



**CASE**  
for Southeast Asia



# Prospect of Decarbonizing Indonesia Energy System

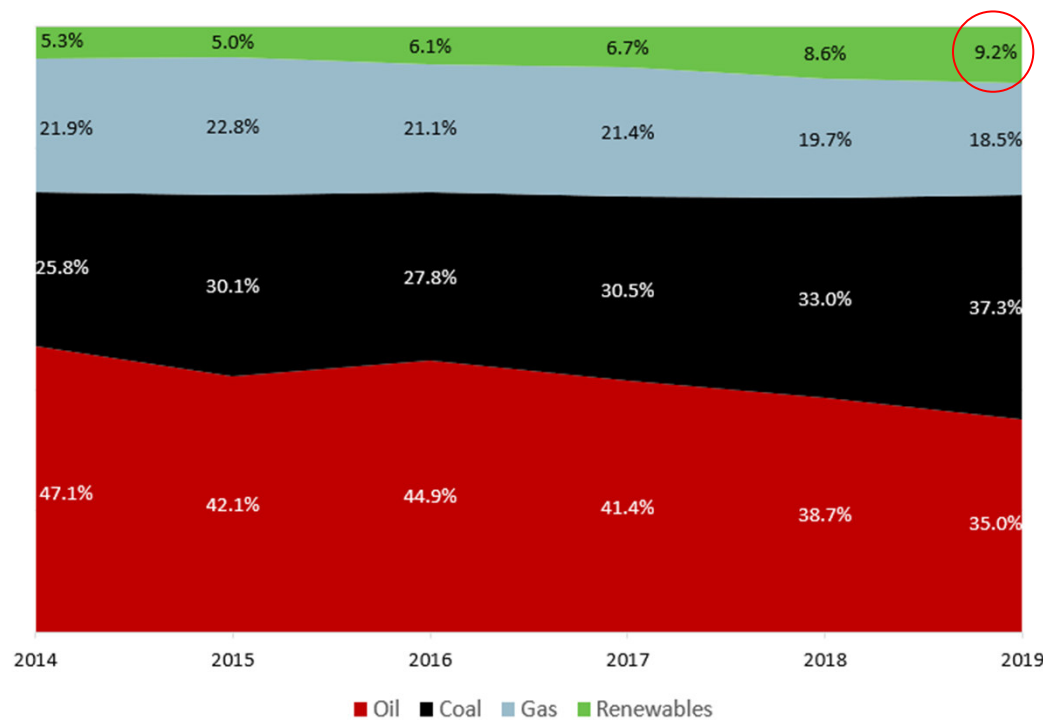
Insight from current policy and future prospect

Fabby Tumiwa | Executive Director  
Institute for Essential Services Reform  
SIEW, 29 October 2020

# Despite increase in renewables share, Indonesian primary energy mix from 2014-2019 is still dominated by fossil fuels

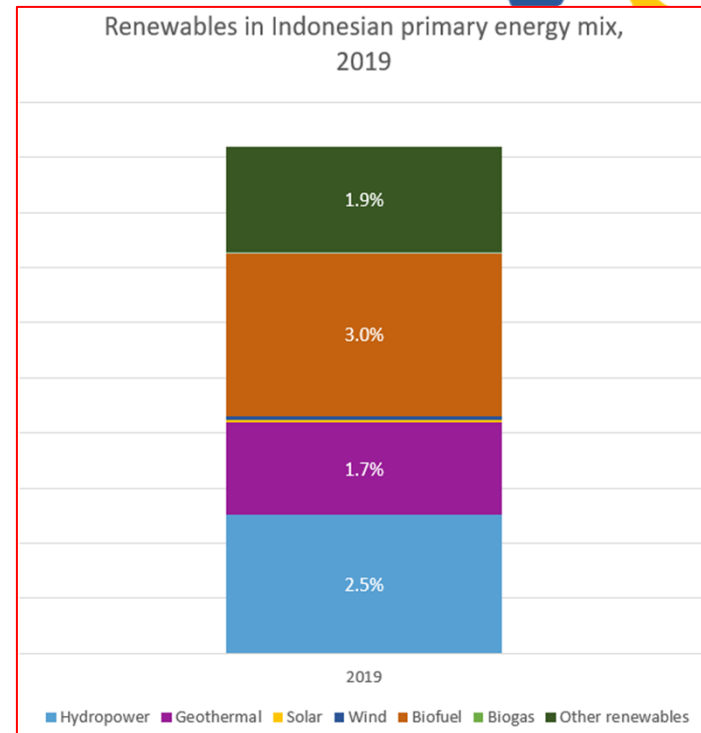


Indonesian Primary Energy Mix, 2014-2019



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Renewables in Indonesian primary energy mix, 2019

