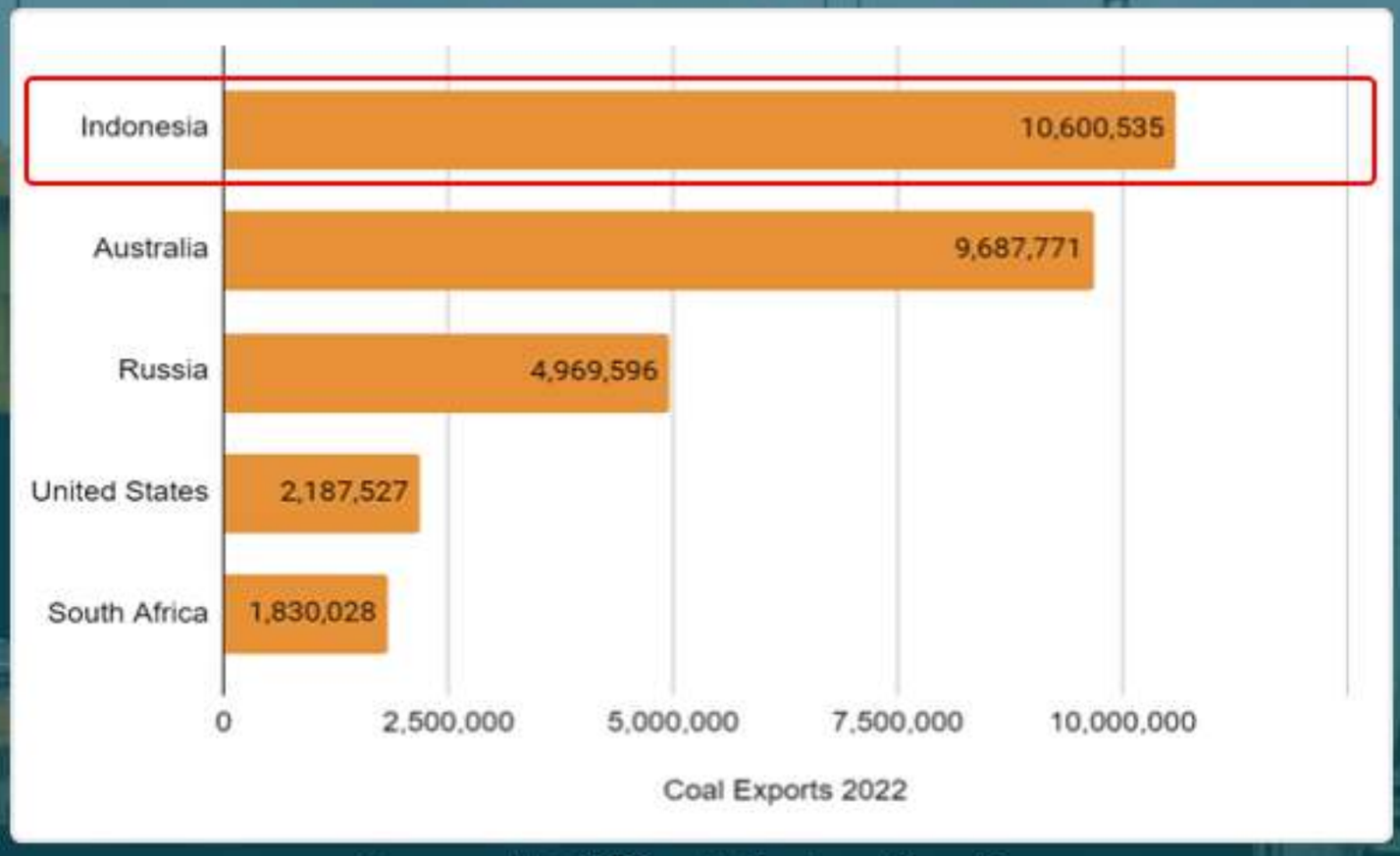
The Urgency of Energy Transition in Indonesia's Coal Sector (1)

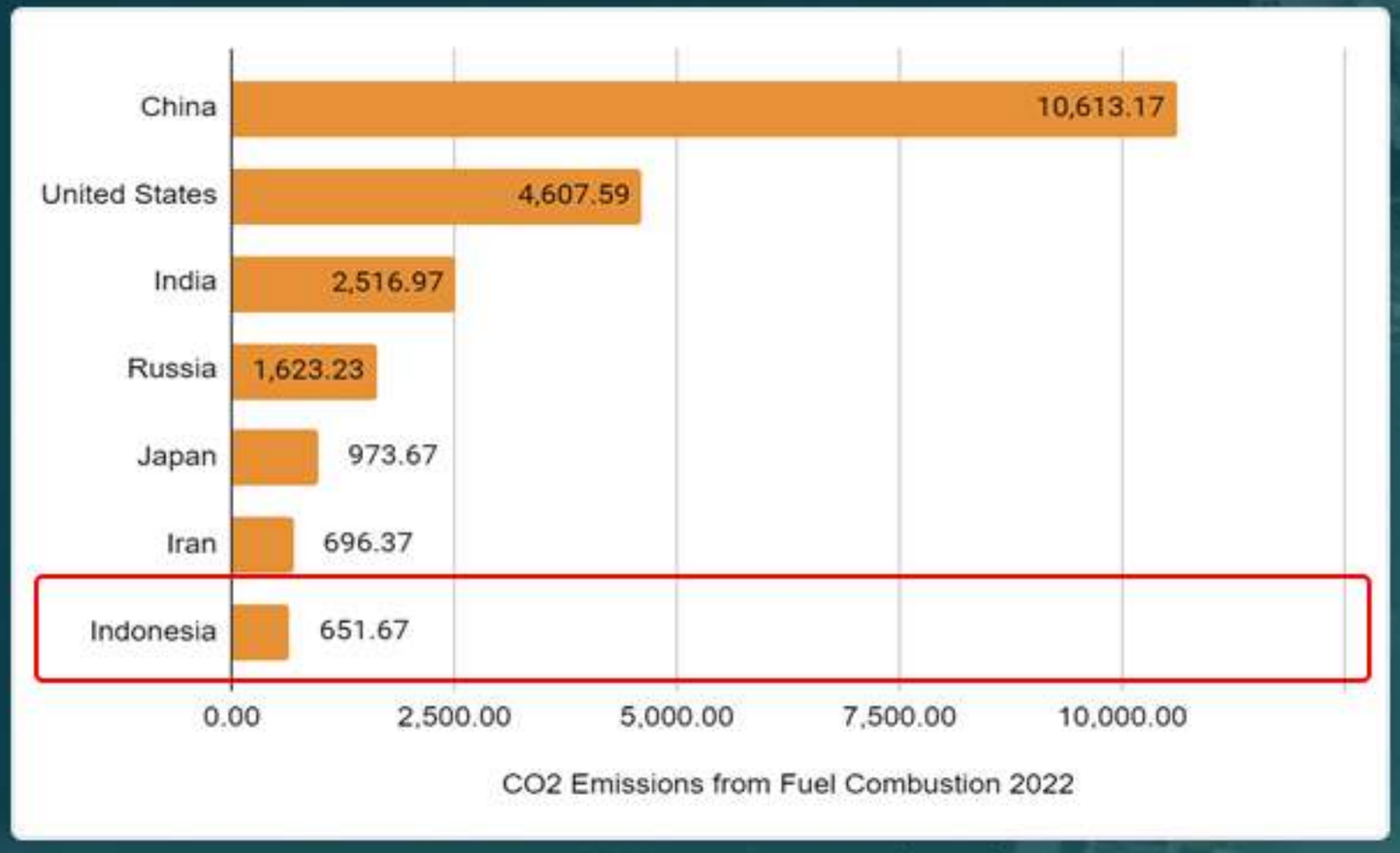
Indonesia is not only the world's largest exporter of coal, but also the largest emitter of carbon dioxide (7th in the world) as a consequence of coal's impact on the environment.

