IESR
Institute for Essential Services Reform

Study

Coal Dynamics in Indonesia

Towards a Just Energy Transition

Seminar Global Energy Transition and The Future of Coal

Jakarta, April 2019

OUTLINE

Table of Content

- Coal in Indonesian Energy Sector
- Coal in Indonesian Economy
- Drivers and Challenges of Coal Transition
- Coal Projection in the Future

The Political Economy of Indonesia Coal - 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

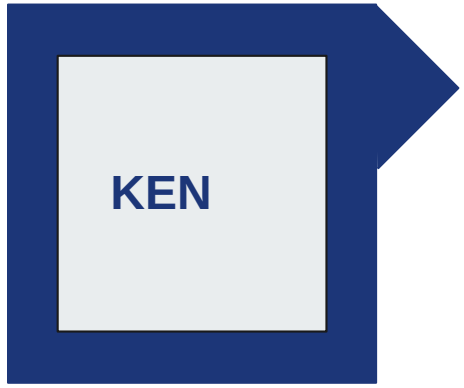
Top 10 Coal Producer in Indonesia

Company	Production (million ton)	Owner	Power Plant (IPP)
Kaltim Prima Coal	60	Bumi Resources (Bakrie Family)	Bakrie Power (Tj. Jati B)
Adaro	50	Tohir Family, Edward Soeryadjaja, Saratoga Investama,	PLTU Batang, PLTU Tanjung (Kalsel)
Berau Coal	33	Sinar Mas Group (Widjaja Family)	PLTU Sumsel 5, Kendari 3
Kideco Jaya Agung	32	Indika Energi	Cirebon Electric Power
Arutmin Indonesia	28,8	Bumi Resources (Bakrie Family)	N/A
Bukit Asam	25.5	PT Bukit Asama (SOE)	Tj Jati A
Borneo Indobara	17,3	Sinar Mas (Widjaja Family)	PLTU Sumsel 5
Indominco Mandiri	13	Banpu Minerals (Thailand)	N/A
Antang Gunung Meratus	7,7	Baramulti Sukses Sarana, Tata Power (India)	N/A
Indoexim Colaindo	6	Gajah Tunggal Grup (Syamsul Nursalim)	N/A

Coal in Indonesian Energy Sector

- National Energy Policy
- Coal Resources
- Coal in Energy Mix
- Coal Domestic Consumption

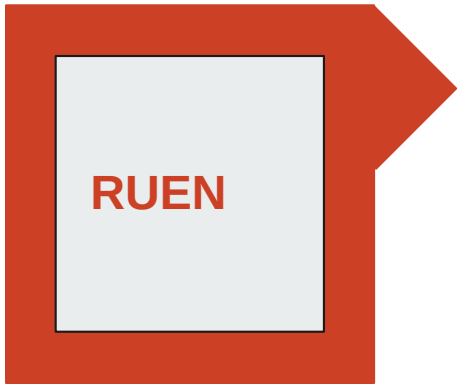
National Energy Policy



Coal in Primary Energy Mix

2025 : min. 30%
2050 : min. 25%

from KEN 2014



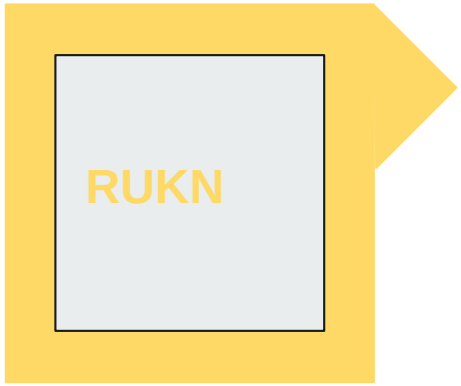
Coal in Primary Energy Mix

2025 : 205.3 Mton (30%)
2050 : 438.8 Mton (25.3%)

Coal Export

Max. 400 Mton from 2019.
If domestic need > 400 Mton, export stop (app. in 2046)

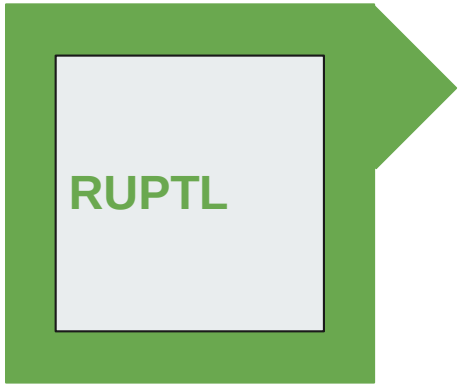
from RUEN 2017



Coal in Primary Energy Mix

2025 : max. 50%
2037 : max. 48%

from Draft RUKN 2018-2037



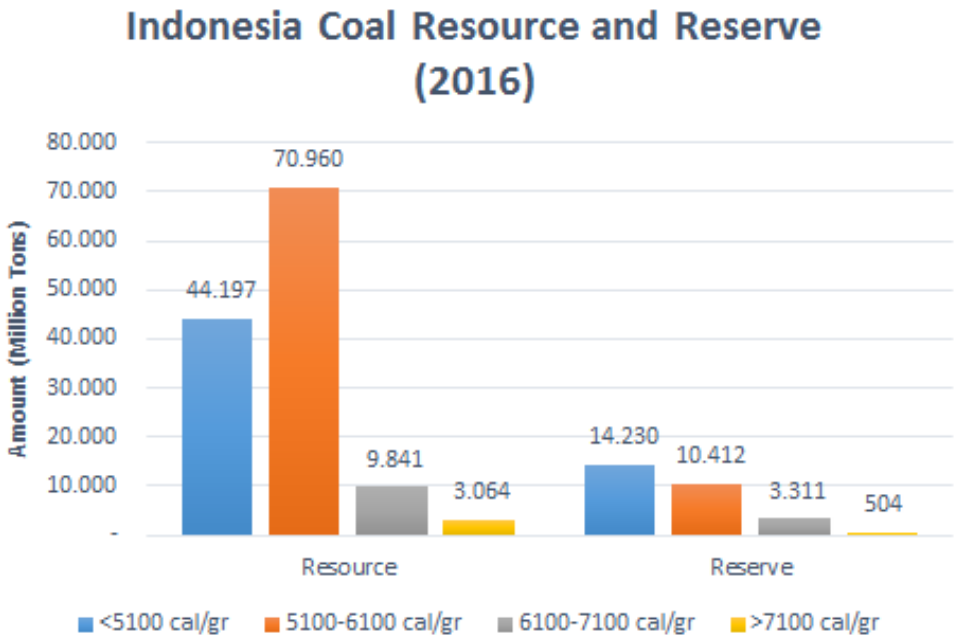
27.1 GW new CFPP until 2028 (*from total planned 56.4 GW*)

OR

48% CFPP from total installed capacity by 2028

from RUPTL 2019-2028

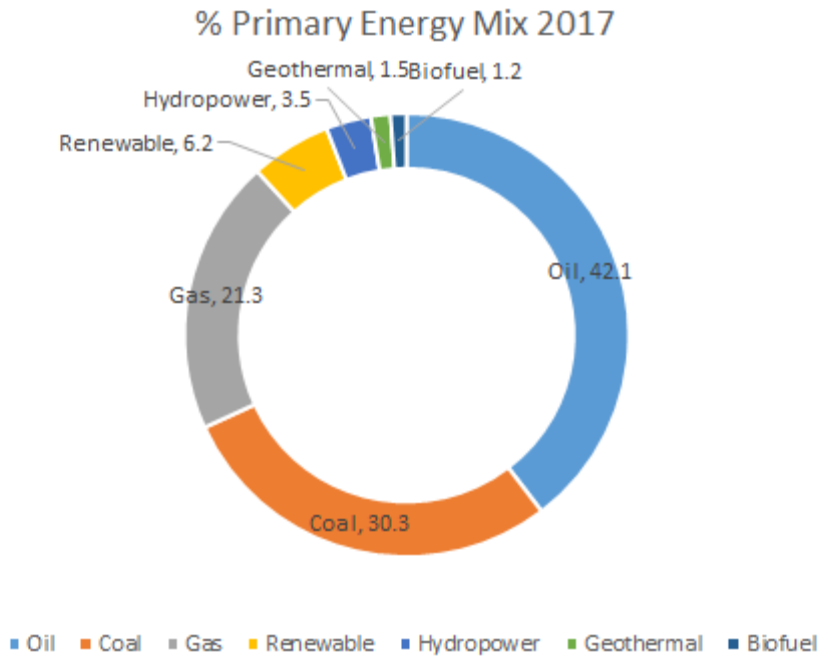
Coal Resources and Reserves



Basin	Typical Deposit	Calorific value (cal/g)	Moisture Content	Sulfur Content	Ash Content
Ombilin	Lenticilar and small coverage area	7000	Low	Low	Low
Barito-Tanjung	Thin and continuous in lateral direction	6000	Low	High	Low
Bengkulu, South Sumatra, Central Sumatra	Thick and wide coverage area	<5000	High	Low	High
Barito-Warukin		<5000	High	Low	High
Kutai and Tarakan		<5000	High	Low	High

