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Dynamics of Coal Transition in Indonesia: The Economic, Power, and Climate Perspectives

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Landscape of Coal in Indonesian Economic & Power Sector

Image: Paiton Power Plant Source: www.paitonenergy.com

The political economy of Indonesia put coal as a commodity

Trading commodity (export) and source of revenues at national and sub-national level

Energy source for power generation, the cheapest among fossil fuel generation

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Energy transition would impact the global and domestic coal demand, the coal industry sunset is coming





Global coal power capacities installation and decommissioning

- Global energy transition is happening due to fast declining price of renewables (solar & wind)
- Global coal fleet has been declining since 2018. The net coal power plant capacity change in the first half of 2020 decreased by 2.9 GW
- Given that the bulk of coal demand is coming from the power sector, the decline in coal power capacity would inevitably lead to the reduction in coal used.

Indonesia domestic coal consumption is rising, largely on the back of expansion of coal power plants fleet



Indonesia coal consumption (DMO) 2014-2020. (The 2020 figure is the set target by the government)



Year on year coal power installed capacity 2018-2028

The domestic coal consumption has nearly doubled between 2014-2019. The coal power plant and cement industries are the two largest industries consumer

The domination of coal consumption from coal power plants continue, as more than 70% of coal consumption is coming from the sector by 2019. According to the latest RUPTL 2019-2028, this trend will carry on

Source: DG Mineral and coal 2014-2019, Arif I 2020

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Majority of Indonesia's coal production is being exported. China and India are the major coal importer.



Indonesia coal export & production (in million tons) and the share of coal export to production (%)



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Indonesia is the top coal exporters in the world with more than 30% share by 2018, followed by Australia.

China and India shares 56% of Indonesian coal export. The import demand for these major coal importers dictates Indonesia coal export volume and, to some extent, coal price.



Share of Indonesia coal export by countries in 2018



Competition of the International market is fierce due to shrinking market size but increase number of global players involved





China, as the largest Indonesian coal importer, has reached solar grid parity. This would impact the country's growth of coal power capacity and coal demand





Solar has reached 100% grid parity (user-side grid parity/GPIu). Cost of generating solar electricity is cheaper than purchasing price from the grid in all China

It is profitable (IRR > 8.54%) to build distributed solar PV generation in about 83.72% of the cities in China. The IRR could reach higher than 20% in about 10% of China's cities

With solar becoming cheaper than coal, energy transition is happening in China. China's coal demand could plunge in the near future, and the China's coal mining industry production and coal import would decline.

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2030 as the tipping point: renewables will outcompete coal power plants globally

Country or region	Percentage of operating and under-construction coal capacity with higher long-run operating cost than renewables in 2018	Percentage of operating and under-construction coal capacity with higher long-run operating cost than renewables in 2030	Year when coal has a higher operating cost than new renewables based on a capacty- weighted average
Australia	37%	72%	2021
China	32%	100%	2022
EU		100%	2019
India	62%	100%	Today
Indonesia	0%	73 %	2029
Japan	0%	100%	2025
Philippines	0%	46%	2030
Russia	0%	10%	2035-40
South Africa	13%	85%	2030
South Korea	0%	99 %	2027
Turkey	0%	100%	2023
Ukraine	0%	100%	2024
United States	70%	100%	Today
Vietnam	0%	40%	2030

% of coal capacity with higher long-run operating cost than new renewables by 2018 and 2030 When will building new renewables be cheaper than running existing coal plants?



Cost of running coal power plant against levelized cost of solar and wind in Indonesia



By 2030, it will be more expensive to operate coal power plants than building new renewables in almost all region in the world.

In Indonesia, the levelized cost of solar is becoming cheaper and is projected to beat coal by 2029. By 2030, about 73% of coal capacity has higher long run operating cost than building renewables.