The Global Export Ranking of Coal in 2022 (TJ)



Source: IEA, 2022a. Author's estimation.

The Global CO2 Emissions from Fuel Combustion Ranking 2022(Mt)



Source: IEA, 2022a. Author's estimation.

Photo Source: Getty Images/Stockphoto

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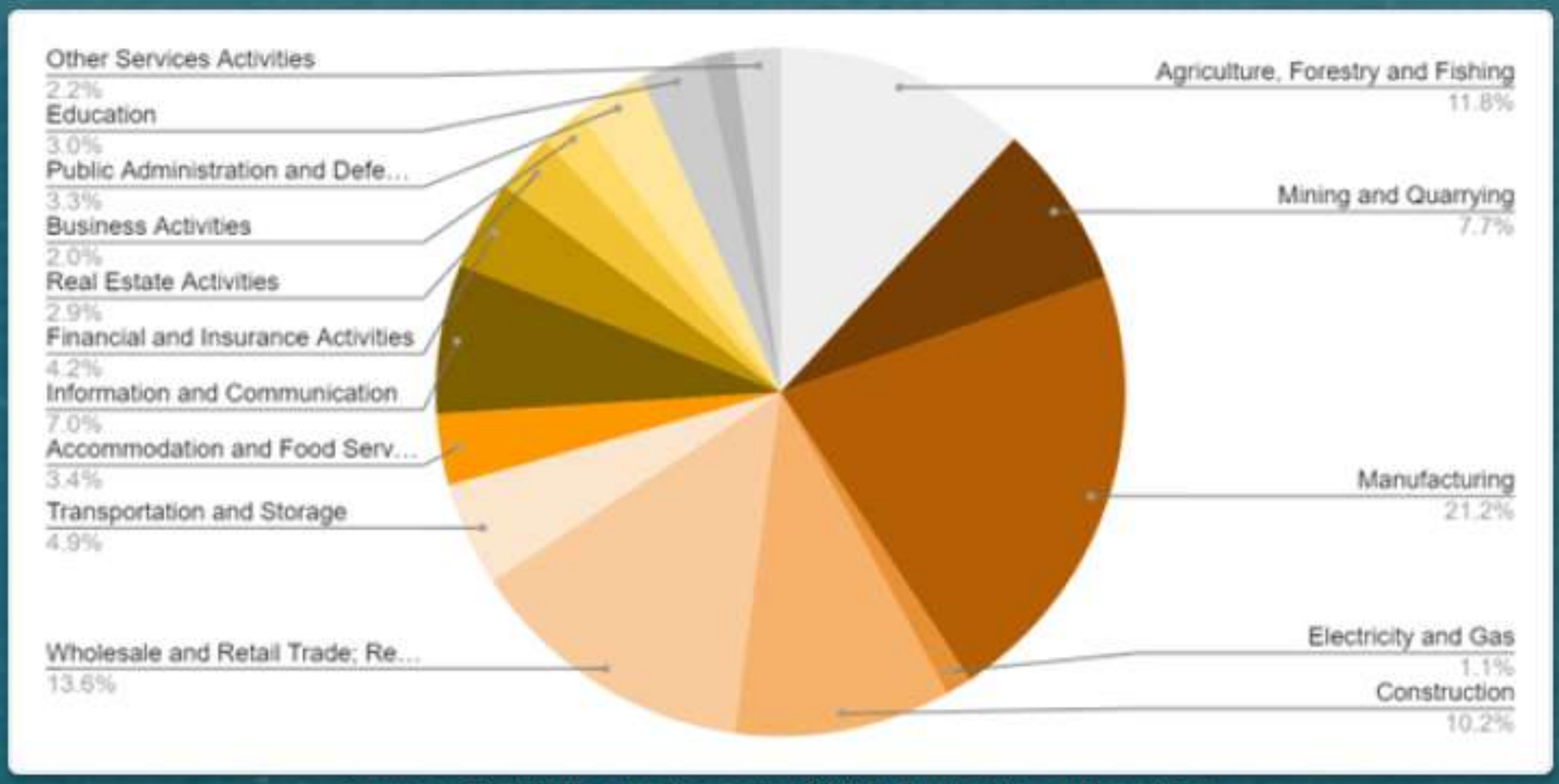
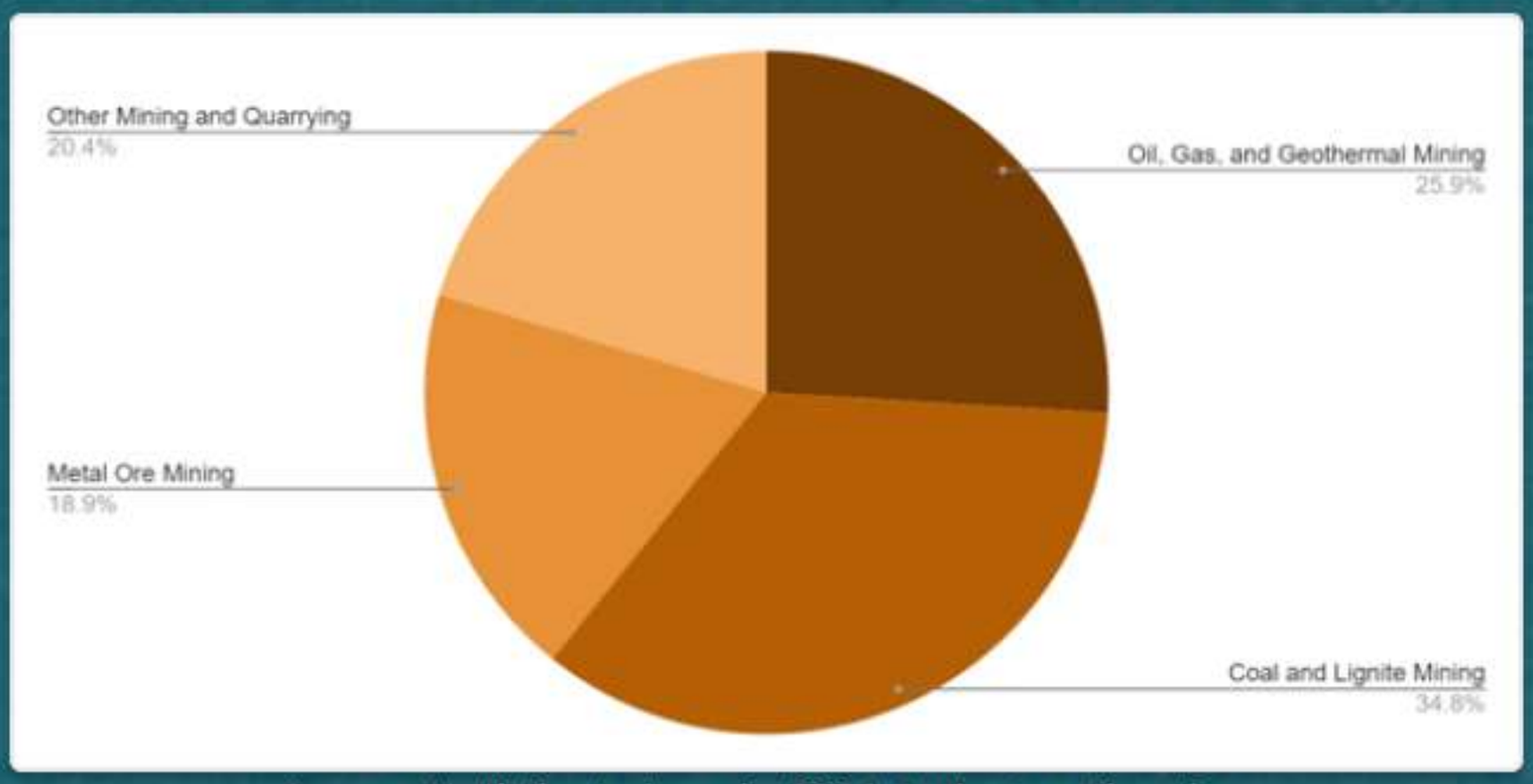
The Urgency of Energy Transition in Indonesia's Coal Sector (2)