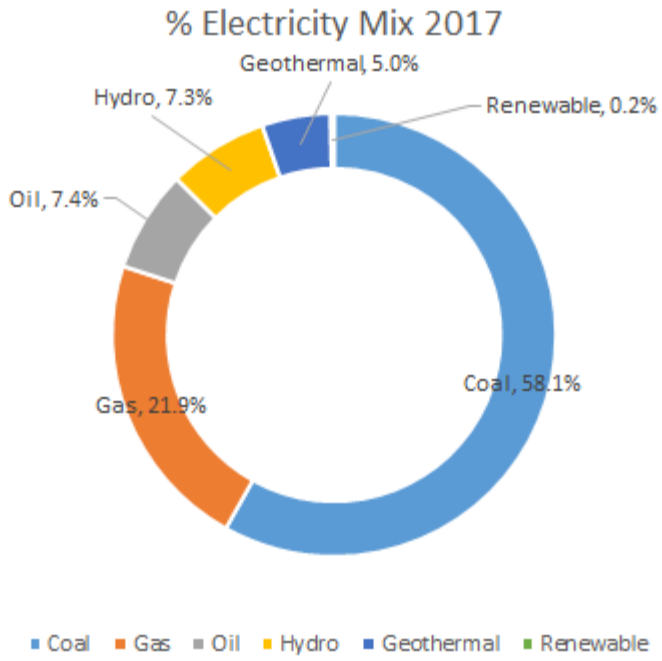
- Indonesia coal reserves accounted for 2.2% of total world reserves (BP, 2018)
- Indonesia coal resources and reserves are dominated by low and medium quality coal
- In September 2018, MEMR announced an increase in resources and reserves to 166 and 37 billion tons (Oktaviani, 2018)
- Most of Indonesia coal are located at Eastern Kalimantan and Southern Sumatera Island

Coal in Energy Mix



Remarks:

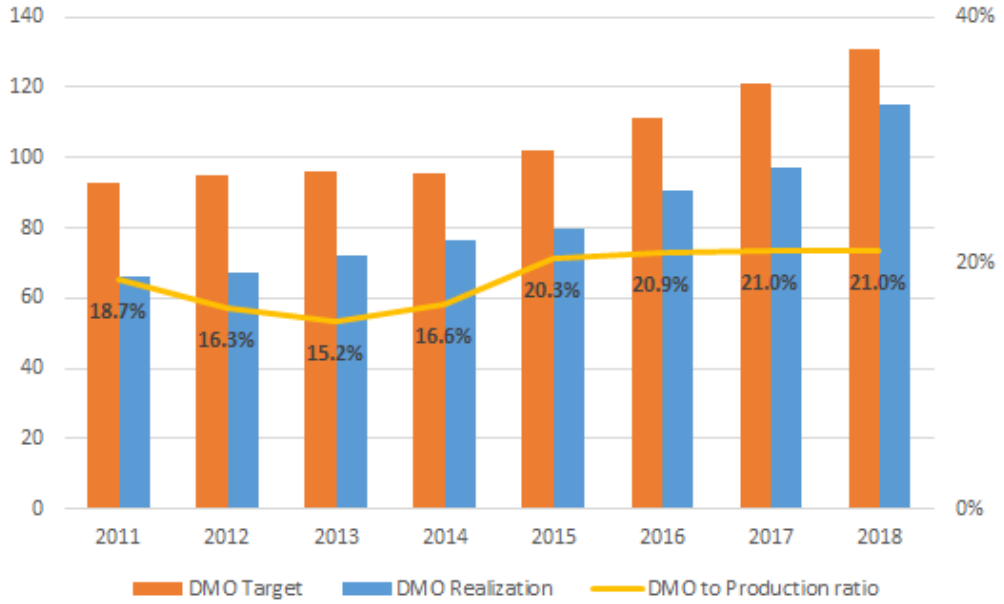
- Exclude Biomass
- Oil including Crude oil, petroleum product and LPG
- Coal including coal and briquette
- Gas including natural gas and LNG
- Biofuel; Liquid biofuel (biodiesel)

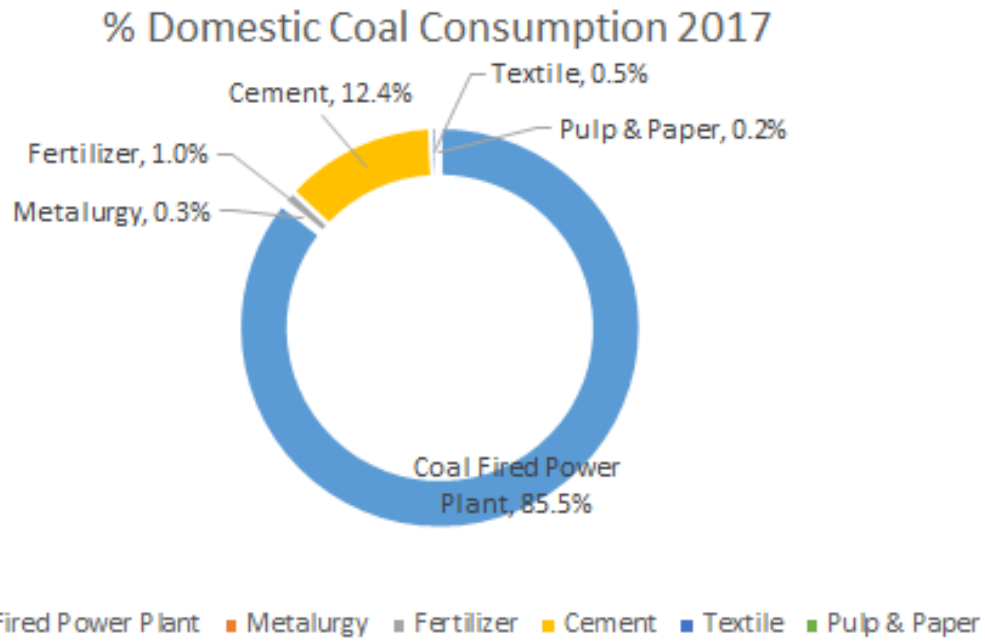


Remarks:

- Other Renewables including wind, solar and waste to energy PP

Coal Domestic Consumption

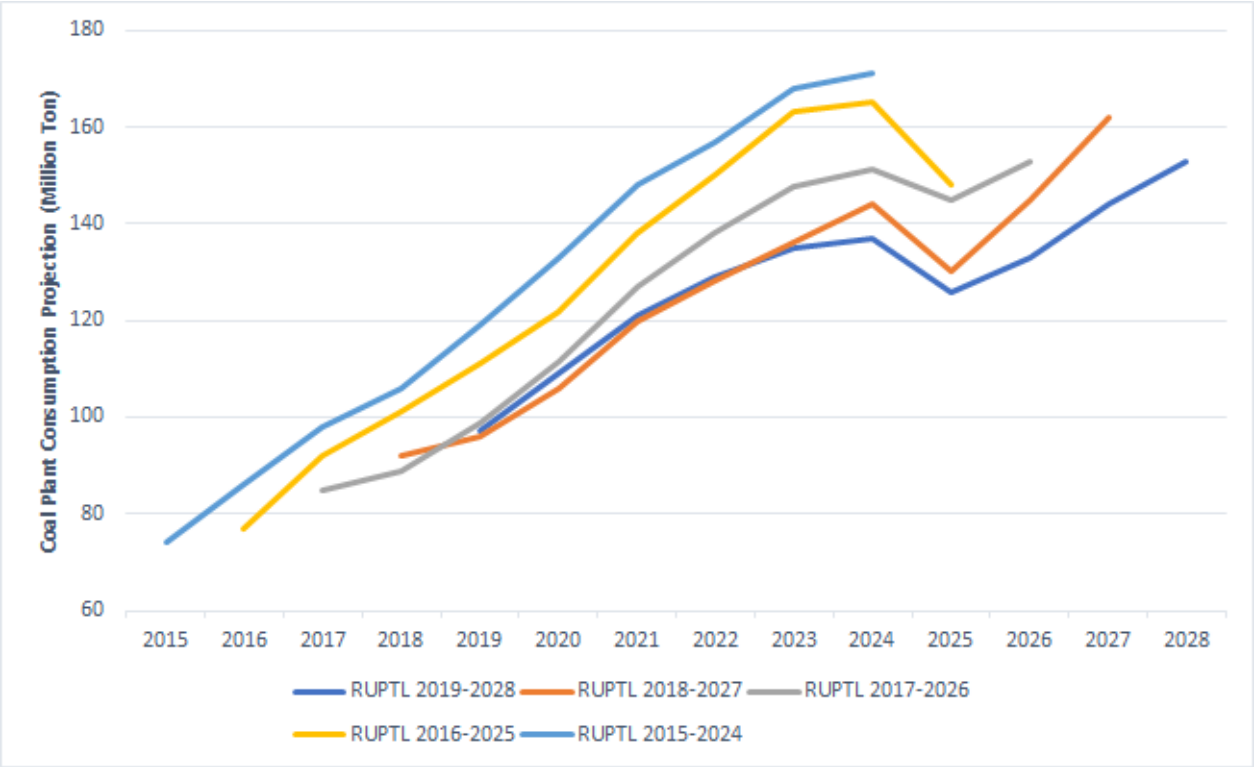




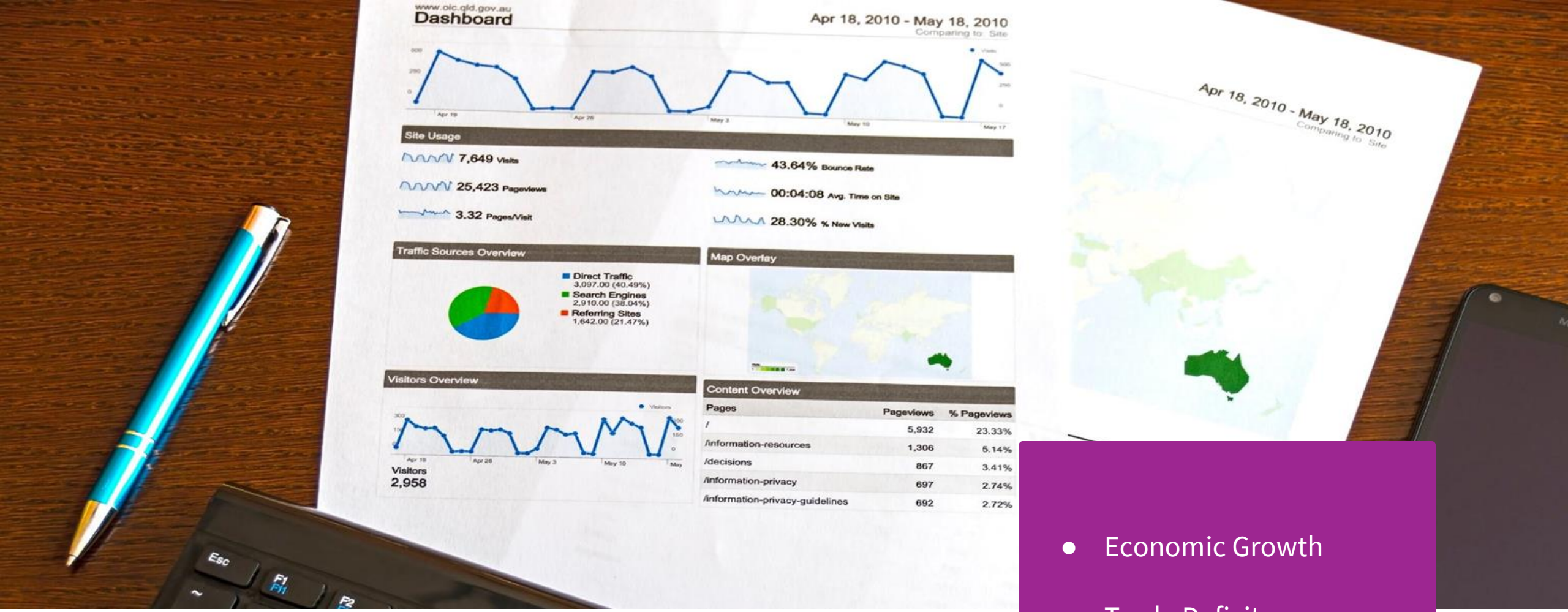
- Most of the coal produced in Indonesia is exported (about 80%)
- MEMR Regulation No. 34/2009 on Domestic Market Obligation (DMO)mandates coal companies to allocate a certain percentage of its production for national use
- The DMO realization has consistently failed to achieve its set target

- Major domestic coal consumers are coal fired power plant (CFPP) while cement and fertilizer industry consumes most of the rest
- The cement and fertilizer industry is expected to grow in the coming years
- However, given the current state of power sector development, CFPP growth will still dictate domestic coal consumption

PLN's Coal Consumption



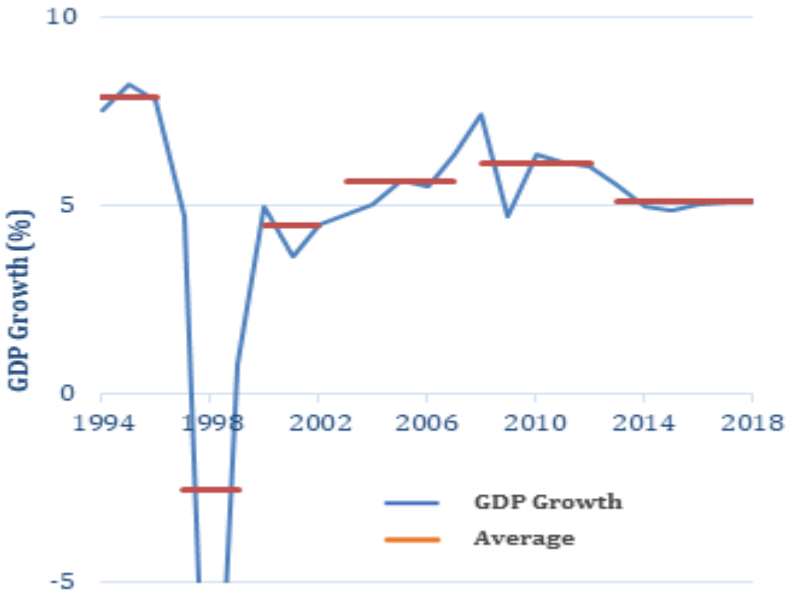
- Historically, PLN through RUPTL has consistently overestimated their coal projection.
- Based on PLN RUPTL 2019-2028, PLN coal consumption will increase from 97 million Ton in 2019 to 153 million Ton in 2028. The annual coal consumption growth rate is 5.2%

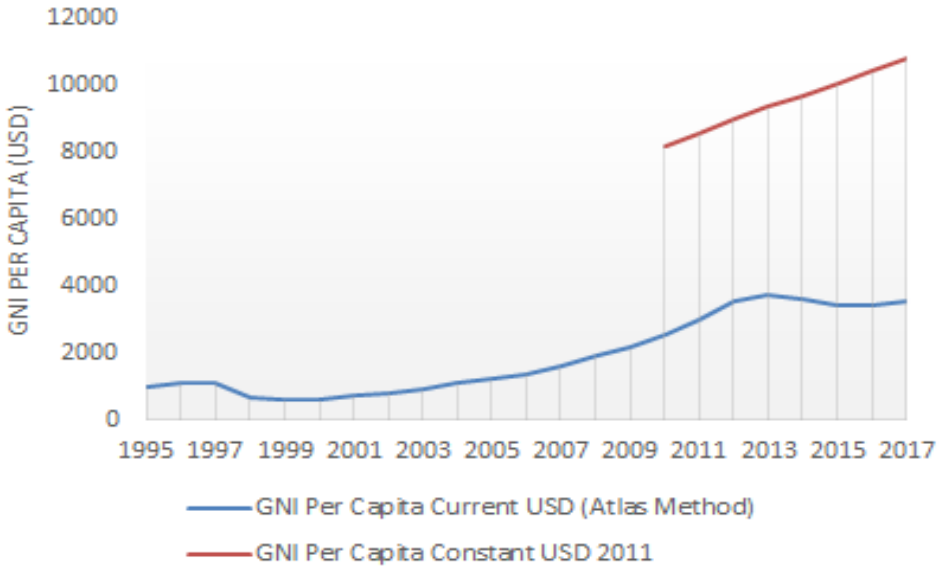


Coal in Indonesian Economy

- Economic Growth
- Trade Deficit
- Coal Trade Revenue
- Coal Influences in Local Economy

Economic Growth

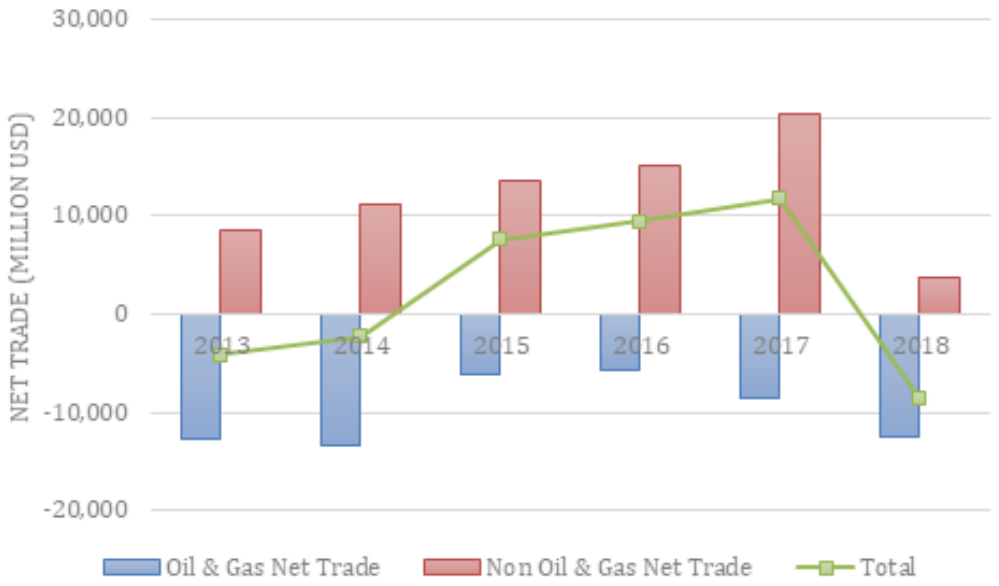




- Indonesia has experienced a fluctuating growth in its economy for the last two decades
- As of now, the country's GDP growth is projected to be stable at an average of 5.24% for the next five years(IMF, 2018)
- Indonesia may become the fifth-largest economy in the world by 2030 and the fourth-largest one by 2050 on purchasing power parity basis (PwC, 2017)

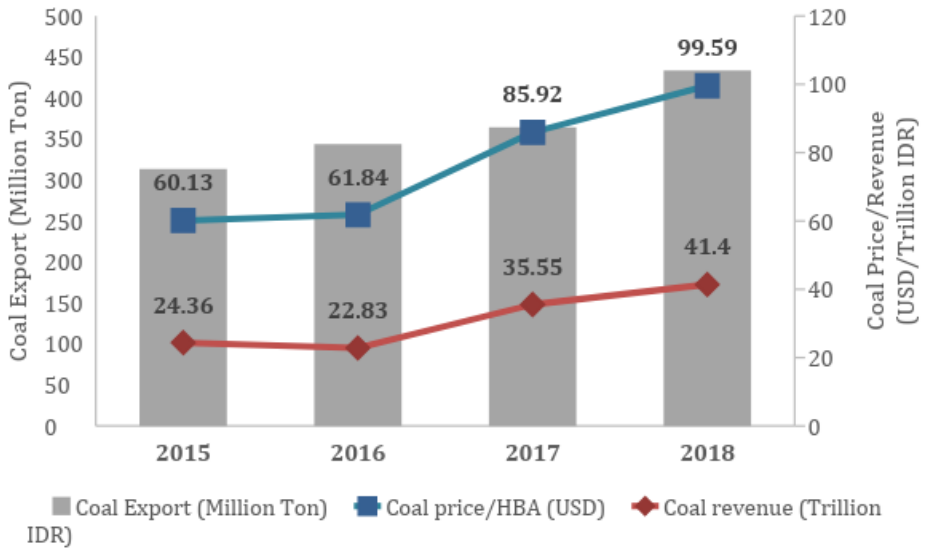
- According to World Bank categorization, Indonesia belongs to lower-middle income country
- Indonesia GNI per capita growth has stagnated around $3500 over the last six years based on current USD using Atlas Method
- However, a closer look at the GNI per capita with constant price 2011, the data shows a steady increase instead
- The stagnated GNI per capita could then be attributed to the devaluation of IDR toward USD since the commodity boom period end.

