



On behalf of



of the Federal Republic of Germany

Key Challenges and Opportunities in the Philippine Energy Transition

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WESM

Wholesale Electricity Spot Market

The Philippines does not subsidize power generation and has evolved a **competitive power market** with real-time transactions based on economic dispatch of all mostly private power plants under the Wholesale Electricity Spot Market (WESM). Bilateral contracts are not considered in the dispatch but settlement of declared bilateral contracts are done outside the WESM.



Sub-Grids

Being an archipelago, there are several island grids that are interconnected via submarine HVDC cables.

Luzon is the main island; **Visayas** has a group of smaller interconnected islands. Luzon and Visayas are now interconnected but **Mindanao** is projected to be interconnected by the end of 2021.



Private Sector

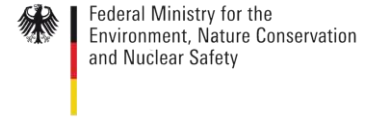
All new power plants shall be privately-owned and operated. The investment decisions shall be made by private companies in a competitive environment. Even distribution utilities are privately owned: either by corporations or by the consumers through rural electric cooperatives.

Understanding the Philippine Power Situation

Key Challenges



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1. Declining renewable energy share in the energy mix
 - Declining energy self-sufficiency and security
 - Increasing volatility and cost of electricity
2. Delayed implementation of key energy laws and policies
3. Public perception that coal power is cheap and renewable energy is expensive
4. Power grid capacity constraints that curtail renewable energy generation and dispatch
5. Financing of Renewable Energy power plants

Declining Renewable Energy Share since RE Law in 2008



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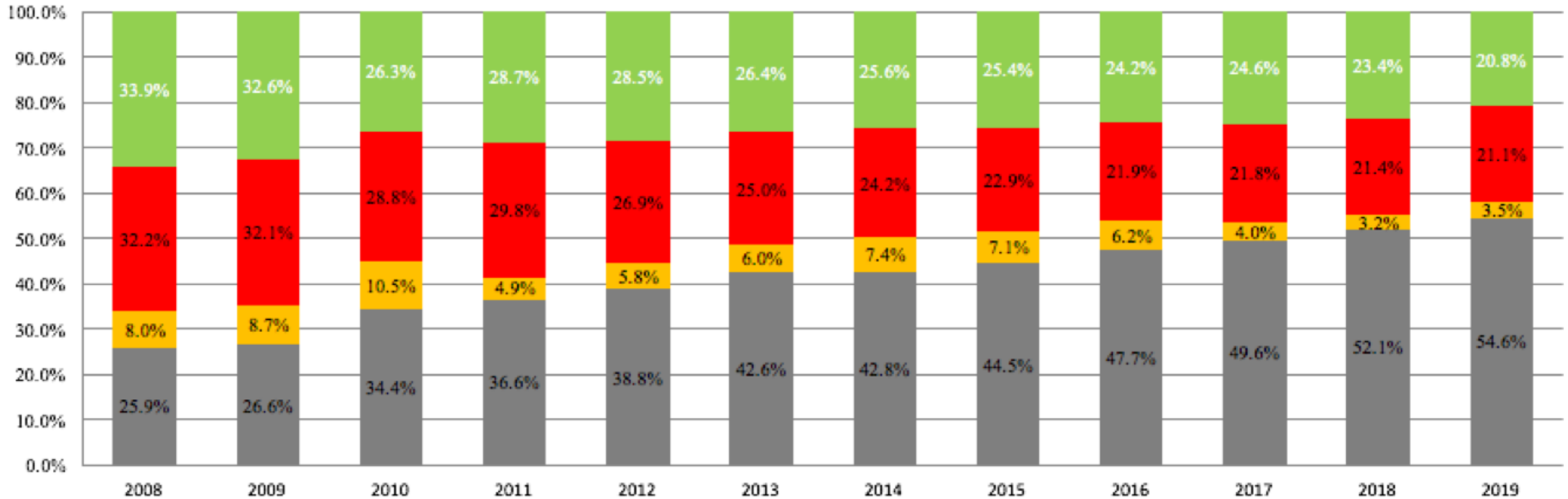
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Power Generation by Source in % Share, Total Philippines

