



Energy Transition in Indonesia

Indonesia Economic Prospects, December 2021

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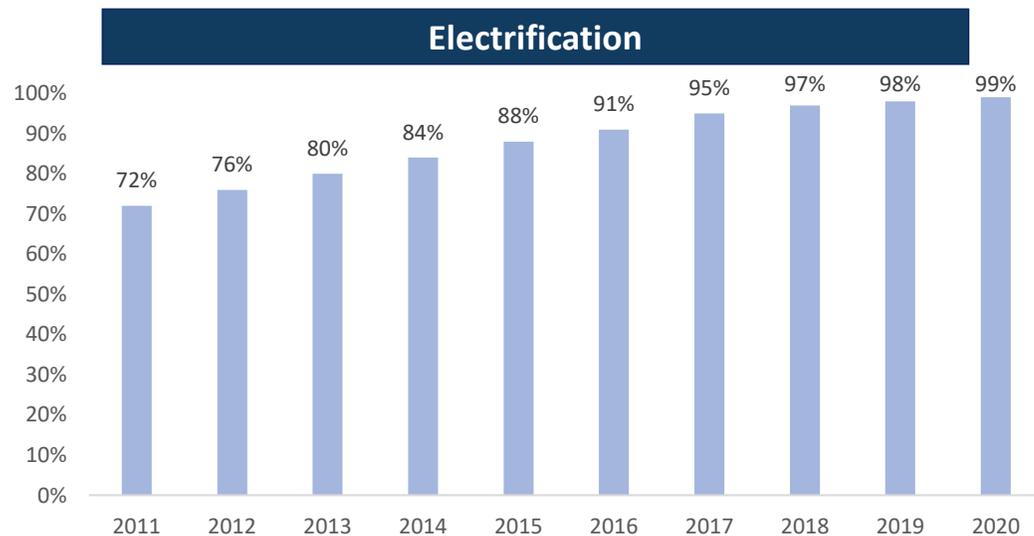


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Indonesia's energy sector's past success has come at the cost of natural capital

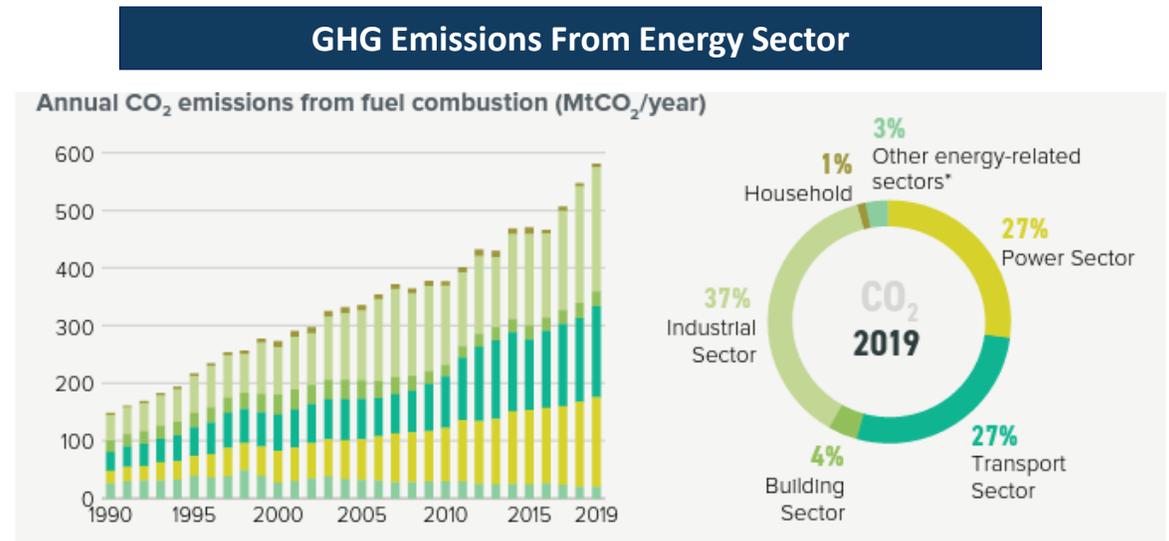
Energy sector has been a fundamental enabler