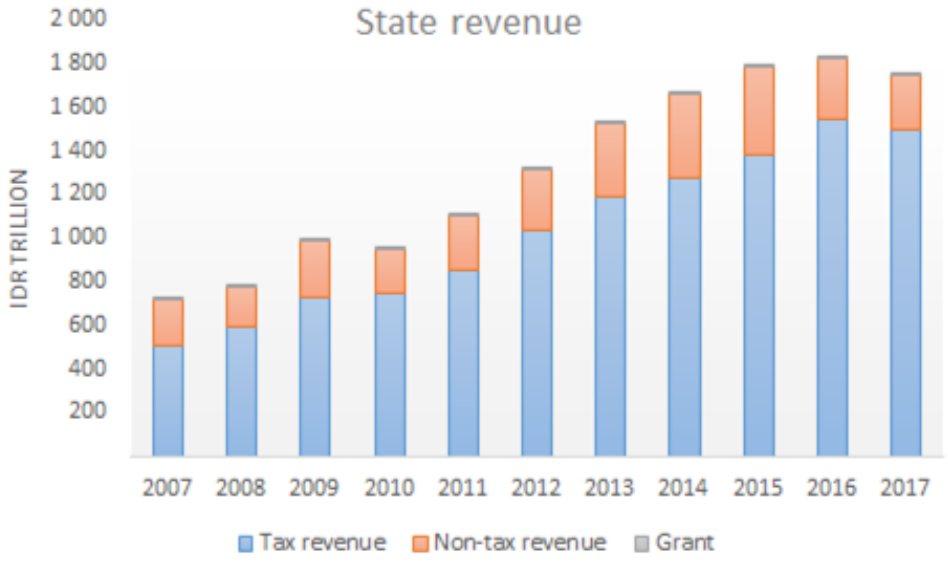
Trade Deficit



- Indonesia import has risen by 22.2 % from 2017 figure, mainly dominated by an increase in import of raw material for industry and fuel (Ministry of Trade, 2019)
- Indonesia suffers the worst net trade record in 2018, reaching minus 8.57 billion USD. The record is worse compared to the 2013 and 2014 trade deficit of 4.08 and 1.89 billion USD respectively
- Government will still look to the export of coal as one way to balance the trade deficit while building a strategy on reducing imports of consumer goods

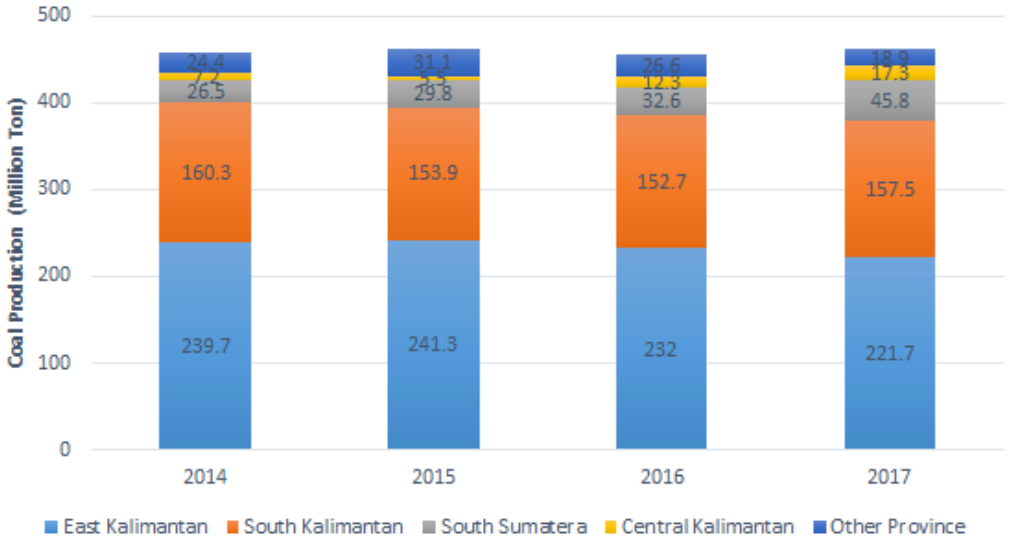
Coal for State Revenue

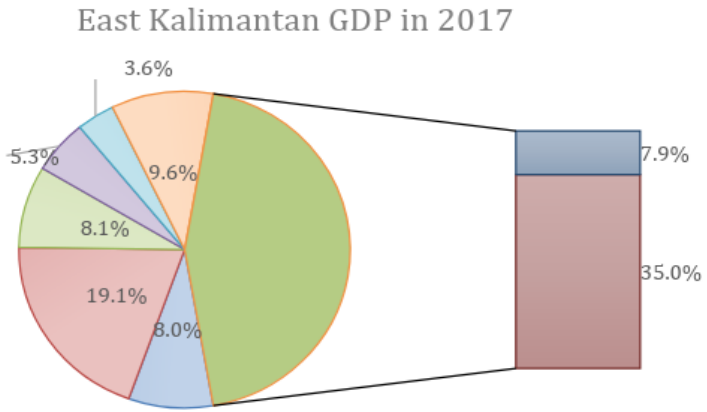




- The proportion of coal revenue has been increasing along with the coal export
- For the last four years, coal revenue collected is around IDR 41.4 trillion (1.93 billion USD) or on average 80% of total non-oil & gas revenue
- However, the actual contribution of coal industries to state revenue was less than 2% in 2017, and will be even lower following the rapid increase in tax revenue

Coal Influences in Local Economy





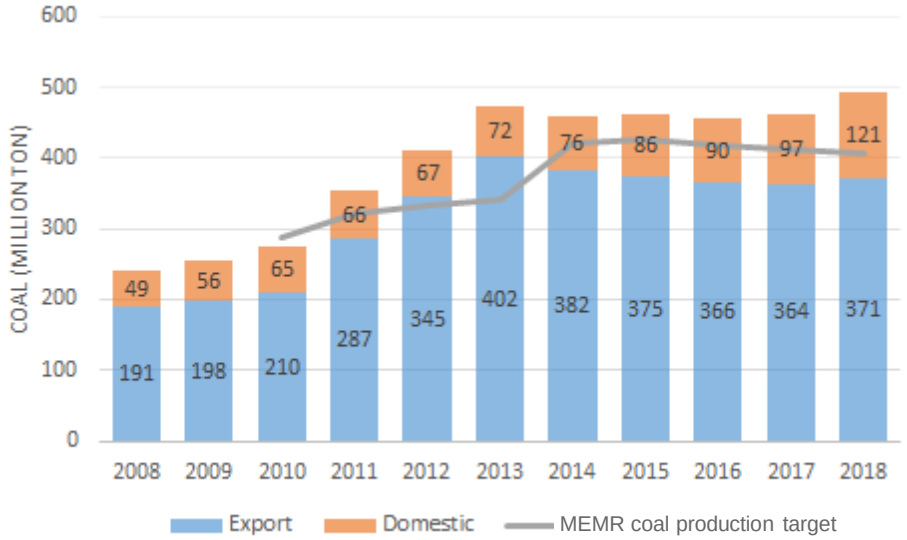
- The Indonesian coal resources and production are mainly distributed over four provinces: East Kalimantan, South Sumatera, South Kalimantan, and Central Kalimantan. More than 90% of Indonesia's coal resources and production are in those provinces
- In the East Kalimantan case, the coal sector contributed up to 35% of provincial GDP in 2017
- By adding the oil and gas to the figure, the number almost reach half of the provincial GDP, meaning that the East Kalimantan economy relies heavily on fossil fuel

Image source: myob.com

Drivers and Challenges of Energy Transition in Indonesia

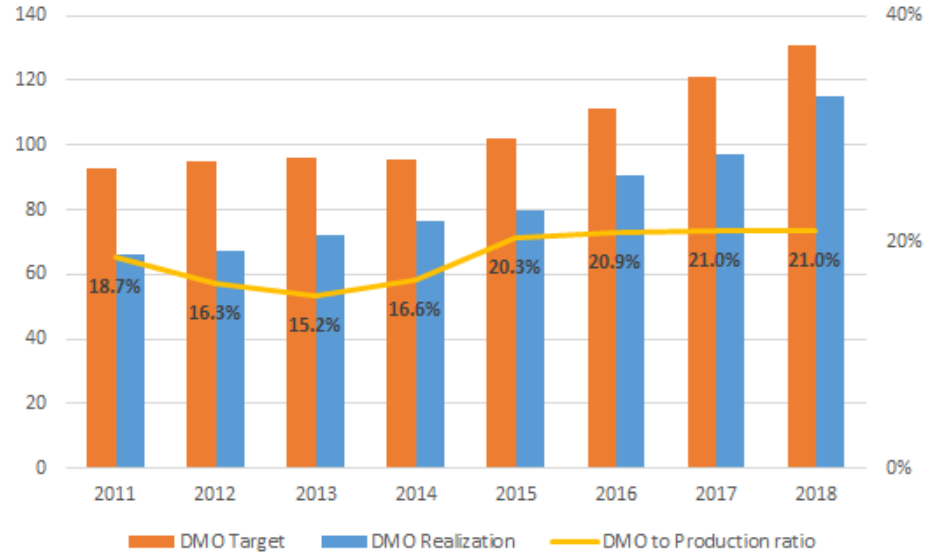
- Indonesian Coal Dynamics
- Drivers & Challenges of Energy Transition in Indonesia