33.9%
in 2008

■ Coal ■ Oil-Based ■ Natural Gas ■ Renewable Energy

20.8%
in 2019



Source: 2019 Power Statistics, DOE

Declining Energy Self-Sufficiency and Security



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Power Generation by Source in % Share, Total Philippines

Resource	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Coal	25.9%	26.6%	34.4%	36.6%	38.8%	42.6%	42.8%	44.5%	47.7%	49.6%	52.1%	54.6%
Oil-Based	8.0%	8.7%	10.5%	4.9%	5.8%	6.0%	7.4%	7.1%	6.2%	4.0%	3.2%	3.5%
Natural Gas	32.2%	32.1%	28.8%	29.8%	26.9%	25.0%	24.2%	22.9%	21.9%	21.8%	21.4%	21.1%
Renewable Energy	33.9%	32.6%	26.3%	28.7%	28.5%	26.4%	25.6%	25.4%	24.2%	24.6%	23.4%	20.8%
Geothermal	17.6%	16.7%	14.7%	14.4%	14.1%	12.8%	13.3%	13.4%	12.2%	10.9%	10.5%	10.1%
Hydro	16.2%	15.8%	11.5%	14.0%	14.1%	13.3%	11.8%	10.5%	8.9%	10.2%	9.4%	7.6%
Biomass	0.0%	0.0%	0.0%	0.2%	0.3%	0.3%	0.3%	0.4%	0.8%	1.1%	1.1%	1.0%
Solar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	1.2%	1.3%	1.3%	1.2%
Wind	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.9%	1.1%	1.2%	1.2%	1.0%
Total in GWh	60,821	61,934	67,743	69,176	72,922	75,266	77,261	82,413	90,798	94,370	99,765	106,041
Self-Sufficiency	67.09	65.81	57.49	61.14	58.78	56.24	53.47	53.15	51.02	53.85	51.04	46.85