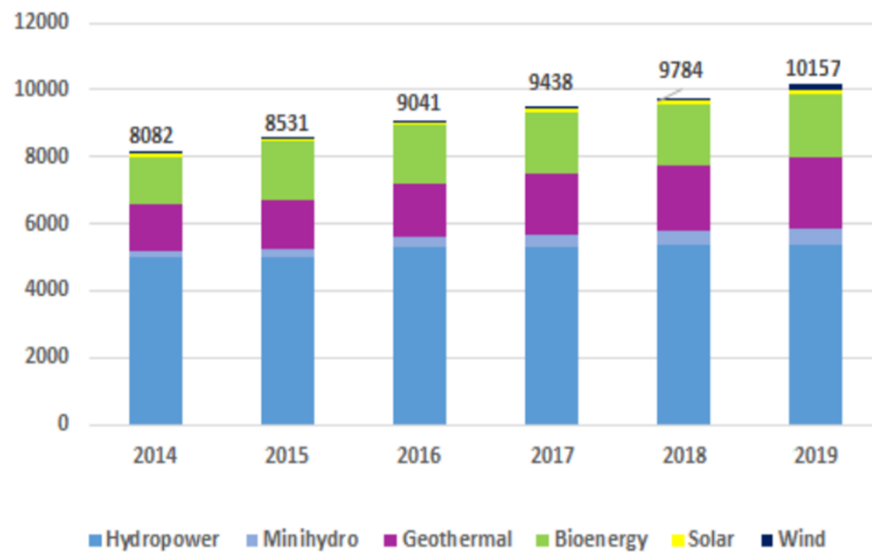


source: Handbook of Energy and Economic Statistic of Indonesia 2019

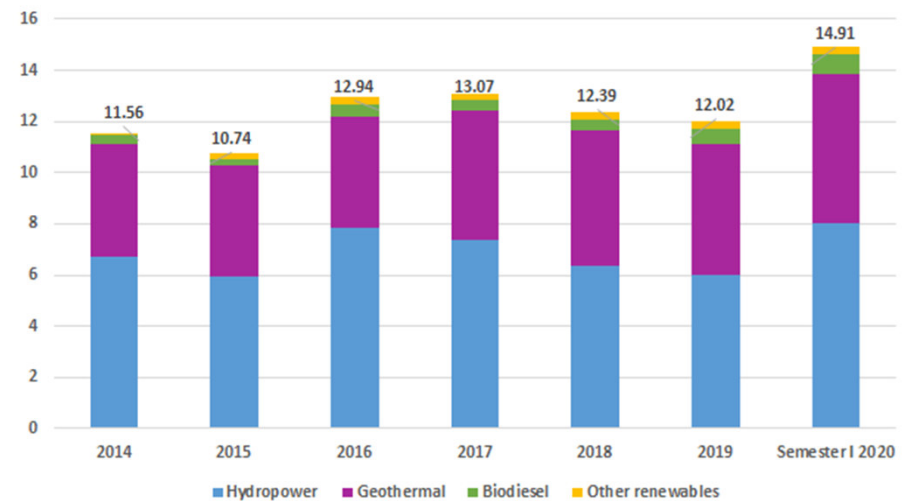
# Modest renewables growth marks the year of 2019



Renewable Energy Installed Capacity (MW)