The Contribution of Mining and Quarrying in Indonesia's GDP by Industry in 2024



Source: Statistics Indonesia, 2024. Author's estimation.

The Contribution of Coal to Mining and Quarrying in 2024



Source: Statistics Indonesia, 2024. Author's estimation.

The mining sector contributed 7.7% to Gross Domestic Product (GDP) in 2024, the major part of which came from the mining of coal and lignite (34.8%). In addition, coal contributes to the State Budget (*Anggaran Pendapatan dan Belanja Negara*/APBN) through mechanisms such as land rent, royalties/taxes, and the sale of mining products. Over the past four years, the sector has generated an average revenue of approximately IDR 31 trillion (around 2.17 billion USD), accounting for nearly 80% of total non-oil and gas revenue. This shows that the coal sector makes a significant contribution in Indonesia.

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Photo Source: ANGHI/Shutterstock.com

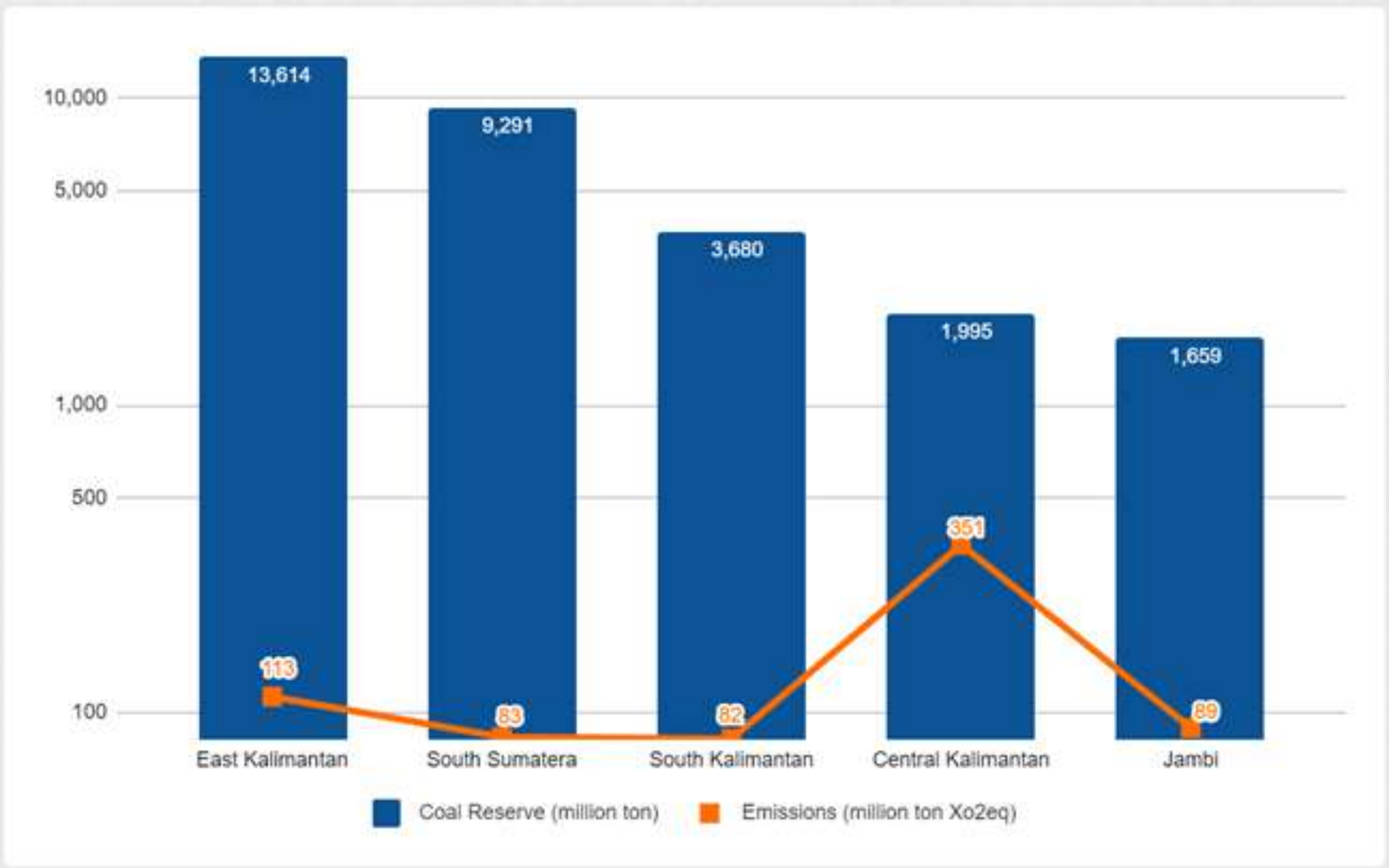