- **Access:** Near **universal electrification** achieved (34 million customers connected to the grid in 10 years)
- **Growth:** increased installed capacity from 40 GW in 2011 to 61 GW in 2020
- **Presence:** PLN is present in over 600 islands and is considered one of the strongest utility in the region



but has become a leading GHG emitter

- **Coal power capacity:** **doubled** in just 10 years (16 GW added)
- **Coal usage:** **105 m tons**; comparing EAP region: China 3.8 b tons, Vietnam 85 m tons, Philippines 34 m tons
- **Emission:** increased by 140% between 1990 and 2017 (excl. land use)
- **Emissions intensity:** 804 gCo₂/kWh (compared to 449 for G20 average)



Indonesia's energy sector is facing several challenges



PLN's financial sustainability is challenged by inadequate tariff and revenue structure. Large investment will be needed for the energy transition which will require a financially sustainable utility.



The **fragmented sector regulation challenges** effective coordination of sector policies and energy transition goals.



Indonesia is lagging behind peers in Variable Renewable Energy deployment and has yet to adopt standards of automation and digitalization.

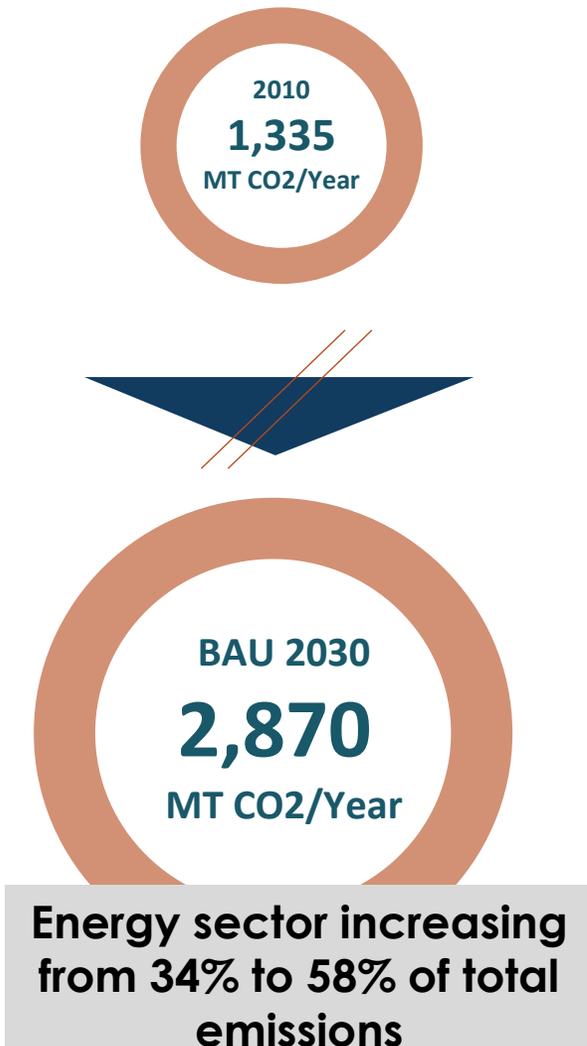


Despite some progress, **the grid quality stays low** with poor reliability.

Coal and fuel subsidies as well as renewable energy pricing distortions constrain the mobilization of private investments in RE.

The **coal phasedown** is likely to have measurable economic and social impacts, including in coal-dependent regions

In the wake of COP26, Indonesia's government made new climate commitments



Climate commitments:

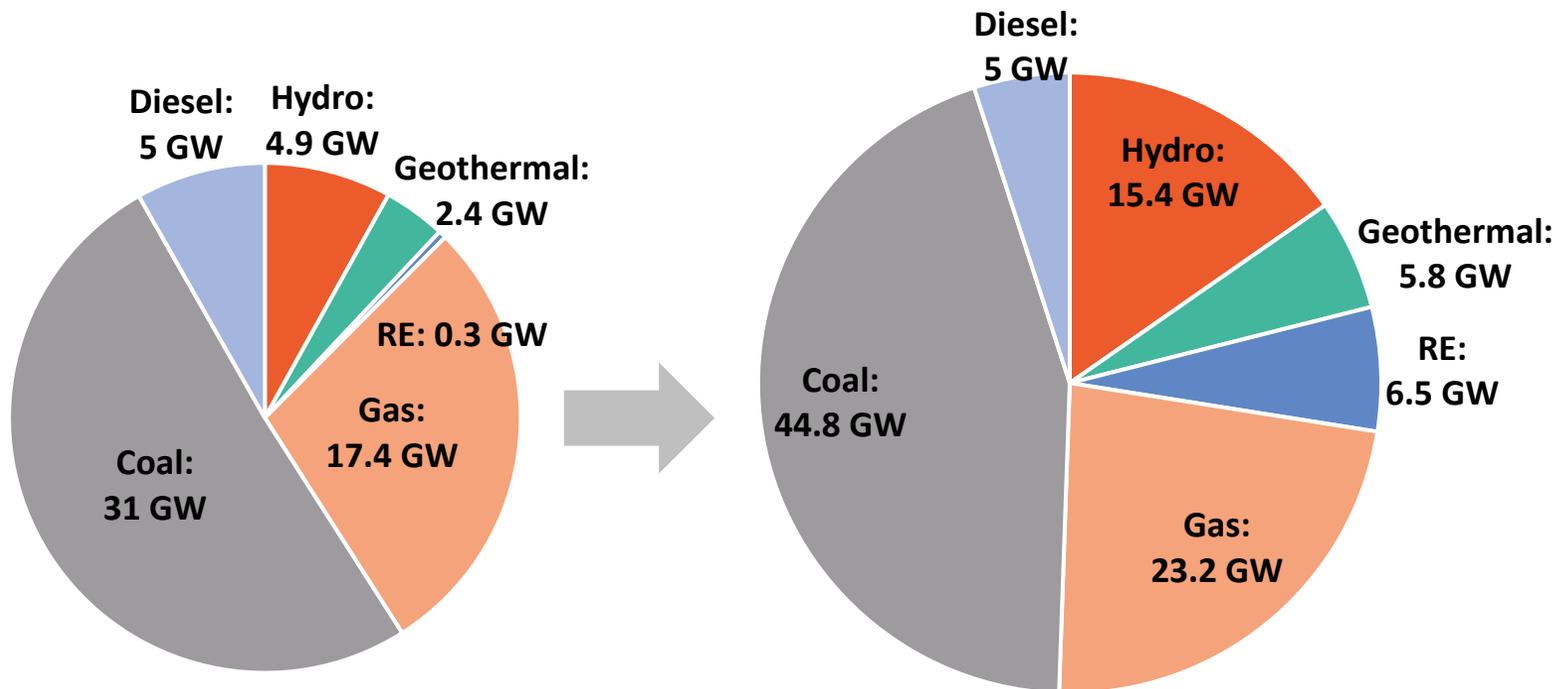
- **NDC:** 26% reduction from BAU (unconditional) and 41 % reduction from BAU (conditional)
- **RE targets:** 23% by 2030 (from 12%)
- **Net zero:** by 2060 or earlier
- **Coal:**
 - no new coal-fired power plants committed after 2022
 - no more coal after 2056 (but might be accelerated in the 2040s)
- **Accelerated retirement of coal plants:** retirement of a minimum of 8 GW of coal projects by 2030

Power sector decarbonization is now a priority for the government

New RUPTL master plan significantly reduces the planned coal capacity, but more needs to be done

2020 : 61.1 GW

Target 2030: 100.7 GW



Technology	RUPTL 2019 – 2028 targets	RUPTL 2021 – 2030 targets	difference
Hydro (and pump storage)	14.5	15.4	6%
Geothermal	5.2	5.8	12%
RE (PV, wind, biomass)	2.6	6.5	145%
Gas	28.8	23.2	-20%
Coal	56	44.8	-20%
Diesel	5	5	-
Total	112.1	100.7	-10%

But decarbonization faces several challenges in Indonesia and all options need to be explored