67.1%
in 2008



46.9%
in 2019

Congestion in Negros–Cebu Transmission Line

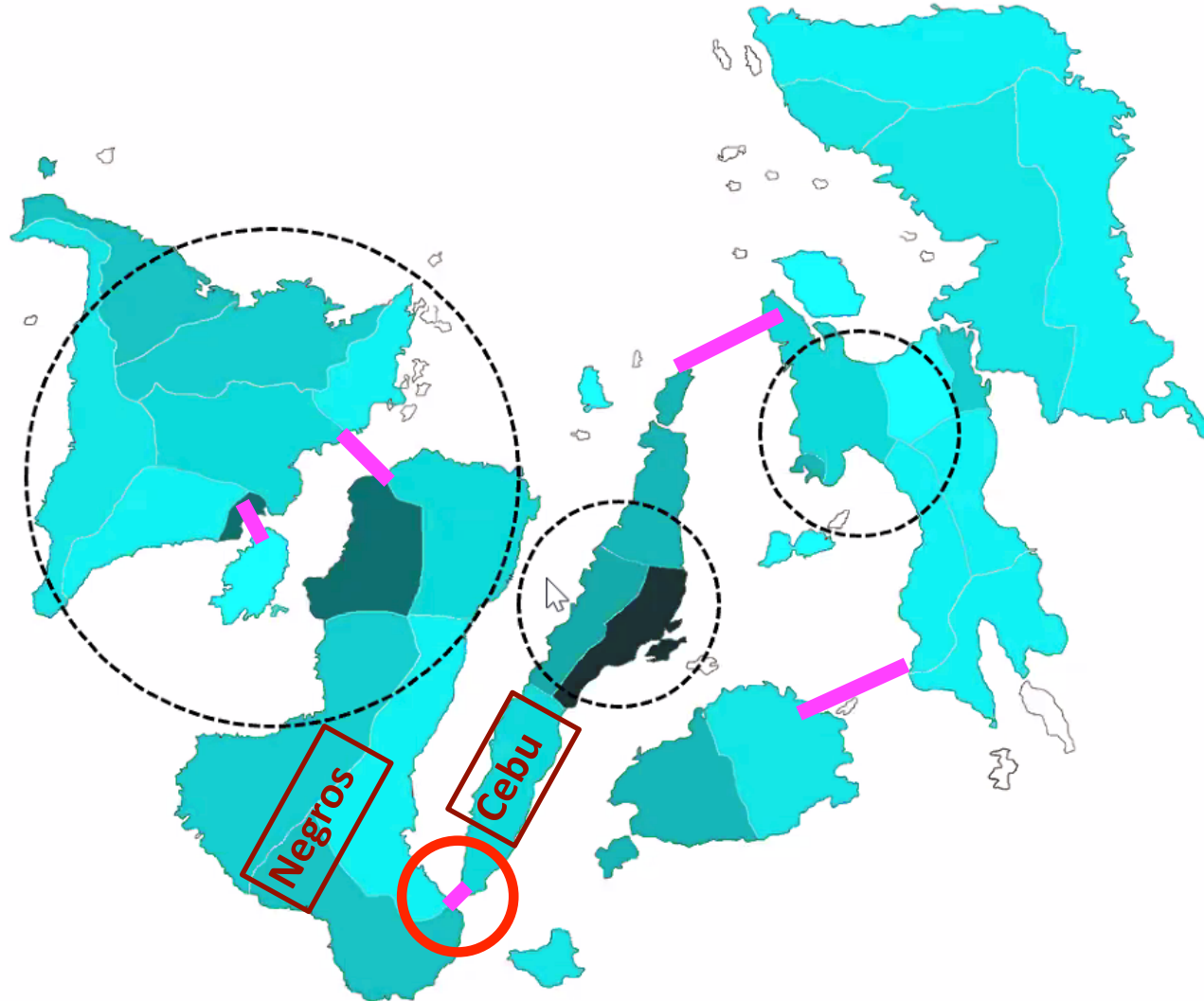


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**VISAYAS
GRID**

**Load Distribution &
Bulk Generation Sites**

Coal & Oil Fuel Price Volatility ...