The Producers of Coal by Region in Indonesia

East Kalimantan and South Sumatera are the largest coal producing province in Indonesia. The mining and quarrying sector is the primary contributor to South Sumatera and East Kalimantan Gross Regional Domestic Product (GRDP):

1. East Kalimantan → 43.18% of the total in 2023, where coal and lignite mining contributed 34.16% to the GRDP (Statistics Kalimantan Timur, 2025).
2. South Sumatera → 26.60% of the total in 2023, where coal and lignite mining is the largest contributor with 15.90% of of the total mining and quarrying contribution (Statistics Sumatera Selatan, 2025).

Meanwhile, **East Kalimantan and South Sumatera also contributes a large amount of carbon emissions in Indonesia.**

Indonesia's Top 5 Coal Reserve with Carbon Emitter



Source: Mawardi et al., 2023; Ministry of Energy and Mineral Resources, 2021. Author's estimation.

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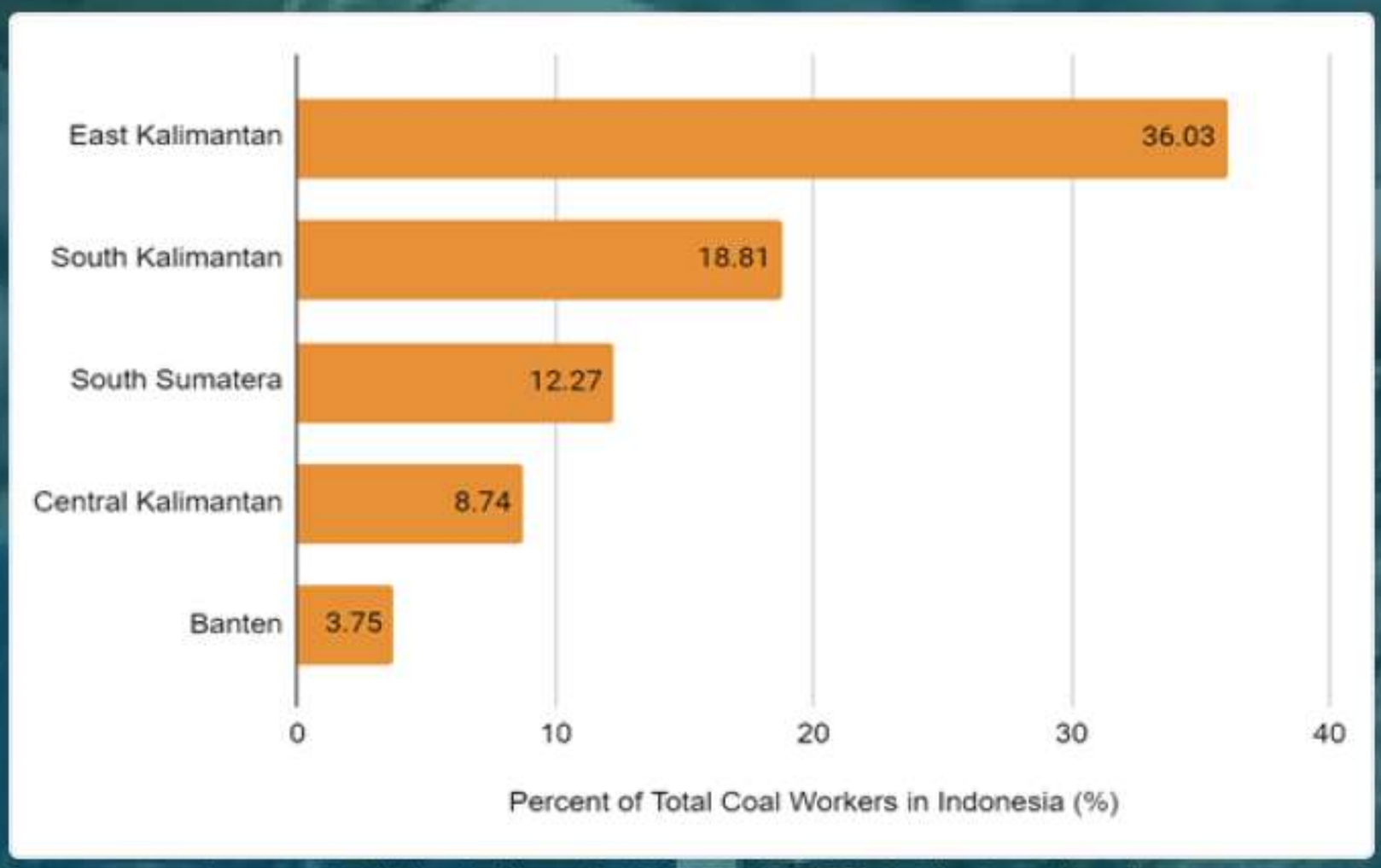
The Coal Workers in Indonesia