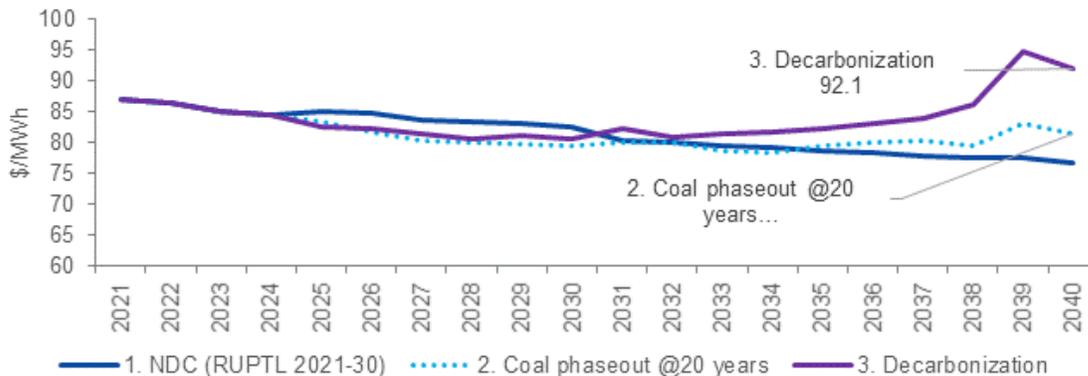
Power sector decarbonization is facing technical and economic constraints

- Limited space to integrate RE
- Complex island grid situation limiting potential for imports
- Excess power and potential carbon lock-in
- Regulatory impediments

but options are available

- A scenario-based analysis focused on the Java-Bali grid was carried out to assess decarbonization options for the next two decades.
- Three scenarios were assessed: **Phasing down coal and scaling up RE are central to reducing the carbon footprint of the power sector.**
- Under the *Coal Phase down* scenario coal power generation would move from 30% of the mix in 2040 in the *baseline* scenario to 5% and **emissions would be cut by 40% while the generation cost would increase by 6% in 2040*** compared to the baseline scenario.
- Under the more ambitious decarbonization scenario (emissions cut by 70% in 2040 vs the NDC Scenario), **coal is fully phased-out in 2040 and the generation cost is 27% higher*** than in the NDC scenario.

Average Cost of Electricity Generation under the three Transition scenarios



Policy Recommendations: Decarbonization Planning, Sector Efficiency and Performance

- **Decarbonization planning:**
 - **Aligning strategies and targets across Government agencies** will be critical to minimize the costs and risks of stranded assets in the future.
 - To that end, **appropriate pathways to phasing-down coal with innovative financing** mechanisms will need to be carefully assessed.
 - Solutions to decarbonize the grid such as **interconnections (domestic and international), Carbon Capture and Storage (CCS) or hydrogen** need to be explored further.
- To improve sector coordination, a **new inter-ministerial commission** could be created to align environment, financial and fiscal targets.
- To improve sector efficiency, **separating system planning, generation procurement and system operations from PLN's other activities** could increase transparency and reduce conflicts of interest.

Policy Recommendations: Clean Energy Deployment

- **Develop clear medium-term VRE deployment targets with associated tender timelines** would help PLN benefit from low PV and wind power prices.
- Three regulatory changes can help Indonesia boost private investment in RE: **reducing local content requirements, phasing out coal and fuel subsidies and lifting RE price controls.**
- **New investments in grid flexibility** are needed to integrate RE and **appropriate pricing mechanisms** and regulation is critical for their viability.



Policy Recommendations: Financial Sustainability

- **Setting the appropriate revenue requirements** is critical for the financial viability of PLN.
- **Increasing the share of revenue received from tariffs through a subsidy reform** will improve PLN's financial health.
- PLN could explore **new financing schemes and sources** and develop an ESG framework



Policy Recommendations: Coal Phase-Down

- **Phasing down the use of coal would require a just transition** for the people, communities, and businesses which rely on Indonesia's coal industry.



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Decarbonization options for Indonesia

Installed Electricity Generation Capacity in 2021 and 2040 under Different Transition Scenarios