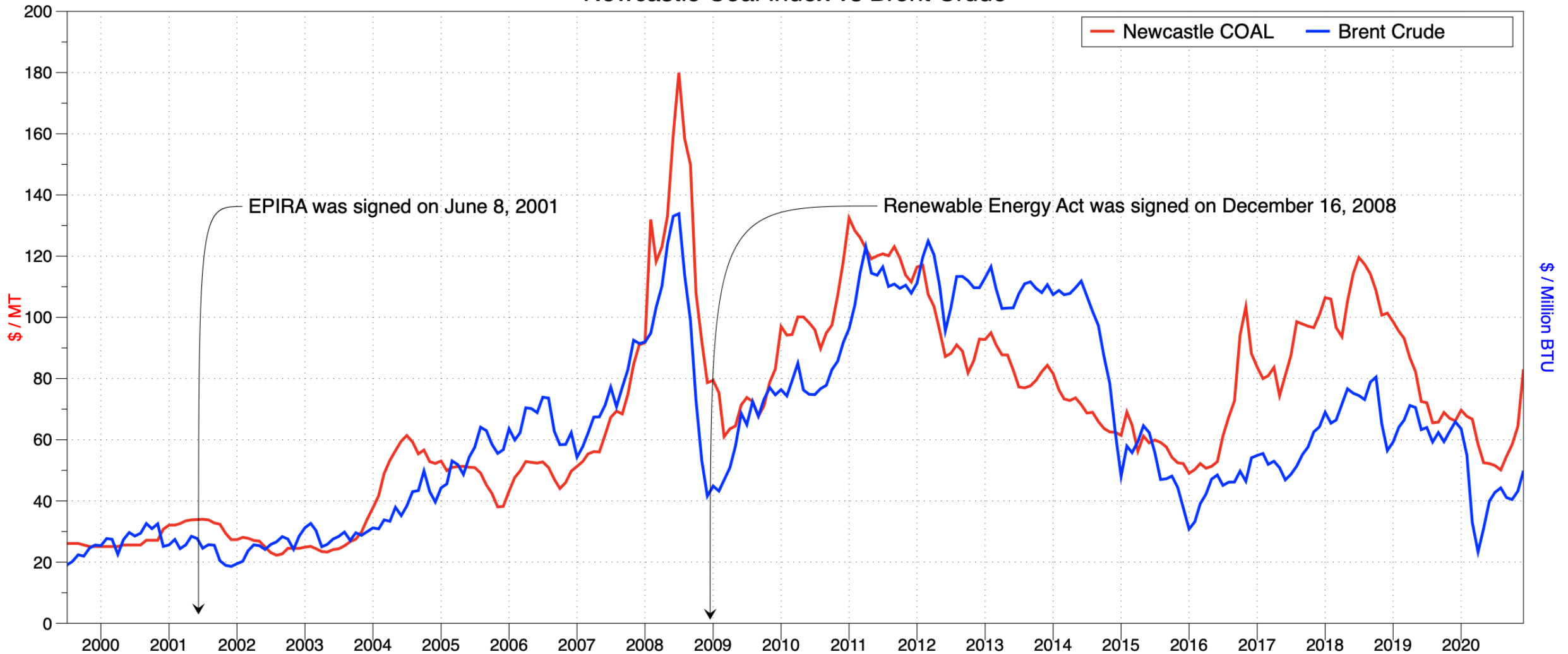
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Newcastle Coal Index vs Brent Crude



... Large variations in electricity costs at distribution level



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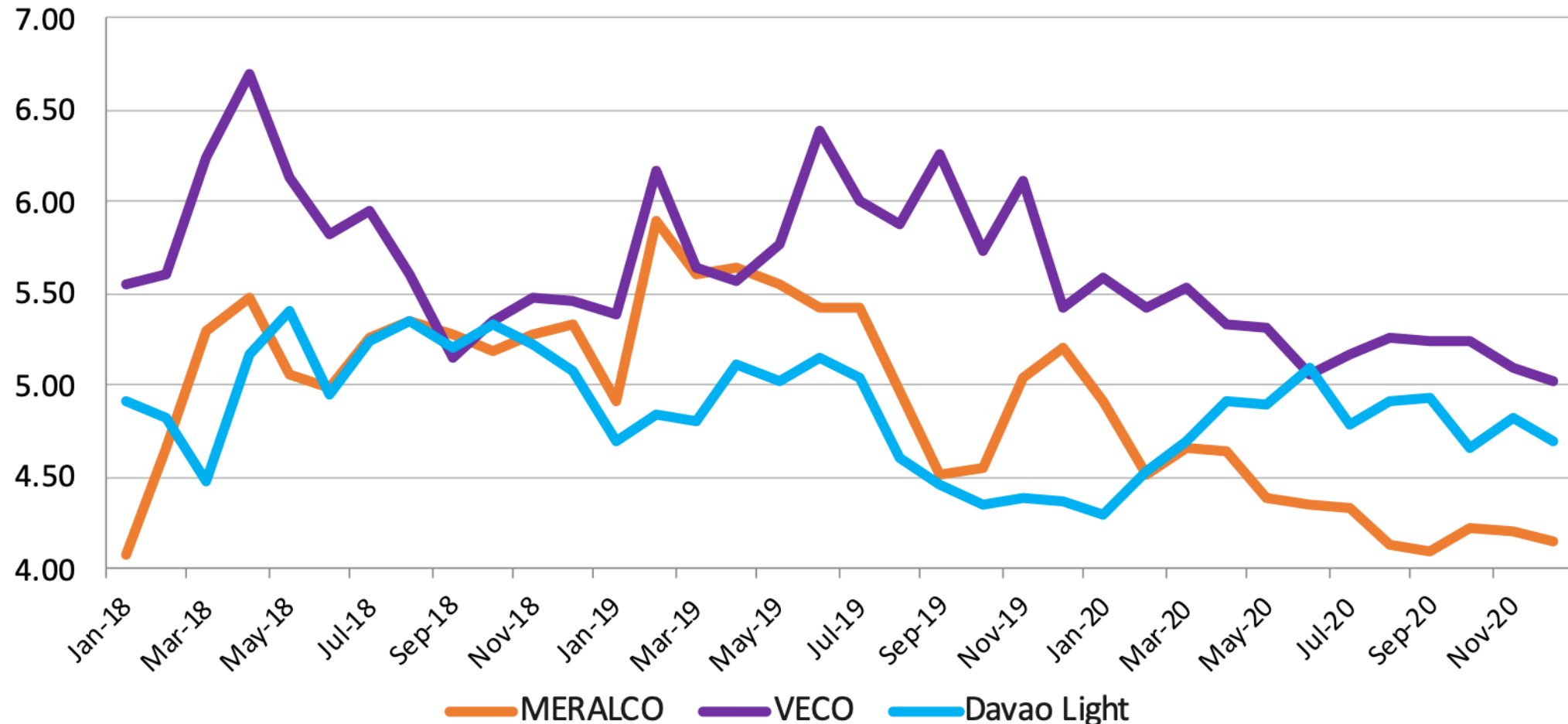
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Comparative Monthly Generation Rates of Large DUs, Pesos / kWh