Indonesia employs a total of 336,962 coal workers, representing approximately 0.24% of total employment in all sectors and spread across various provinces. East Kalimantan contributing 36.03% of coal workers and South Sumatera contributing 12.27%. Furthermore, this pattern may reflect the geographical locations of Indonesia's major coal reserves and mining activity. However, the proportion of coal workers in South Sumatera is not balanced by the high coal reserves. Therefore, East Kalimantan and South Sumatera are expected to bear the greatest socioeconomic impact as Indonesia transitions away from coal.

Proportion of Coal Sector Workers (%)



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

Photo Source: Indonesia Investment

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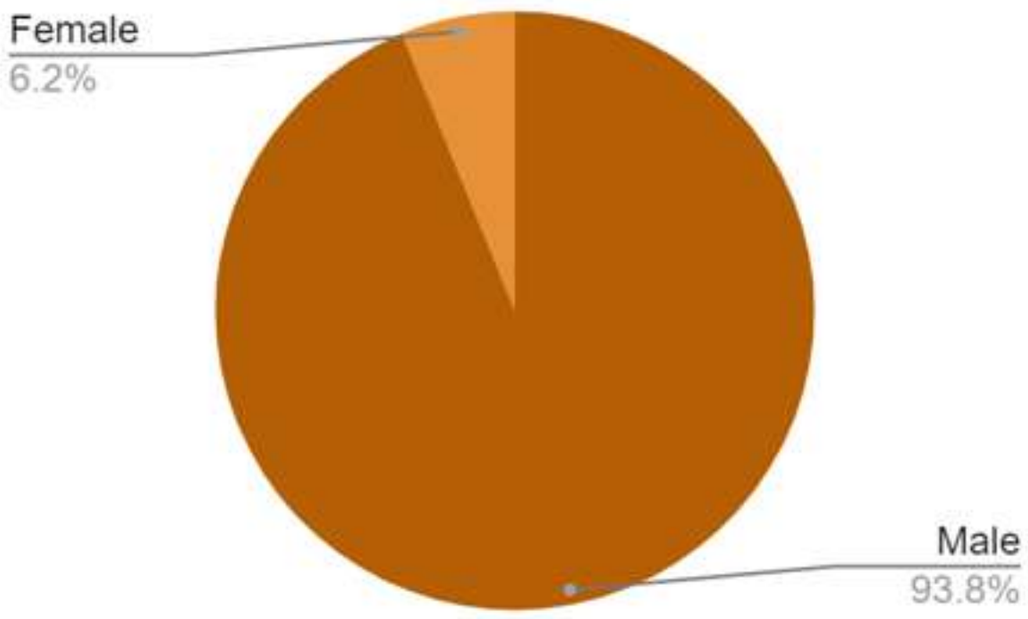
Photo Source: Indonesia Investment

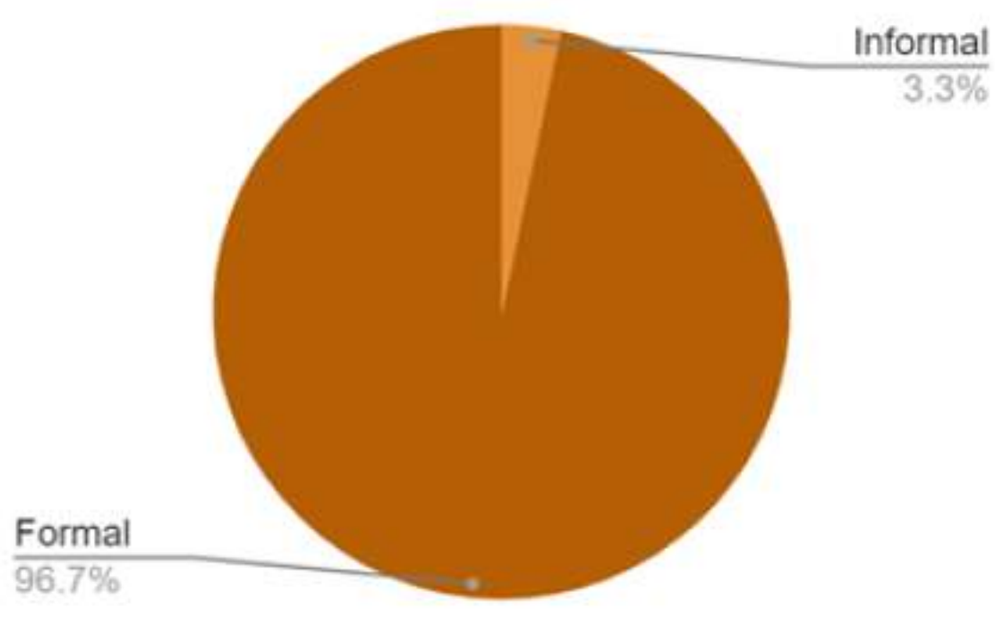
Characteristics of Coal Workers in Indonesia (1)

