



Knowledge Evidence and Engagement Programme (KEEP) Energy Transition Analysis (ETA) Report

Analysing Energy Transition Risks in the Philippine Power Sector

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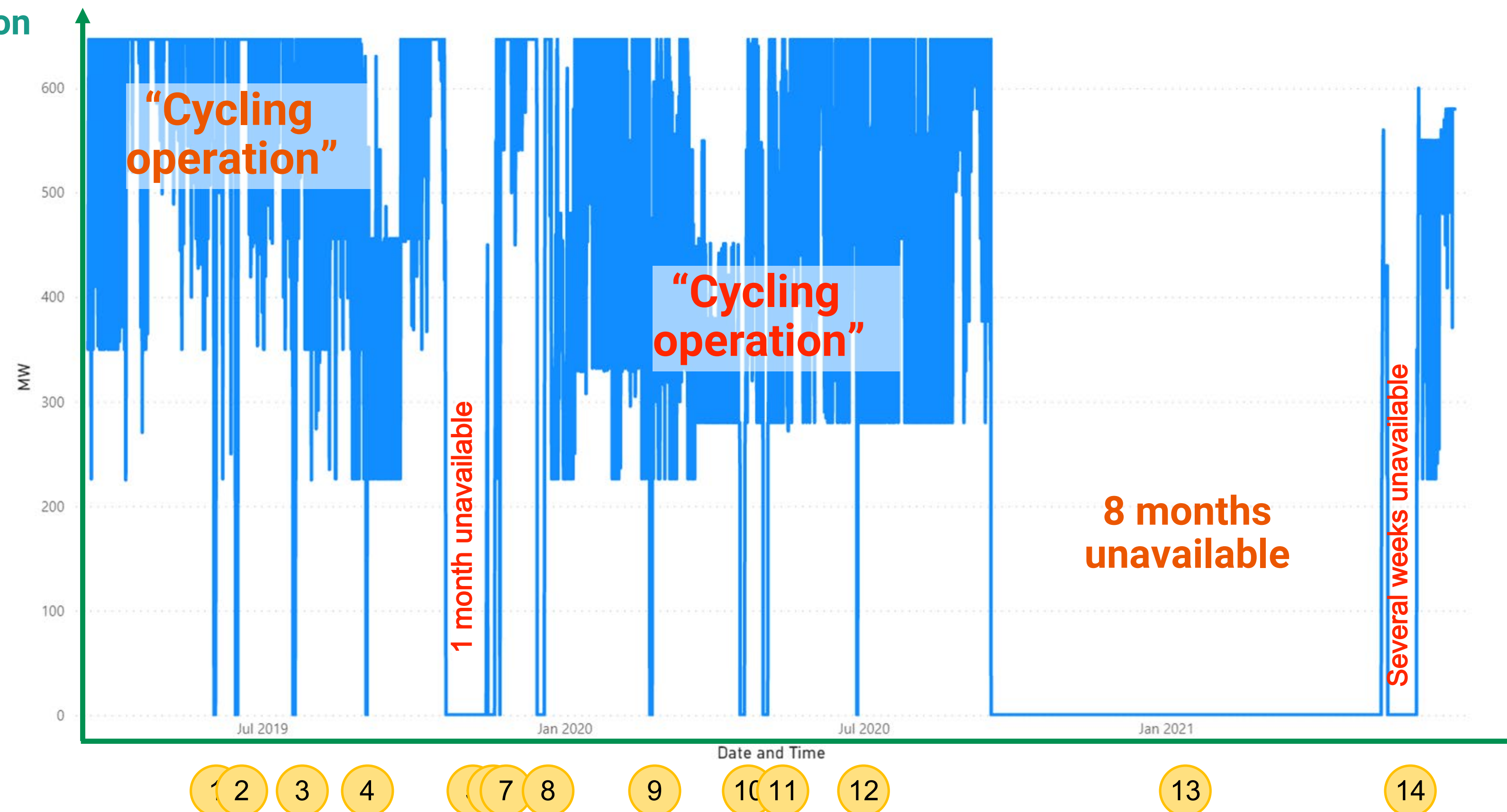
Energy affects all sectors

- Key attributes needed are reliability, cost and sustainability. During these pandemic times, these attributes are analogous to resilience, affordability and being carbon-free.
- There is empirical evidence that shows current coal power assets have low reliability and high cost. This provides both the **rationale** and **urgency** for the energy transition in the Philippines.
- International finance and insurance providers have started to impose sustainability requirements on their transactions.