Coal Production Dynamics



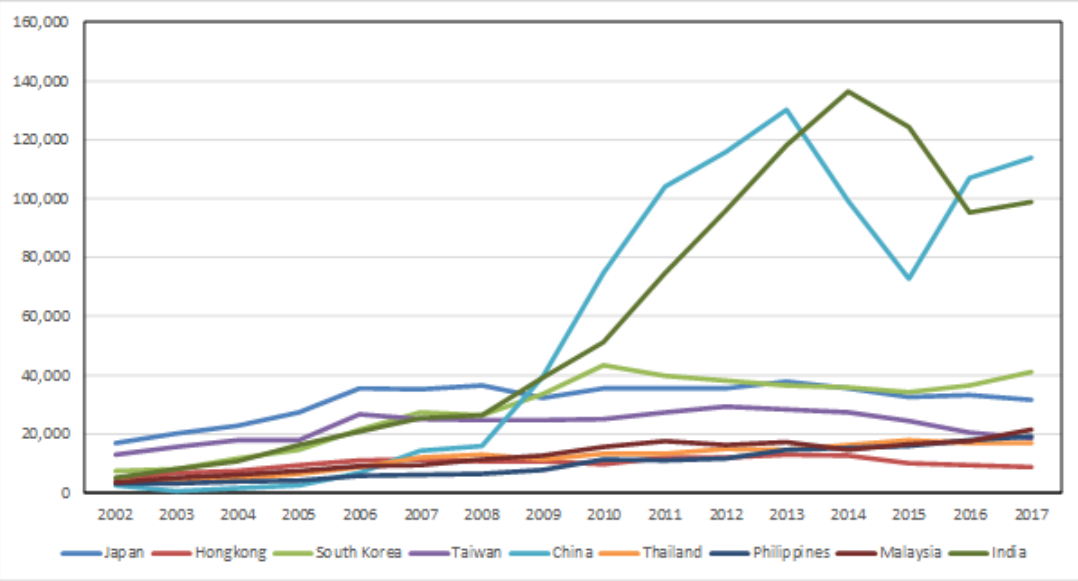
- Indonesia coal production increase significantly since 2006 and coal export has increased about 250% in a decade.
- The annual target set by MEMR were above RUEN and RPJMN (National Mid-Term Development Plan) target. However, the actual coal production since has always been above the target set by MEMR (figure above).
- In 2018, the government even allowed miners to increase coal production more than 100 million ton over MEMR target to compensate for DMO cap-price policy.
- Several cause of coal overproduction in Indonesia:
  - The over-licensing of new mines. The Government Regulation (Peraturan Pemerintah/PP) No. 75/2011 effectively hands over the licensing authority from central government to local governments
  - Coal as a political commodity
  - Coal price. Local miners can easily boost their production to chase the benefit of the increasing price of coal at the international market

Coal Domestic Demands Dynamics



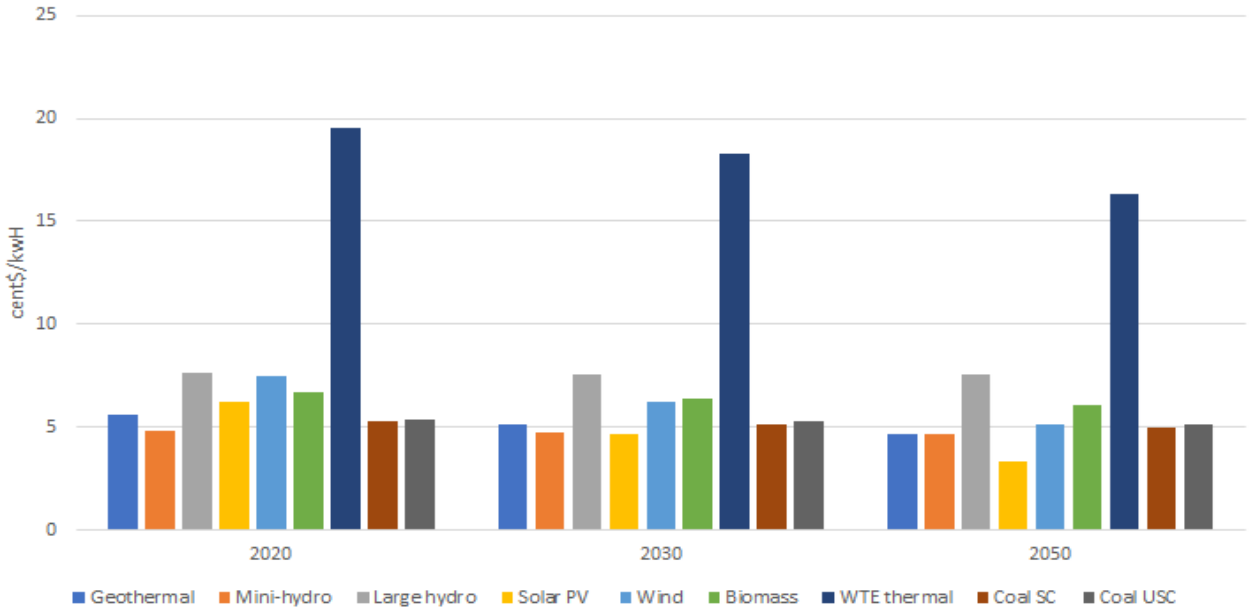
- The government introduced MEMR Regulation No. 34/2009 on Domestic Market Obligation (DMO) to secure the supply of coal for domestic needs. However, the DMO realization has consistently failed to achieve its set target.
- About 98% of domestic coal consumption is coming from the power and cement industry. The power sector absorb 85.5% of coal domestic consumption while cement around 12.4%
- Coal consumption in power sector will increase due to:
  - Increase in planned coal plant in RUPTL
  - Coal consumption per unit electricity is increasing

Coal Export Dynamics



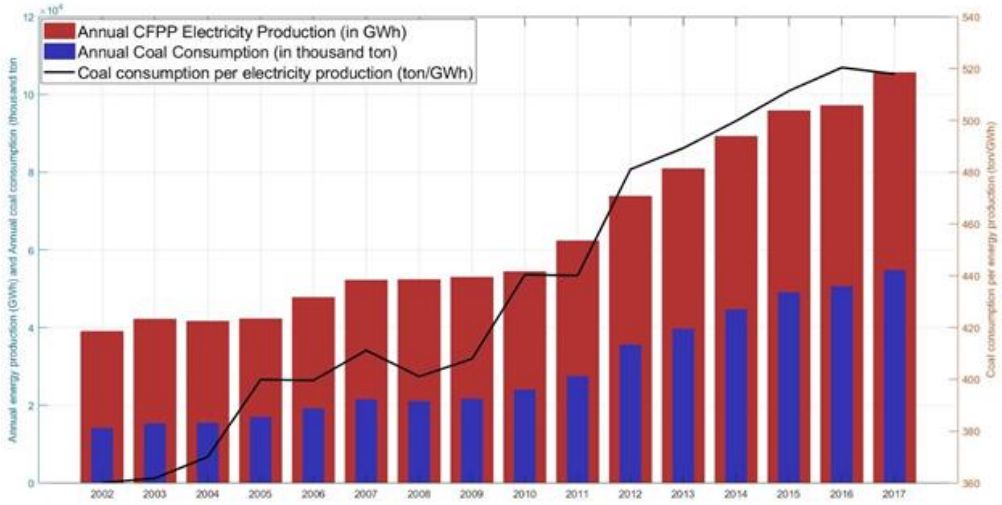
- Over 80% of Indonesia's coal production is exported, with one-third of it exported to China and on-fourth to India
- With a substantial portion of coal being sent overseas, coal demand in Indonesia relies heavily on the dynamics of the global coal market.
- When international coal prices dropped significantly, domestic production rates also followed the trend. In 2015, many Indonesian mining companies ceased activity and lowered their production when coal prices hit USD 50/ton
- Since the early 2000s, Indonesia also saw a steady increase in coal export to neighboring countries. The need for more power generation in Southeast Asia is the driver.