Source: carbon tracker initiative (2018)

Contrary to the national economy, coal mining contributes a large share in coal producing region's economy. Thus, the economy growth of these provinces are closely aligned with the coal industry situation



About 2-2.7% of Indonesian GDP of coming from coal mining. The figure is totally different when observing a specific region economy. For example, the coal mining GDP shares are 35% and 20% for East and South Kalimantan Provinces respectively

With the large share of economy coming from the coal industry, often the economic growth depends on the coal industry situation. For example, the East Kalimantan province experience a contraction in economic by the year 2015-2016 when coal demand plunge and coal price is low.





Paris Agreement and the Future of Coal-Fired Power Plants in Indonesia

Image source: unsplash

Energy sector is projected to be the largest source of GHG emission by 2030, yet the sector's GHG mitigation target is not ambitious enough



CAT assessment of Indonesian NDC

Energy sector is the largest contributor to GHG emission in 2030. Under current NDC, although energy sector has reduced its emission by 19% and 24% against BAU, it is still a threefold increase against 2010 GHG emission level.

Climate Action Tracker (CAT), an independent climate analytic organisations, categorized Indonesia NDC unconditional target as highly insufficient and the conditional target as insufficient. An ambitious increase in climate change target is needed to comply with the Paris Agreement

Source: NDC & CAT

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Reducing power sector emission by significant number holds the key for Indonesia to achieve ambitious climate change target





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In 2015, power sector shares the highest GHG emission (~40%), much higher than transport (31.5%). Moreover, coal power plant contributed ~70% of emission from power sector (or about 28% of total GHG emission from the energy sector)

Increasing mitigation action in power sector, especially aimed towards coal power plants, is inevitable

More than 60% of the coal fired power plants in Indonesia are of less than 10 years old



Distribution of Indonesian coal power plants by COD year period



Stopping the construction of new coal power plants is crucial and should be implemented as soon as possible

Source: RUPTL 2019-2028, news article, www.sourcewatch.org

Implementing key policies (moratorium of new coal power plant and early coal power retirement) could put Indonesia back on track in achieving the Paris Agreement target





Combination of moratorium of new coal power plants (2021 at the latest) and early retirement policies (after 20 years of operation) could put Indonesia as the role model in increasing ambition of the GHG emission reduction in the power sector

The phase-out policies need to be clear to give the correct signal to all related stakeholders

Source: IESR analysis





Coal Transition Strategy in Indonesia

Image source: unsplash

Lessons learned from global coal transition that the transition process is time-consuming and could affect a number of different stakeholders



Item	UK	Canada, Ontario	Canada, Alberta	Germany
Drivers	 The declining economics of coal due to surge of gas and renewables power plant Climate change Carbon tax 	• Air pollution; Smog	 Change of government and political will 	 Better renewable economy Climate change
Enabling Conditions	 Liberalized power market Availability of competitive gas Carbon tax mechanism 	 Clear government policy on coal phase-out 	 Clear government policy on coal phase-out Availability of gas resources Carbon tax 	 Renewable development Liberalized power market Clear government policy on coal phase-out Impaired economic profitability of coal plants
Transition Policy Focus	 Region Coal Workers Communities 	 Coal Power Companies Utility 	 Coal Power Companies Coal Workers Communities 	 Region Coal Workers Coal Power Companies Electricity User
Strategy Applied	 Regional economy regeneration 	 Engagement with stakeholders 	 Engagement with stakeholder 	 Engagement with stakeholders Regional economy regeneration

Indonesian specific strategy need to be crafted which accommodate the aspirations of coal industry's different stakeholders

There are a few key points that can be done to pave the coal transition strategy

- Intensify the dialogue and align the various interests
- Establish an independent commission
- Detail the transition strategy for each region and district
- Strategy need to consider long-term goals but flexible
- Decide on the need for the short-term transition strategy (e.g. co-firing coal with biomass)

Generate additional source of fund



Thank you

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To be more precise, 96% of the coal reserves are located in only four out of 34 provinces, namely East Kalimantan, South Sumatera, North Kalimantan, and South Kalimantan