SUAL Coal-fired 650 MW Power Plant Unit 2

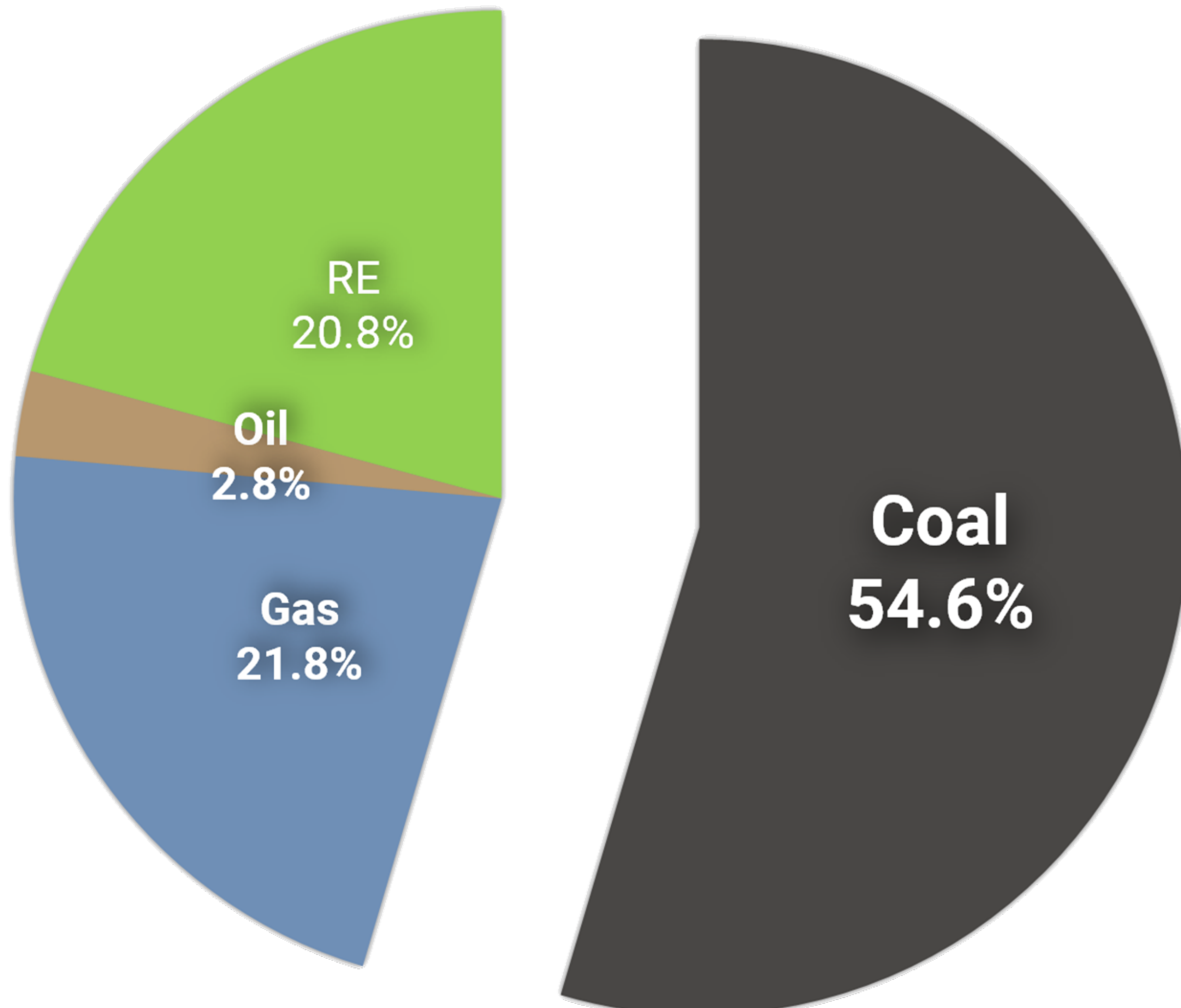
registered **14 outages** in March–June 2019

MW generation



Hourly WESM data from
March 2019–June 2021

Coal is not reliable but it is the dominant power supply source in the Philippine power grid