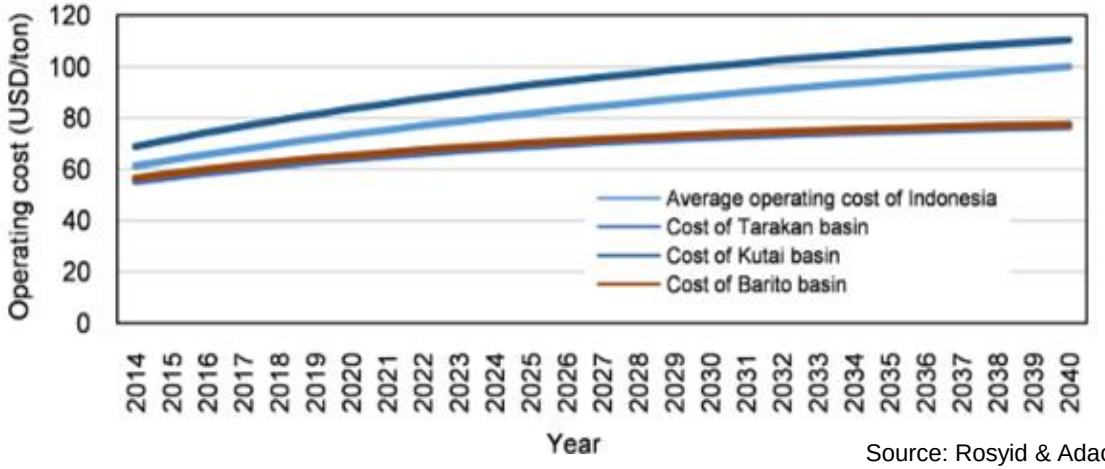
Drivers of Coal Transition



- The Levelized Cost of Electricity (LCOE) of different generation technologies in Indonesia with the financial and technological figures provided by the National Energy Council. This LCOE solely represents the technology cost, excludes land cost, pre-development cost, decommissioning cost, and taxes. The WACC applied is 10% for all technologies and the calculation utilizes only the data available in the publication mentioned.
- By 2020 LCOE of hydro, geothermal and solar power plant is already on par with ultra-super critical (USC) coal power plant
- By 2050 solar power plant is the cheapest source of electricity
- The calculation have not taken into account:
    - Cost of externalities
    - Faster declining cost of wind and solar from the global market

Drivers of Coal Transition (2)





Source: Rosyid & Adachi (2016)

- There are inefficiencies in coal mining and coal plant operation
- Coal Plant
  - The declining performance of existing coal power plants over the years, probably due to declining efficiency of old coal power plants, lower quality of coal consumed, and poor performance of new coal power plants
  - In the last 15 years, PLN's coal consumption has increased from 360 tons/GWh to 520 tons/GWh (Adiatma et al, 2018)
- Coal Mining
  - Projected average operating cost (including extraction, processing, transportation, and royalty payment) of Indonesia's coal would increase up to USD 100 per ton in 2040 (Rosyid & Adachi, 2016)
  - Coal price is predicted to decline to its 2015 price in 2030 (World Bank, 2018)

Barriers to Coal Transition

Subsidies in coal sector

- The government subsidizes coal industry sector through loan guarantee, tax exemption, and preferential royalties and tax rates.
- The number of subsidies quantified so far reached at least USD 946.2 million and USD 644.8 million for 2014 and 2015 respectively or equal to USD 2 per ton and USD 1.4 per ton of coal produced in 2014 and 2015 (Attwood et al., 2017)
- Imposed a price cap on coal consumed for public power generation
- All the environmental and social cost that is not included in coal production cost.

Inconsistent Policy Translation

- The energy policy, KEN and RUEN, together with NDC supports 23% renewable energy target in primary energy supply by 2025
- Recent regulation introduced an increased risk and ultimately become the barrier for higher penetration renewables
- Difference translation from KEN/RUEN in RUPTL

Barriers to Coal Transition (2)

According to RUEN, only 18% of RE power plant (or 6% of total power plant) in 2025 will be solar or wind power, but it will increase to 40% of RE capacity (or 15% of total capacity) in 2050.

If Indonesia is to follow its RUEN, then in the long run the integration cost of variable RE will become a challenge.

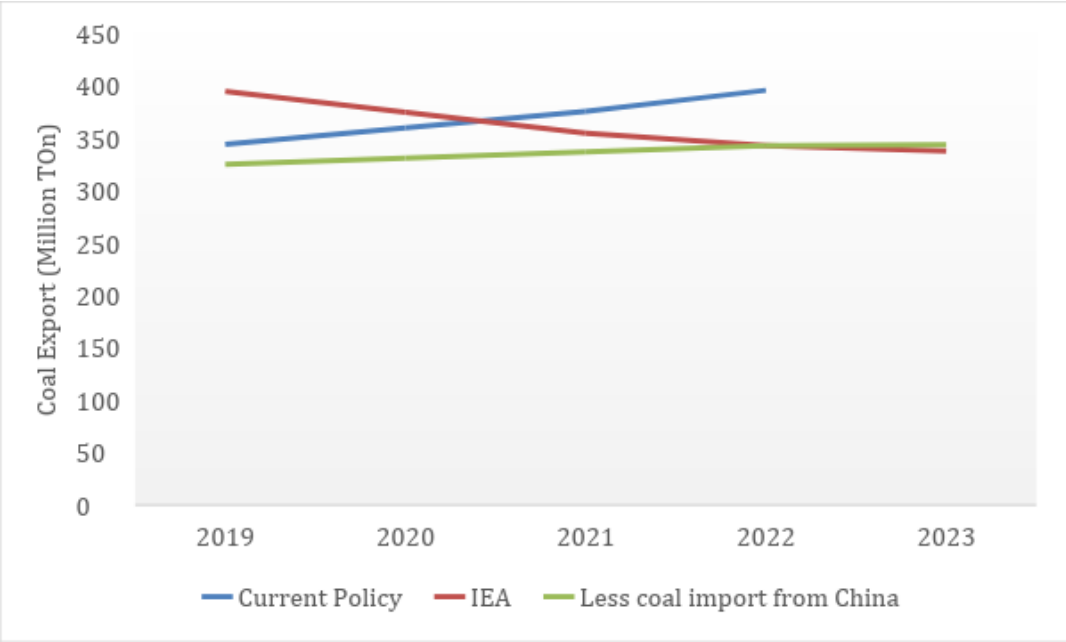
Several strategies that can be implemented:

- Demand response policy (e.g. electric vehicle, volatile price policy)
- Flexible thermal power plant
- Power storage technology (hydro storage and battery)

Coal Projection in the Future

- Coal Export
- Coal Domestic Demand
- Implications of Current Coal Trajectory

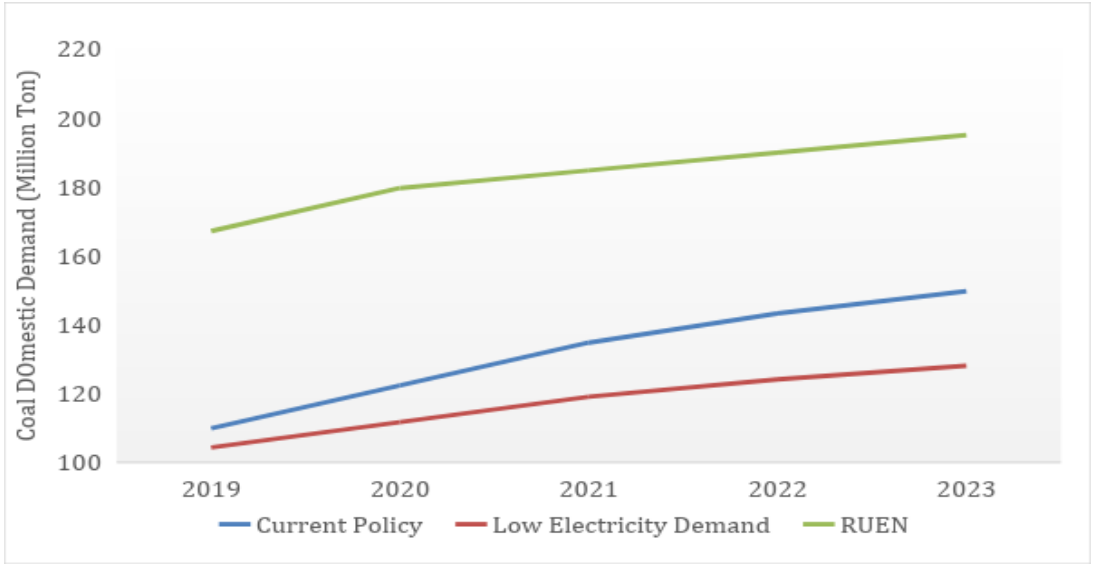
Coal Export



Based on three scenarios: Current Policy, IEA, and Low coal demand from China (alternative to current policy scenario)

- Generally under current policy, coal export to major export destination is relatively stable with potential to decrease while coal export to Southeast Asia tend to increase
- IEA predict a decrease in overall coal export from Indonesia
- China has one of the most volatile coal market and has higher probability of changing demand (previously happened in 2013-2015)
- Third scenario showcase this possibility against current policy scenario