Key Findings



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1. Baseload supply less important than flexible generation
 - Complements cheaper variable renewable energy generation
 - Addresses typical hourly variations in load profile
2. Timing of power network infrastructure is important to maximize renewable energy development and dispatch
3. End-users value power reliability and cost predictability particularly during disruptive events
 - Renewable power plants have outperformed fossil power plants during the pandemic

Key Opportunities



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1. Wholesale Electricity Spot Market (WESM)
 - provides market to absorb and dispatch all renewables ahead of all other generation and will be enhanced for true economic dispatch
2. DOE Moratorium on greenfield coal power plant development
3. Renewable power is now competitive in many areas and the Transmission Development Plan is now developing CREZ
4. Green Energy Auction of ~2,000 MW by DOE in June 2021
5. National Renewable Energy Plan (NREP)
 - will target higher share of renewables of at least 35% by 2030 from 20.8% today

Renewable Portfolio Standard (RPS)



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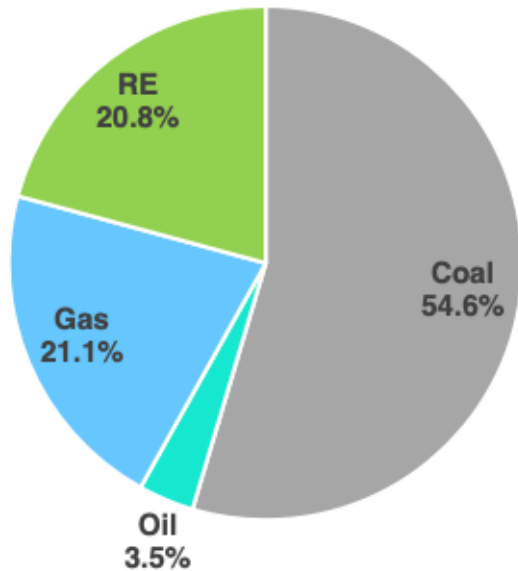


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- **35% by 2030-target is achieved by implementing RPS at 1% for 2020-2022 and increased to 2.52% moving forward**

2019 Gen Mix Per Plant Type



RPS Increment	2030 Gen Mix				2040 Gen Mix			
	Coal	Oil	Gas	RE	Coal	Oil	Gas	RE
2.52% RPS starting 2023	41.0%	0.5%	21.3%	37.3%	29.7%	0.3%	14.2%	55.8%



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