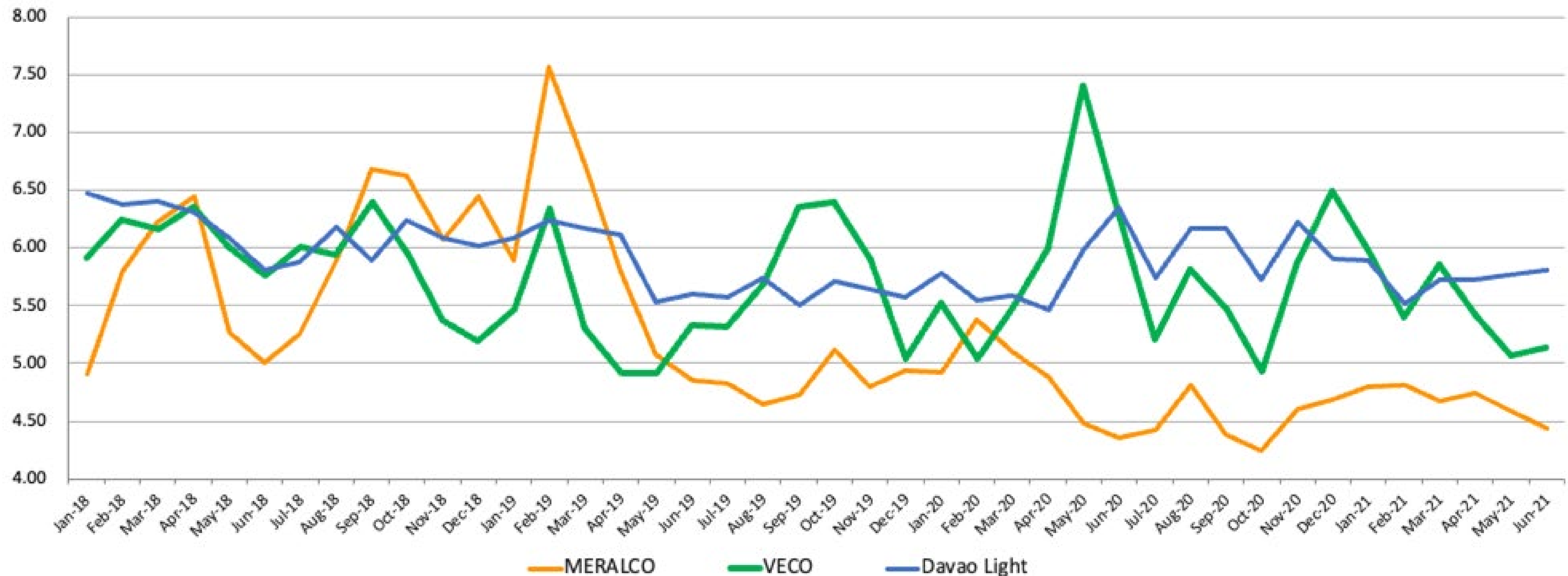


2019 Power Generation by Source:

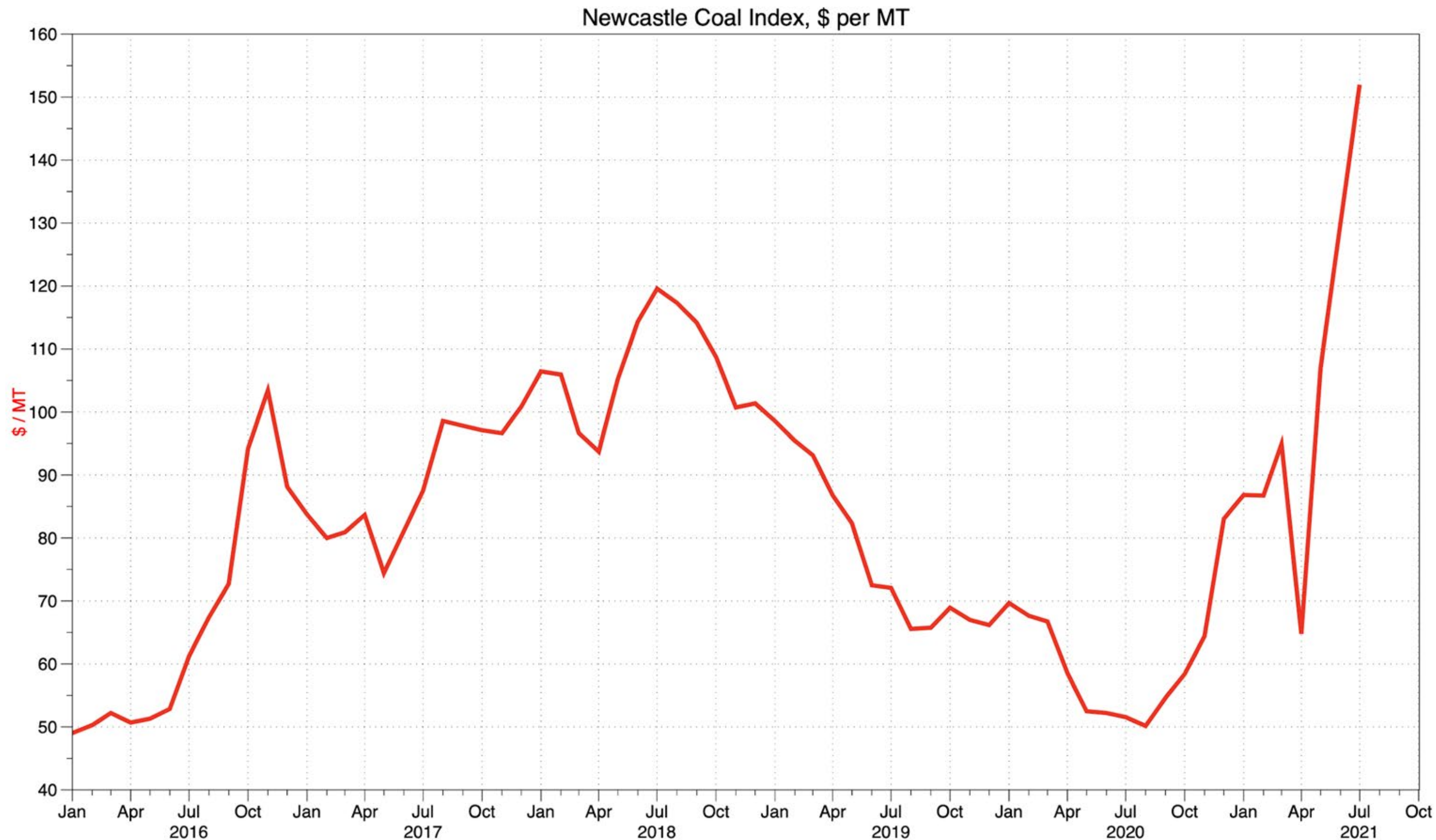
Coal is bigger than all others combined.

Coal power costs are very volatile ...

Cost of Coal Generation charged to captive customers, P / kWh
Note: 12% VAT will be added to these generation costs to make it comparable to renewable energy cost



... because fuel costs are very volatile.



**60% increase in
Coal Price Index
March-June 2021**



Key Points of the ETA Report

- ✓ The transformation and materialisation of energy transition risk in power generation depends on regulation and the extent of risk-sharing improvements in the Power Purchase Agreements.
- ✓ The speed of the energy transition in the Philippines will be driven by a combination of endogenous and exogenous factors.
- Merchant generators in the Philippines could face a “missing money problem” due to bilateral contracts.
- ✓ Proactive policymaking is needed to minimise stranded cost risk and ensure a least-cost power system.
- Greater bond disclosures can help protect retail investors from stranded asset risk.



The transformation and materialisation of energy transition risk in power generation depends on **regulation** and the extent of **risk-sharing improvements in the Power Purchase Agreements.**

Competitive Selection Process (CSP)

- There is a ***bias for baseload power supply*** as proven by the excess capacity in Luzon, Visayas and Mindanao
- There is a need to improve electric distribution utility capacity to do least-cost capacity expansion studies
- There is a need to recognize the benefits of an optimal mix with flexible generation, renewable energy supply and local energy resources.
- Unsolicited proposal option for RE

Power Purchase Agreements

- Automatic fuel price pass-through
- Automatic fuel consumption allowances over the life of the contract that increase costs
- Mandatory energy offtake even in disruptive events
- Poor selection of benchmark parameters in pricing formulas leading to higher future payments