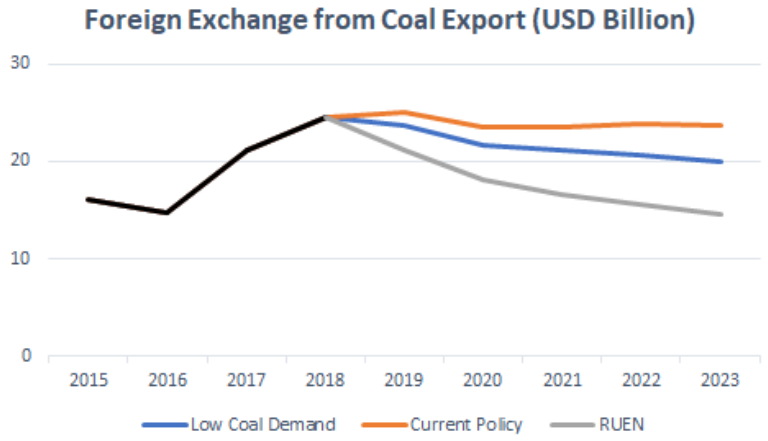
Coal Domestic Demand

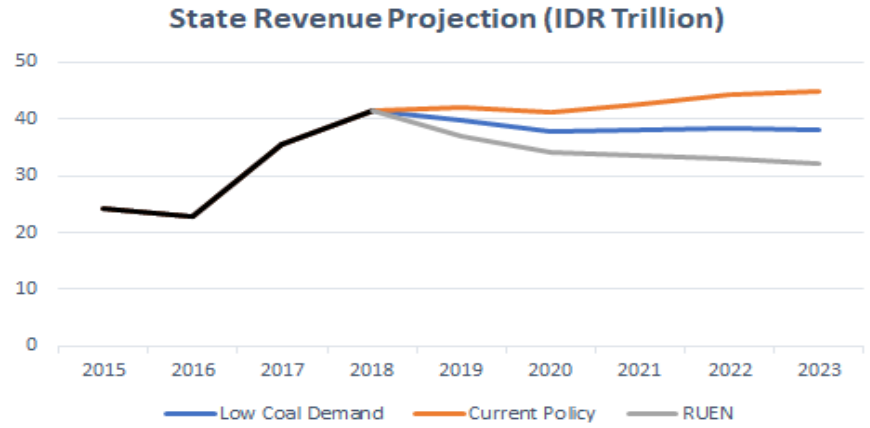


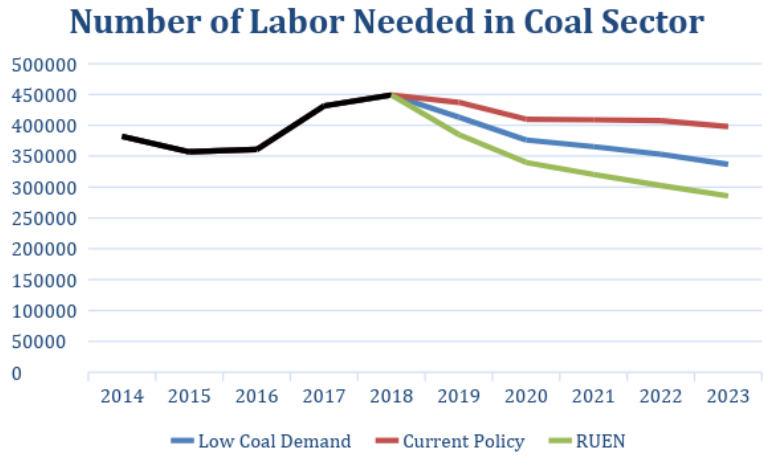
Based on three scenarios: Current Policy, RUEN, and Low electricity growth (alternative to current policy scenario)

- Roughly 85% of coal consumption is coming from the power sector and 12.5% from the cement industry
- The projection is based upon growth on both of these sectors
- The current policy utilize PLN forecast combined with historical growth in cement industry
- The low electricity demand use the lower electricity growth to estimate demand coming from power sector
- The RUEN will strictly follow RUEN policy of coal consumption
- An expected increase between 31 to 53 million ton could come from power and cement industry (considering the low electricity growth scenario and current policy scenario)

Implications

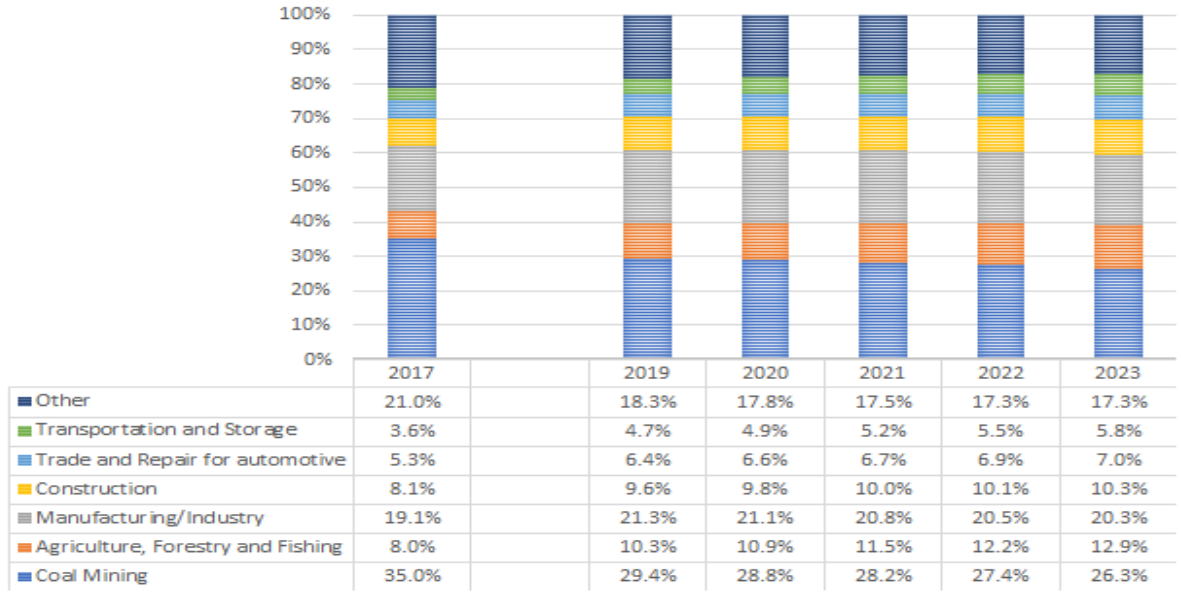




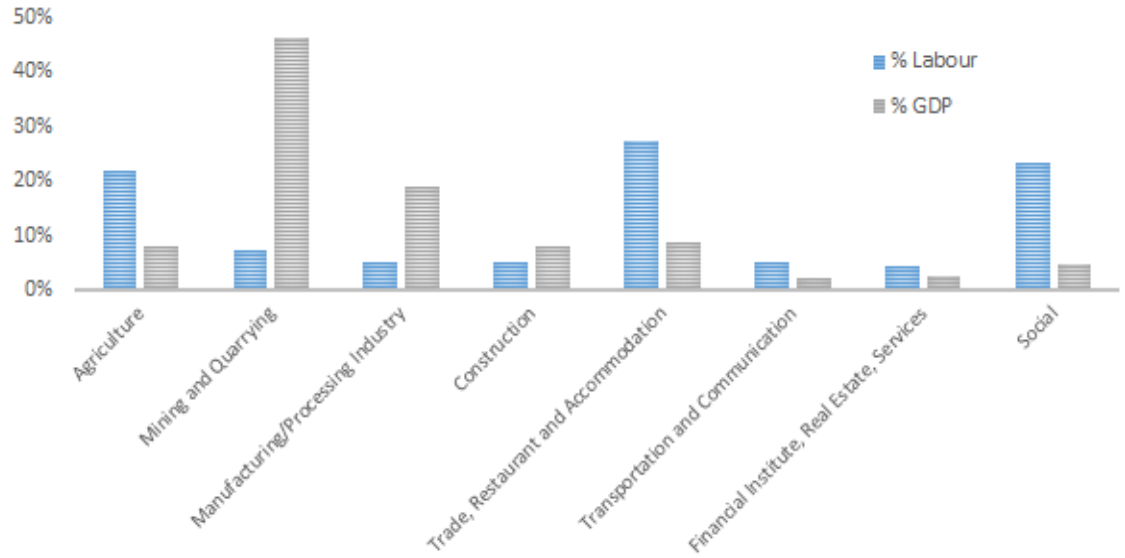


- State finance
  - A negligible reduction on state revenue: IDR 13 trillion (<1% of total state revenue)
  - More significant implication in trade balance: USD 9 billion (equal to foreign exchange deficit in 2018)
- Labor
  - Counting on increase labor productivity, the labor needs in coal sector would decrease

Implications



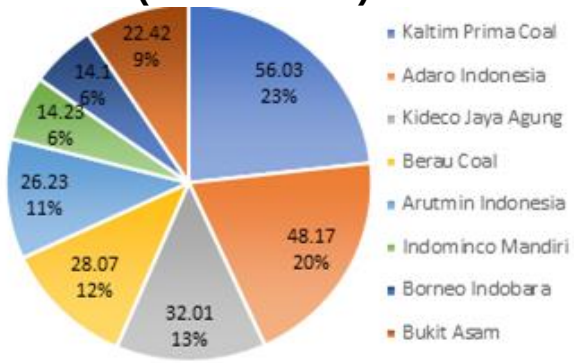
	2017	2019	2020	2021	2022	2023
Other	21.0%	18.3%	17.8%	17.5%	17.3%	17.3%
Transportation and Storage	3.6%	4.7%	4.9%	5.2%	5.5%	5.8%
Trade and Repair for automotive	5.3%	6.4%	6.6%	6.7%	6.9%	7.0%
Construction	8.1%	9.6%	9.8%	10.0%	10.1%	10.3%
Manufacturing/Industry	19.1%	21.3%	21.1%	20.8%	20.5%	20.3%
Agriculture, Forestry and Fishing	8.0%	10.3%	10.9%	11.5%	12.2%	12.9%
Coal Mining	35.0%	29.4%	28.8%	28.2%	27.4%	26.3%



- Local economy
  - A sectoral shift could be expected, especially if the local economy would like to maintain current national economic growth of 5.2%)
  - GDP to labor ratio in manufacturing sector is second highest in East Kalimantan, after mining sector, making it suitable for covering the economic impact of coal transition
  - Tourism industry has potential to be developed further

Coal Production

Indonesia top coal producers in 2017 (million tons)

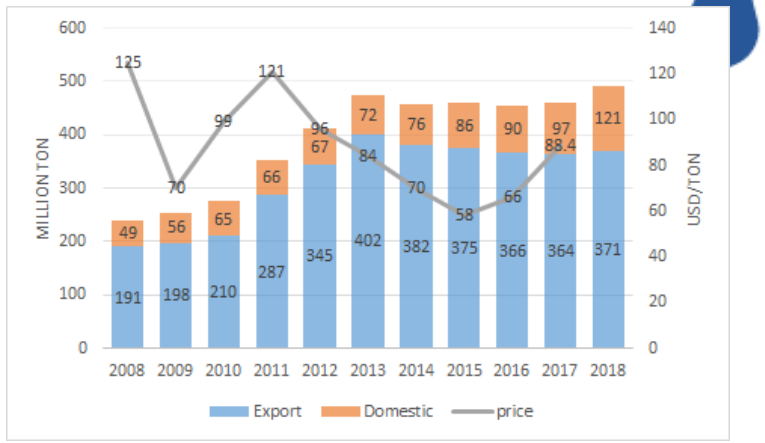


Comparison of production plan and realization

Type of coal company	Production target (million tons)	Actual Production (million tons)*
CCoW	297.31	282.04
State-owned IUP	23.20	22.42
Foreign owned IUP	18.70	16.87
Provincial IUP	73.79	139.78
Total	413	461.12

*) Actual production is a prognosis based on data until 3rd quarter.