Proportion of Coal Sector Workers in Indonesia by Gender



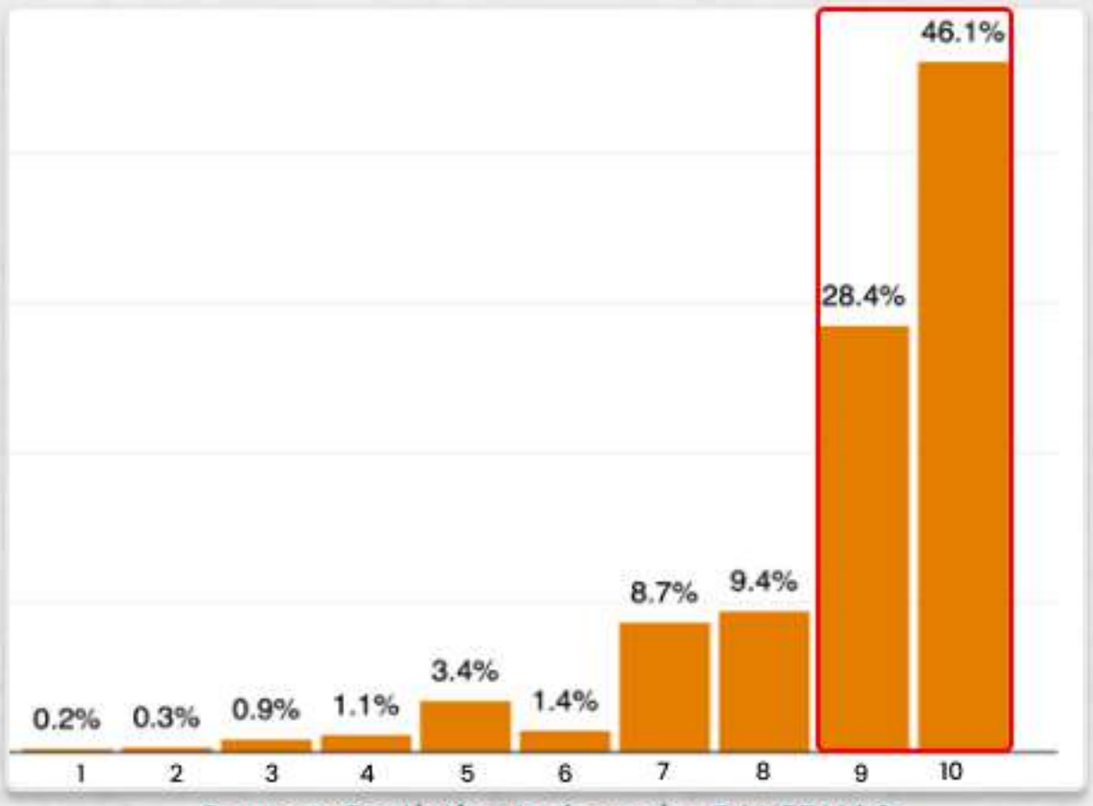
Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

Proportion of Coal Sector Workers in Indonesia by Job Status



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

Distribution of Coal Sector Workers in Indonesia by Decile Wage



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

The demographic and employment characteristics of coal workers are the key factors in determining the sector's vulnerability to structural shifts induced by the energy transition. The coal workforce is dominated by male, with men accounting for 93.82% of total employment—underscoring the physically demanding nature of the industry. Employment in the sector is highly formalized, with 96.67% of coal workers classified as formal employees. This formal employment structure significantly influences wage distribution, where **the majority of coal workers fall within the top wage deciles**, highlighting a strong concentration of high-income earners in the sector.

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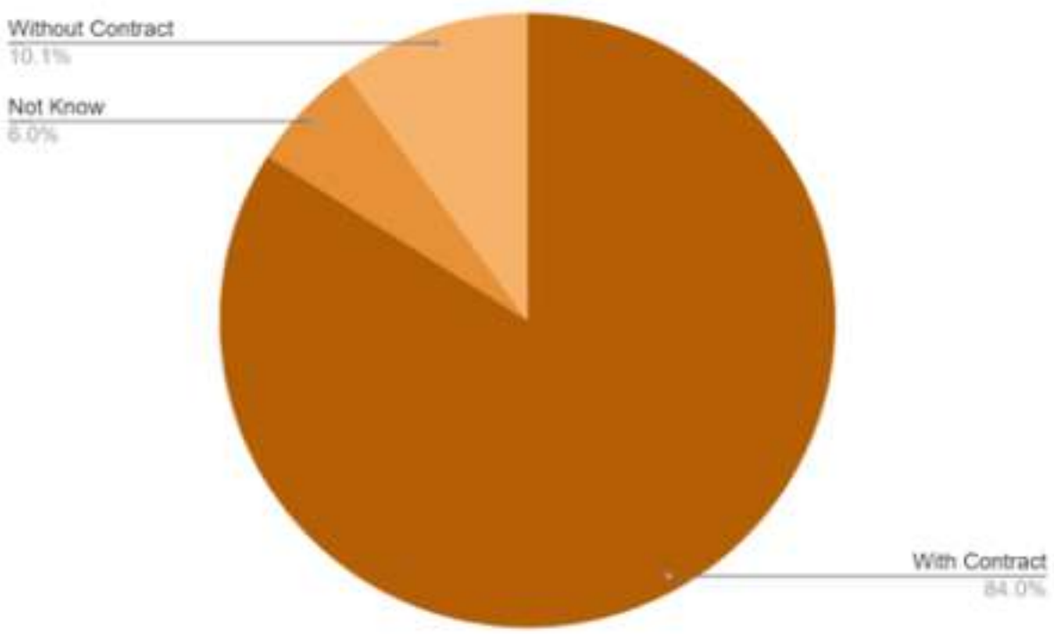
Photo Source: Indonesia Investment