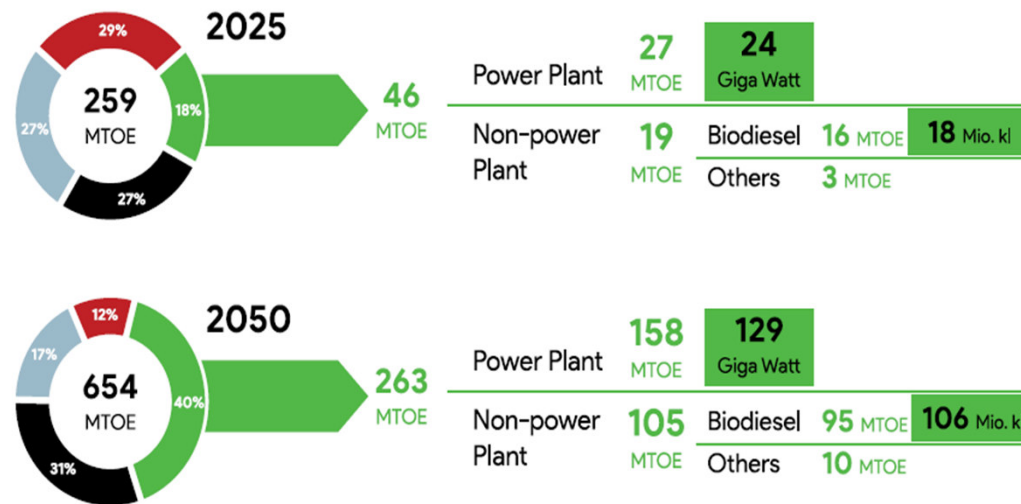


Renewable Generation Mix (%)



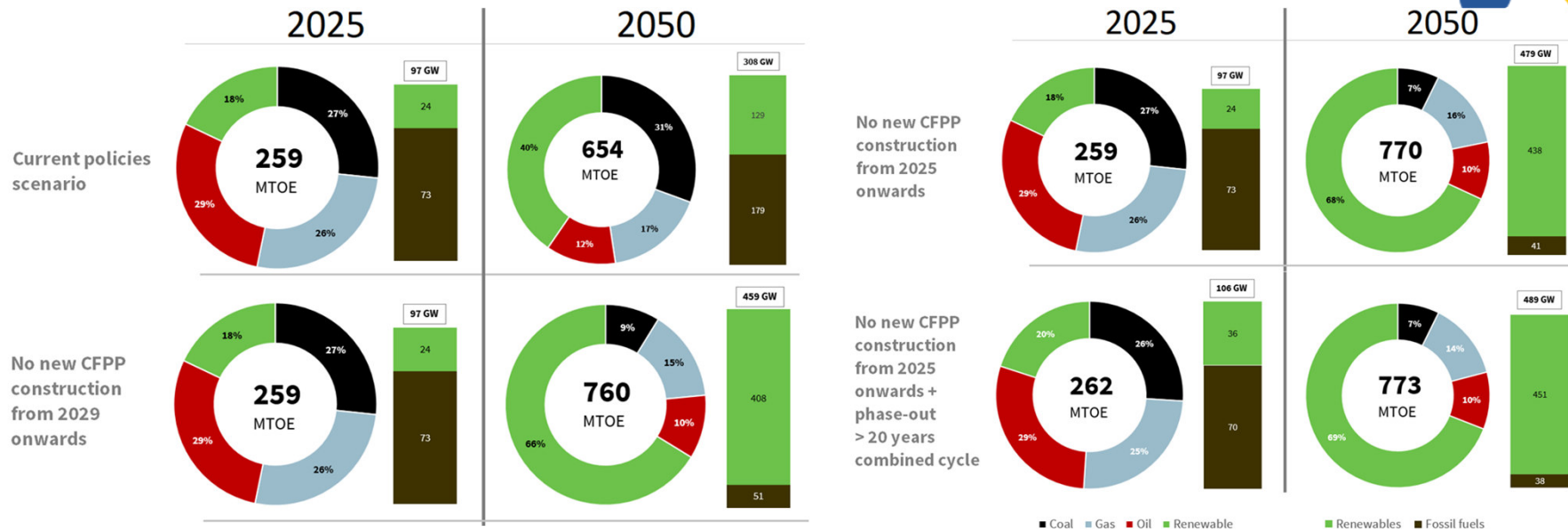
source: Capaian Kinerja 2019 ESDM, DJK

# Electric vehicles and biodiesel program will increase renewables share, both in the primary energy mix and installed capacity