Comparison of production and price

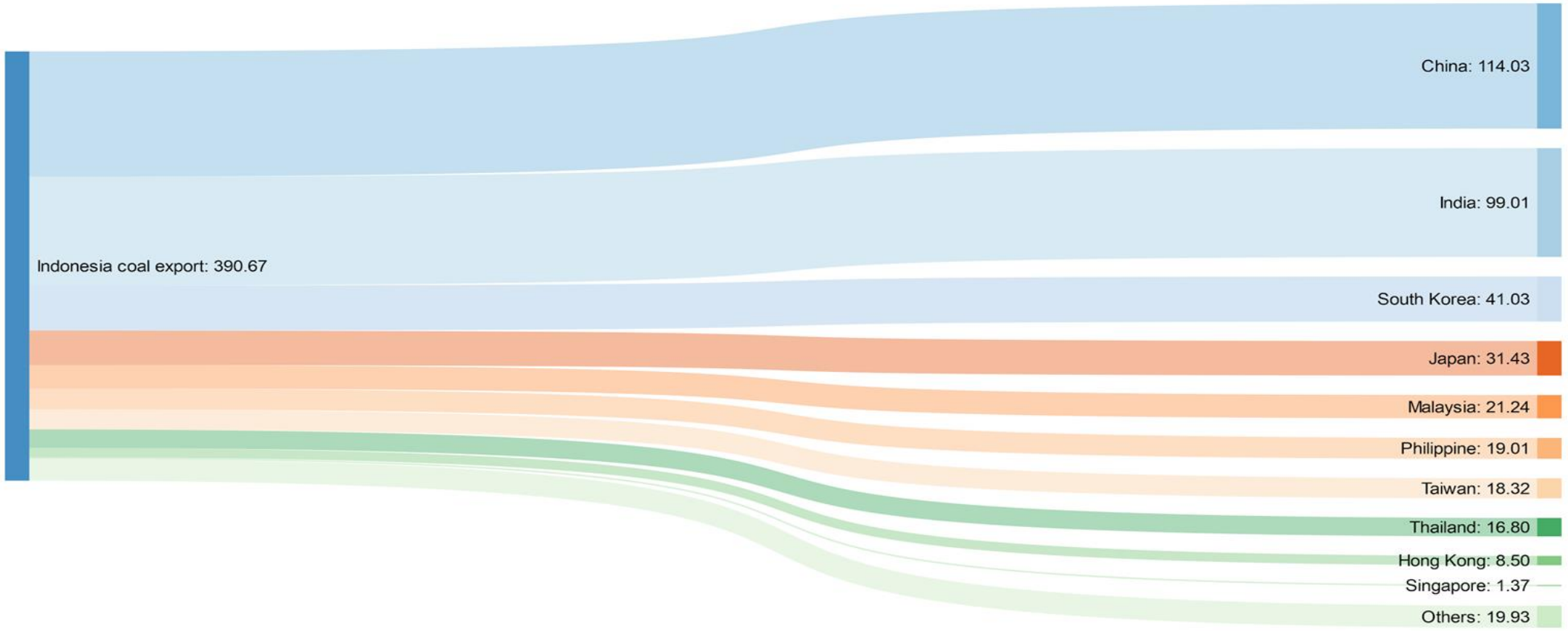


Factors that has led to coal over production:

- The over-licensing of new mines
  In 2017, the total coal production exceeded the production plan approved by MEMR by almost 50 million tons. It was caused by the overproduction of Provincial IUP holders, which in aggregate produced almost twice of their initial plans. A large number of IUP holders might have made actual monitoring of production more difficult for the provincial governments.

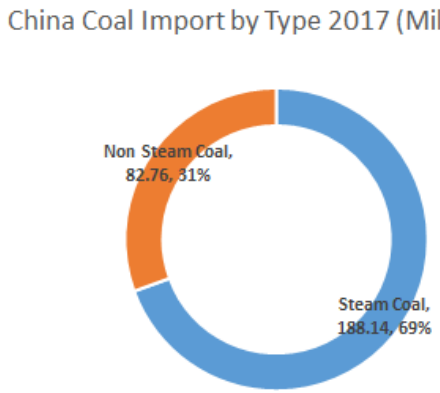
- The coal market price
  The increasing price of coal has affected production as the coal mining company increase its production in response to gain profit. At the same time, government is seeking for solution to balance trade deficit and as a result has increased coal production cap in 2018 by 100 million ton.

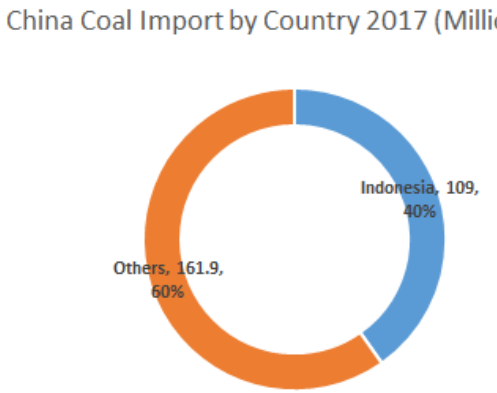
Coal Demand



Around 80 percent of Indonesia's domestic coal production being exported to several countries, placing Indonesia at the 2nd position as the coal exporter country in 2017. Most of Indonesia coal is exported to China and India. Coal demand in China is forecasted to decline beginning in the early 2020s, as result of saturated heavy industry growth and government campaign to replace coal with natural gas or renewables in power generation. IEA forecasted that India thermal coal import will decrease, as the government of India released several policies to reduce dependence on imports.

Coal Demand (2)





Geopolitical situation of the global coal market has a strong influence over coal production and export in Indonesia. Some illustration:

- Government of China policy and regulation on coal mining industry and coal domestic price can affect the volume of coal export from Indonesia.
  - About 69% of China coal import is steam coal
  - Indonesia supply 58% of the steam coal import demand or 40% of total import demand from China
  - China government has concerned over the impact of coal import to their domestic coal mining industry and major downstream industries of coal (steel, cement, fertilizer etc). Policies and regulations can change according to China needs

Coal Demand (3)

- Recent China coal import ban (or slow custom policy) from Australia at Port Dalian may trigger increased export from other coal exporting country.
  - No such ban (or slow custom policy) imposed on Indonesia and Russia
  - 46% of Australian coal export to China is coking coal
  - About 20% of total Indonesia export is coking coal. Indonesia has the resources to fill the market.
  - Indonesian coal mining company could see China ban for Australia coal import as an opportunity to increase production and export.

- With the aim to reduce emission, South Korea has prioritized low sulphur thermal coal from Russia*.
  - Komposisi PLTU akan turun dari 45% (2017) menjadi 36% (2030)
  - Coal import from Russia has increased by 12% in 2018 compared to 2017
  - With tight limits on coal sulphur content, the coal import from Russia is expected to continue to increase
  - In the contrary, coal import from Australia and Indonesia has experienced a decline in the last few years.

**https://www.argusmedia.com/en/news/1841492-south-korea-hikes-russian-thermal-coal-imports*

Conclusion

Key challenges to a just energy (coal) transition:

- Coal, just like other natural resources, attracts many kind of interests to monetise the resources. Coal and Indonesia politics are intertwined, influence long-term national and local energy policy.
- Coal is perceived as cheapest source of electricity and consumer loves cheap energy price. This is a strong driver for politician to maintain coal dominance.
- Coal is source of revenues for national and subnational governments, it contributes to local economy in different scale and level. Moving away from coal can cause insecurity for government in meeting government's revenue target.
- In the four provinces that produce coal, alternative to economy and livelihood are still limited. Job security and livelihood post coal have to be addressed.
- Coal mining companies are just started to move away to diversify its business to power develop plant as IPPs are seeking for investment return in the long-term.

Conclusion

Key issues to be addressed in coal transition debate:

- Strong international climate regime and cost of delay to act swiftly to national and global economy.
- The dynamics of international coal market and declining of coal import from major economies require policy reform in coal production and utilisation.
- The disruption of distributed generation (solar, wind and battery), the competitiveness of renewable energy technologies, and potential of griid deflection of electricity consumers.
- Develop local economic alternatives based on the competitiveness and resources, retraining of local worker, and develop new innovative business.
- Rationalise coal power plants to avoid risks of stranded asset in the near future.
- Accelerate renewable energy development to meet Paris Agreement’s goal.

Thank You!

Institute for Essential Services Reform

is a think tank that actively advocates and campaigns to ensure the fulfillment of people's energy needs, justice in the use of natural resources and ecological sustainability.

Address:
Jalan Tebet Barat Dalam VIII
No. 20B
Jakarta Selatan 12810
Indonesia

Phone : +62 21 22323069
+62 21 8317073
Fax : +62 21 22323860
Email : iesr@iesr.or.id
Website : www.iesr.or.id