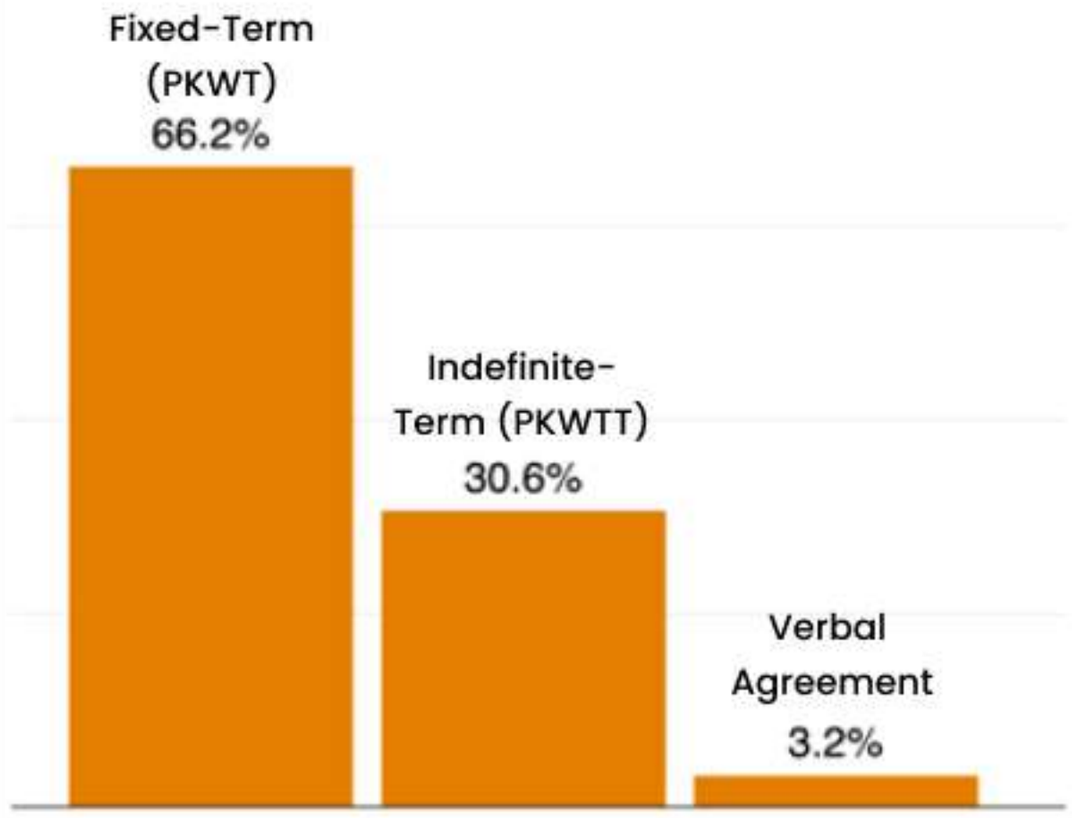
Characteristics of Coal Sector Workers in Indonesia (2)

Proportion of Coal Sector Workers in Indonesia by Contract Availability



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

Proportion of Coal Sector Workers in Indonesia by Contract Type



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

The predominance of formal employment ensures that most coal workers have job contracts. However, job security remains a concern, since the majority of contract workers are employed under the fixed-term agreements (*Perjanjian Kerja Waktu Tertentu*/PKWT contracts). **This widespread reliance on fixed-term contract** suggests that while formal employment offers some benefits, job stability remains uncertain, and access to long-term social protection may be limited. As a result, **many workers remain vulnerable to employment disruptions, especially amidst the energy transition and shifting labor demand in the sector.**

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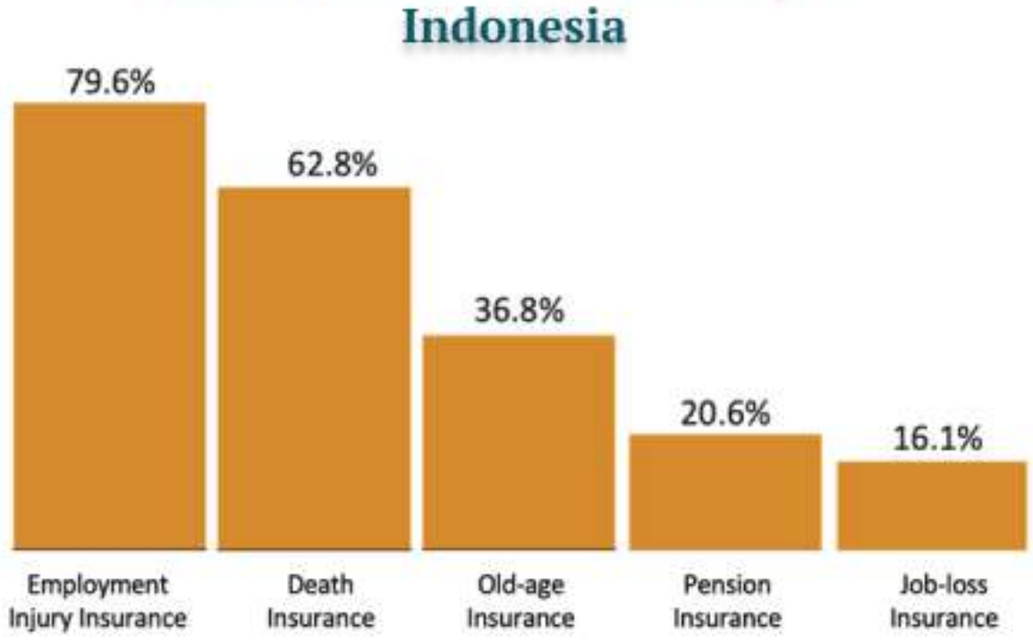
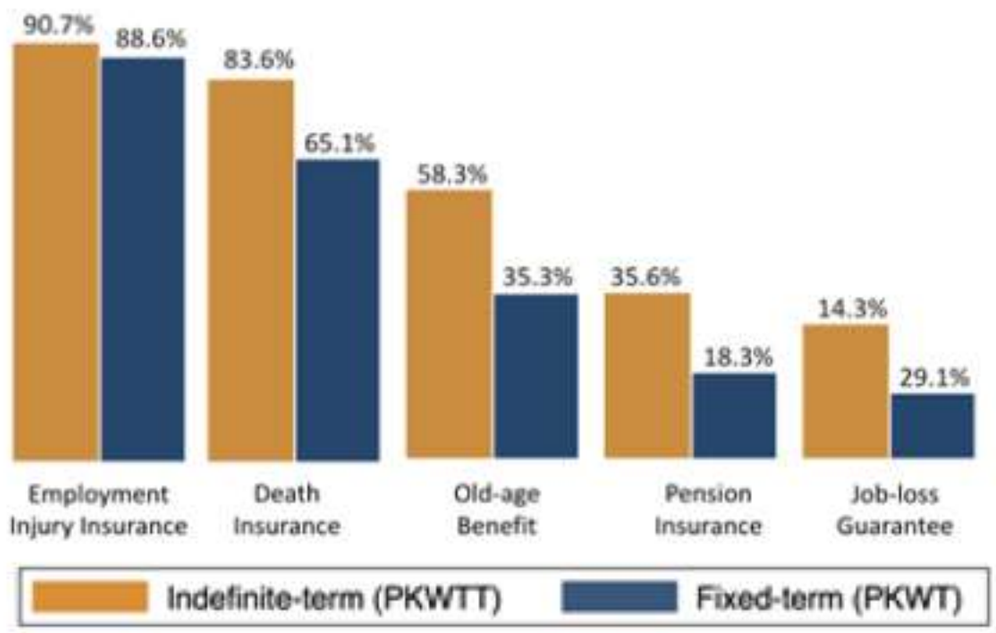
Characteristics of Coal Sector Workers in Indonesia