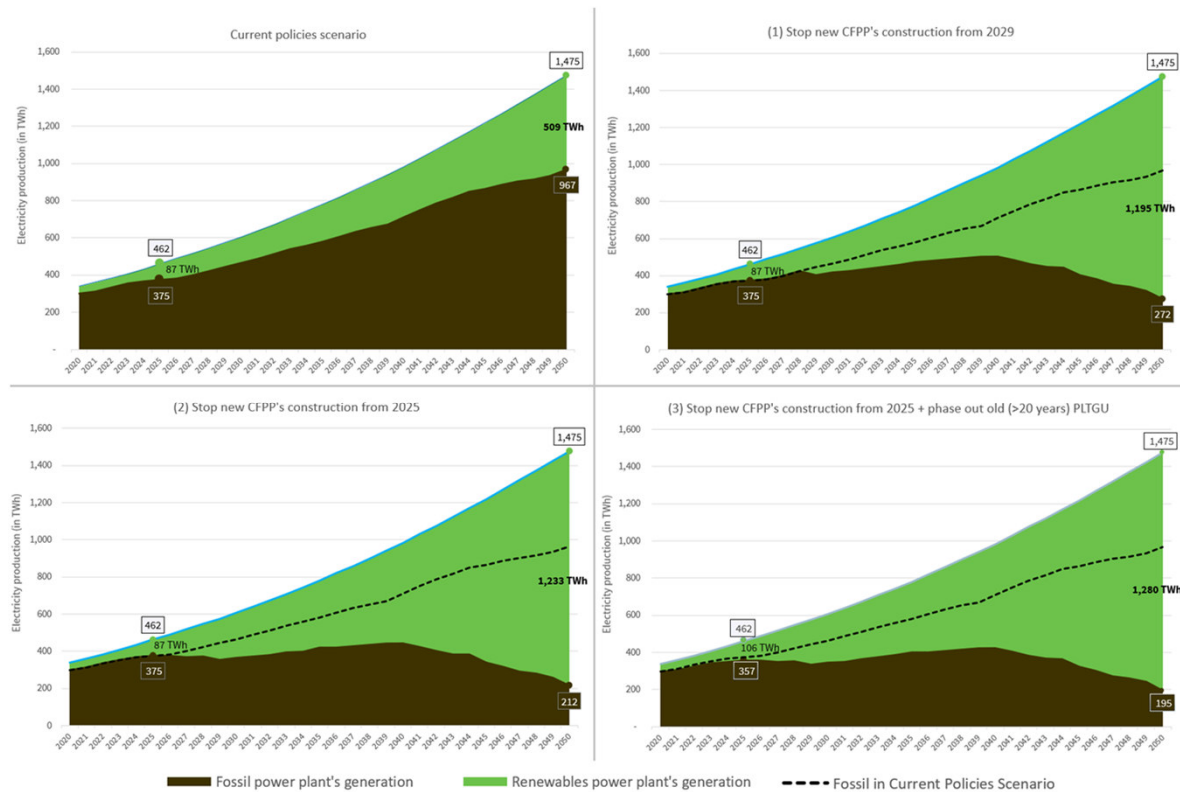
- Under the current policies scenario, the primary energy mix in 2025 will only be 18%. However, by 2050, renewable energy share in the primary energy mix will reach 40.3%, far above the existing RUEN target and realization scenario projection.
- The current policies scenario will increase renewable energy share in the primary energy mix due to the biodiesel program (B50 from 2021 to B100 starting in 2030). Meanwhile, the electric vehicle program will increase the demand for electricity compared to the realization scenario. Eventually, power plants installed capacity also increase.
- 60% of the renewable energy share between 2025-2050 in the primary energy mix comes from the generation sector (power plants), decrease compare to the realization scenario.

# Under our energy transition scenario, renewable energy share in the primary energy mix by 2050 will be at least 66%



- Renewable energy mix and installed capacity in the energy transition scenario will increase significantly, especially from the time period when there is no new coal fired power plant (CFPP) is built and all CFPPs older than 30 years are phased-out.

# Higher shares of renewables installation means more ‘green’ electricity is generated

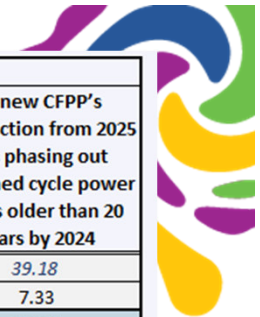


- Due to the electric vehicle program, Indonesian electricity consumption is projected to reach 462 TWh by 2025 and 1,475 TWh by 2050.
- Renewable energy contribution to the electricity generation will gradually increase from the first sub-scenario to the third sub-scenario, with renewable energy generation reaching 1,280 TWh (out of a total of 1,475 TWh) in the third sub-scenario in this energy transition scenario.

In order to fit the energy transition scenario, the installed capacity of renewable energy in 2025 must be at least 23.74 GW (fossil fuels 72.96 GW), and by 2050 it must be at least 408 GW (fossil fuels 51.1 GW).

- Renewable energy installed capacity in the energy transition scenario will increase from 2 times to around 2.7 times higher of the renewables target in RUEN from 2025 to 2050

Power Plants	Year	Energy Transition Scenario			
		No new CFPP's construction from 2029 onwards	No new CFPP's construction from 2025 onwards	No new CFPP's construction from 2025 plus phasing out combined cycle power plants older than 20 years by 2024	
<b>FOSSIL FUELS (in GW)</b>	Steam (PLTU)	2025	39.18	39.18	39.18
		2050	17.65	7.33	7.33
	Gas (PLTG)	2025	33.41	33.41	30.21
		2050	33.40	33.40	30.20
	Diesel (PLTD)	2025	0.36	0.36	0.36
		2050	0.00	0.00	0.00
<b>TOTAL FOSSIL FUELS</b>	<b>2025</b>	<b>72.96</b>	<b>72.96</b>	<b>69.76</b>	
	<b>2050</b>	<b>51.05</b>	<b>40.73</b>	<b>37.53</b>	
<b>RENEWABLES (in GW)</b>	Geothermal (PLTP)	2025	3.30	3.30	3.30
		2050	28.50	28.50	28.50
	Hydropower (PLTA)	2025	12.48	12.48	12.48
		2050	76.04	76.04	76.04
	Mini/Micro Hydro (PLTM/MH)	2025	1.96	1.96	1.96
		2050	19.39	19.39	19.39
	Bioenergy (PLT Bio)	2025	3.30	3.30	3.30
		2050	32.60	32.60	32.60
	Solar (PLTS)	2025	1.73	1.73	14.03
		2050	172.87	203.24	215.54
	Wind (PLTB)	2025	0.97	0.97	0.97
		2050	60.60	60.60	60.60
	Ocean (PLT Laut)	2025	0.00	0.00	0.00
	2050	17.90	17.90	17.90	
<b>TOTAL RENEWABLES</b>	<b>2025</b>	<b>23.74</b>	<b>23.74</b>	<b>36.04</b>	
	<b>2050</b>	<b>407.89</b>	<b>438.26</b>	<b>450.56</b>	
<b>TOTAL POWER PLANTS</b>	<b>2025</b>	<b>96.70</b>	<b>96.70</b>	<b>105.80</b>	
	<b>2050</b>	<b>458.95</b>	<b>479.00</b>	<b>488.10</b>	



## What is next?



The scenario indicates that decarbonisation in the energy system is possible started in 2040 - 2050, but reaching net-zero emission could be after the mid of century. The key of decarbonisation for power sector is to accelerate the deployment of renewable energy from now to 2030.

As the electrification of transport sector could start later (2030 onward) requires enabling environment to accelerate the transition to happen.



There is a need to review existing coal utilization plan and the construction of the new coal-fired power plants. The decarbonization requires decision to stop building new & phase out coal power plants within decades.



Assessing the development of alternative scenarios in the national energy plan that integrates a larger portion of renewable energy,





STUDY REPORT



**National Energy General Plan (RUEN):  
EXISTING PLAN, CURRENT POLICIES  
IMPLICATION, AND ENERGY  
TRANSITION SCENARIO**



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To learn more, please check our report

<https://iesr.or.id/pustaka/ruen-existing-plan-current-policies-and-energy-transition-scenario>

Accelerating  
Low Carbon Energy Transition

**Institute for Essential Services Reform**

Jln. Tebet Barat Dalam VIII No. 20B  
Jakarta Selatan 12810-Indonesia  
T: +6221 2232 306 | F: +6221 8317 073  
[www.iesr.or.id](http://www.iesr.or.id) | [iesr@iesr.or.id](mailto:iesr@iesr.or.id)

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