Proportion of Coal Sector Workers' Social Insurance Ownership in Indonesia



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

Proportion of Coal Sector Workers' Social Insurance Ownership in Indonesia by Contract Type



Source: Statistics Indonesia, SAKERNAS 2023. Author's estimation.

Most coal sector workers are employed under formal contracts, which enables **the majority to be enrolled in at least one social insurance program**. However, **coverage is heavily concentrated in the employment injury insurance (*Jaminan Kecelakaan Kerja*/JKK) and death insurance (*Jaminan Kematian*/JKM)**, while participation in other social security schemes remains significantly lower. The limited access to unemployment insurance is particularly concerning, as it leaves a substantial portion of the workforce without a critical safety net in the face of potential job displacement during the energy transition. Moreover, **coal workers with indefinite-term contracts (*Perjanjian Kerja Waktu Tidak Tetap*/PKWTT) have a higher participation rate in social insurance programs than those employed under fixed-term contracts (Perjanjian Kerja Waktu Tetap/PKWT)**. This raises further concern, as the majority of coal workers are on fixed-term contracts, which restricts their access to comprehensive social protection.

Photo Source: context.news

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I-O Simulation

We employ **a mixed Input-Output (I-O) model** to simulate the potential impacts of energy transition on employment in the coal sector and its value chain. This model captures both forward and backward linkages, illustrating how changes in coal ripple through the wider economy (Leung & Pooley, 2001). Since the decline in coal output is driven by exogenous factors like policy and regulation rather than internal market dynamics, the mixed Input-Output (I-O) model treats this reduction as exogenous.

"It is important to note that these are forward-looking simulations rather than impact evaluations, as the I-O model does not capture real-world causal relationships or specific policy measures that may shape actual outcomes. Since the energy transition is ongoing and not yet fully realized, an impact evaluation is currently not feasible—making simulation a more appropriate approach for exploring potential effects under existing conditions."

Job losses within the coal sector rise significantly with the phase-out, increasing from 71,942 at a 30% reduction to 239,805 at a full (100%) phase-out. **The findings illustrate that the coal phase-out has extensive economic consequences beyond the sector itself, affecting both upstream and downstream industries.** While capital-intensive sectors, such as electricity and oil refining, experience the largest output contractions, labor-intensive sectors, like construction and transportation, suffer the most significant job losses.

1. **The forward analysis** examines how declining coal output affects employment in the coal sector and its downstream industries. The electricity sector experiences the largest output decline but relatively moderate job losses due to its capital-intensive nature. In contrast, labor-intensive industries like construction and non-metallic mineral products suffer significantly higher employment losses.

2. **The backward analysis** assesses job losses in the coal sector and its upstream industries due to reduced coal production. Land transport and related logistics sectors are among the most affected by the transition, with projected job losses exceeding 100,000 due to their labor-intensive nature. In contrast, capital-intensive industries such as coal mining and oil and gas refining experience minimal employment impacts, with losses limited to fewer than 1,400 jobs.

Photo Source: REUTERS

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I-O Simulation

Sector	Output Multiplier	Percentage of Coal Phase Out			
		30%	50%	70%	100%
		Potential Job Loss			
Direct Effect					
Coal and Lignite Mining	-1	71,942	119,903	167,864	239,805
Forward Analysis: **The 5 Most Affected Downstream Sectors by Coal Phase-out**					
Electricity	-0.381	21,861	36,434	51,008	72,869
Construction	-0.091	29,310	48,850	68,391	97,701
Non-Metallic Mineral Products Industry	-0.068	35,093	58,488	81,883	116,975
Chemical, Pharmaceutical, and Traditional Medicine Industry	-0.028	2,727	4,544	6,362	9,089
Private Information and Communication Services	-0.026	3,423	5,705	7,987	11,411
Backward Analysis: **The 5 Most Affected Upstream Sectors by Coal Phase-out**					
Business Services	-0.054	17,256	28,759	40,263	57,518
Other Mining and Quarrying	-0.053	15,118	25,196	35,274	50,392
Warehousing and Support Services for Transportation, Postal, and Courier Activities	-0.045	29,167	48,612	68,056	97,223
Land Transport	-0.043	30,220	50,366	70,512	100,732
Coal Industry and Oil & Gas Refining	-0.033	400	667	933	1,334

Source: Statistics Indonesia, IO 2016 and SAKERNAS 2018. Author's estimation.

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Conclusion and Recommendation

Conclusion:

1. The majority of coal workers hold fixed-term contracts (PKWT), which restricts their access to social insurance and leaves them without an adequate safety net in the event of job displacement as a consequence of energy transition. Furthermore, because most coal workers fall within the top wage decile, they are ineligible for social assistance programs.
2. The coal phase-out driven by the energy transition affects not only workers in the coal sector but also those in upstream industries that supply inputs to coal production, as well as downstream industries that rely on coal as an input. Moreover, the employment impact of the coal phase-out will be greater in labor-intensive industries.

Recommendation:

1. The government needs to expand the coverage of social protection for workers affected by the coal phase-out, especially for informal workers and PKWT.
2. The energy transition in the coal sector will disproportionately affect regions that depend heavily on coal. To safeguard workers facing job losses, regional governments must implement additional policy measures alongside existing social insurance programs (e.g. local unemployment benefit).
3. In addition to protecting displaced workers through social insurance programs, the government can implement policies that facilitate a smooth transition to new employment—such as providing reskilling and upskilling opportunities.

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