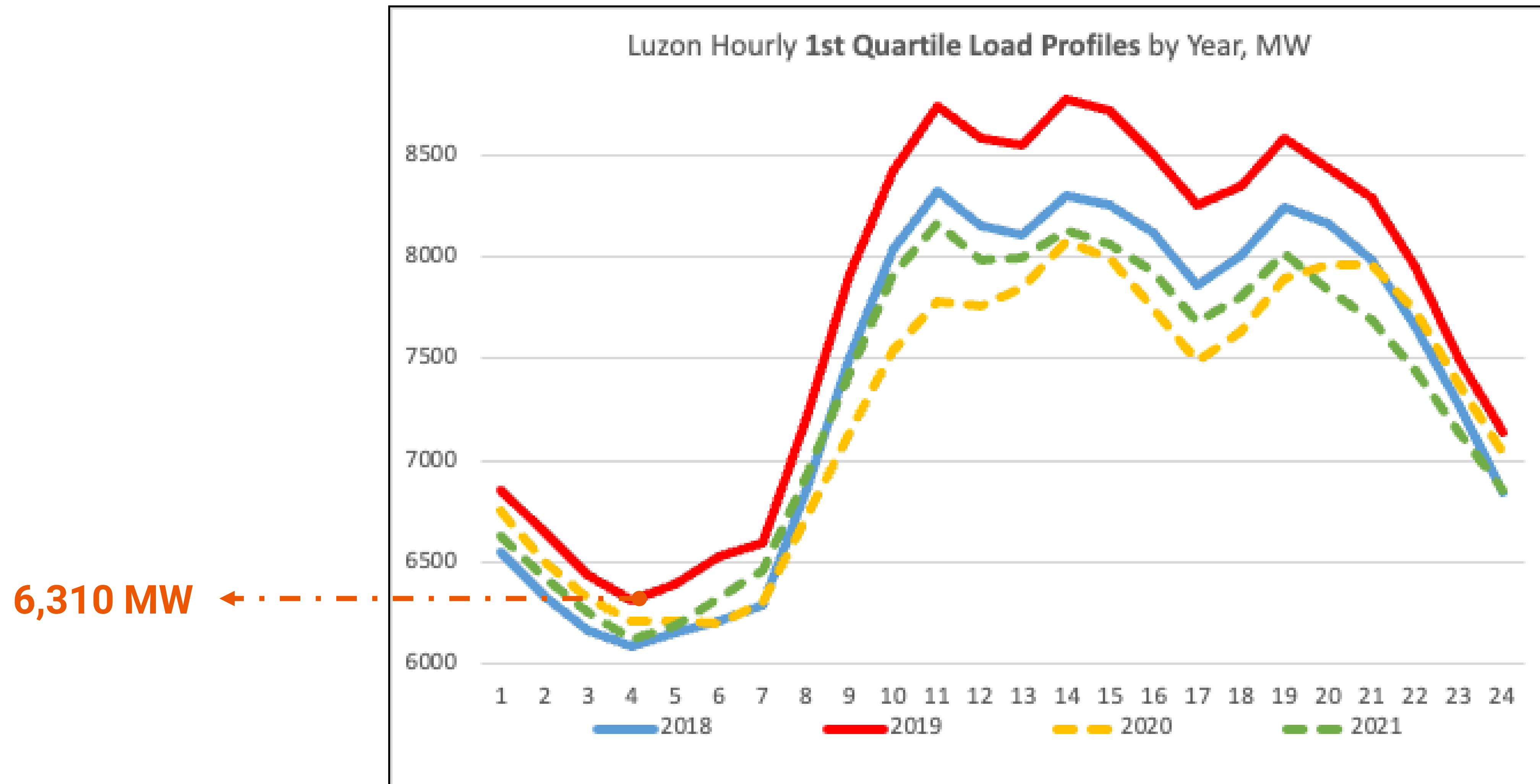


Determination of Required Baseload Capacity

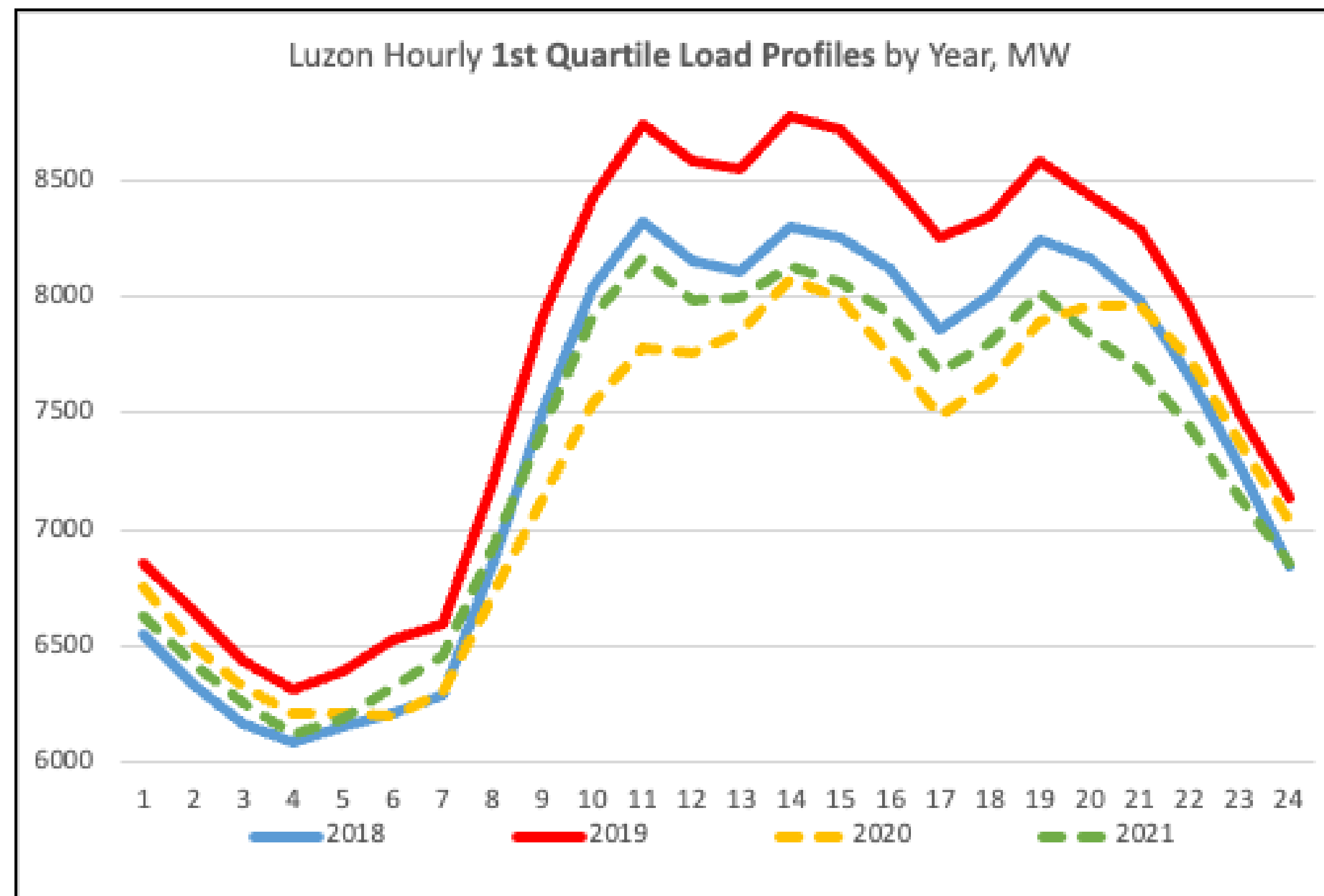
Baseload is not the same as 24-hour power delivery

- **Baseload power refers to the minimum capacity needed by the power grid at any given time.**
 - The daily load profile in the country shows a peak during noontime and another peak during the evening. Therefore there are baseload power plants like coal-fired power plants which provide the minimum capacity, and peaking power plants which meet the fluctuating needs.
- **Thus an examination of the hourly load curve is needed to determine the optimal baseload capacity requirement.**
 - In the next chart, one method used is the first quartile or hourly MW levels that represent the bottom 25% of the actual hourly loads.

Using 1st Quartile Hourly Loads based on NGCP data to estimate True Baseload level



While minimum load that determines baseload requirement is only 6,310 MW, the total baseload capacity of Luzon is 10,813 MW



CAPACITY MIX, MW
Installed and Dependable Capacity

FUEL TYPE	LUZON			
	Capacity (MW)		Percent Share (%)	
	Installed	Dependable	Installed	Dependable
Coal	7,280	6,855	42.0	43.8
Oil Based	2,200	1,436	12.7	9.2
<i>Diesel</i>	802	668	4.6	4.3
<i>Oil Thermal</i>	650	150	3.7	1.0
<i>Gas Turbine</i>	748	618	4.3	4.0
Natural Gas	3,452	3,286	19.9	21.0
Renewable Energy	4,412	4,068	25.4	26.0
<i>Geothermal</i>	865	769	5.0	4.9
<i>Hydro</i>	2,564	2,470	14.8	15.8
<i>Biomass</i>	195	131	1.1	0.8
<i>Solar</i>	453	362	2.6	2.3
<i>Wind</i>	337	337	1.9	2.2
TOTAL	17,344	15,645	100.0	100.0
BESS	10	10		

Data from NGCP

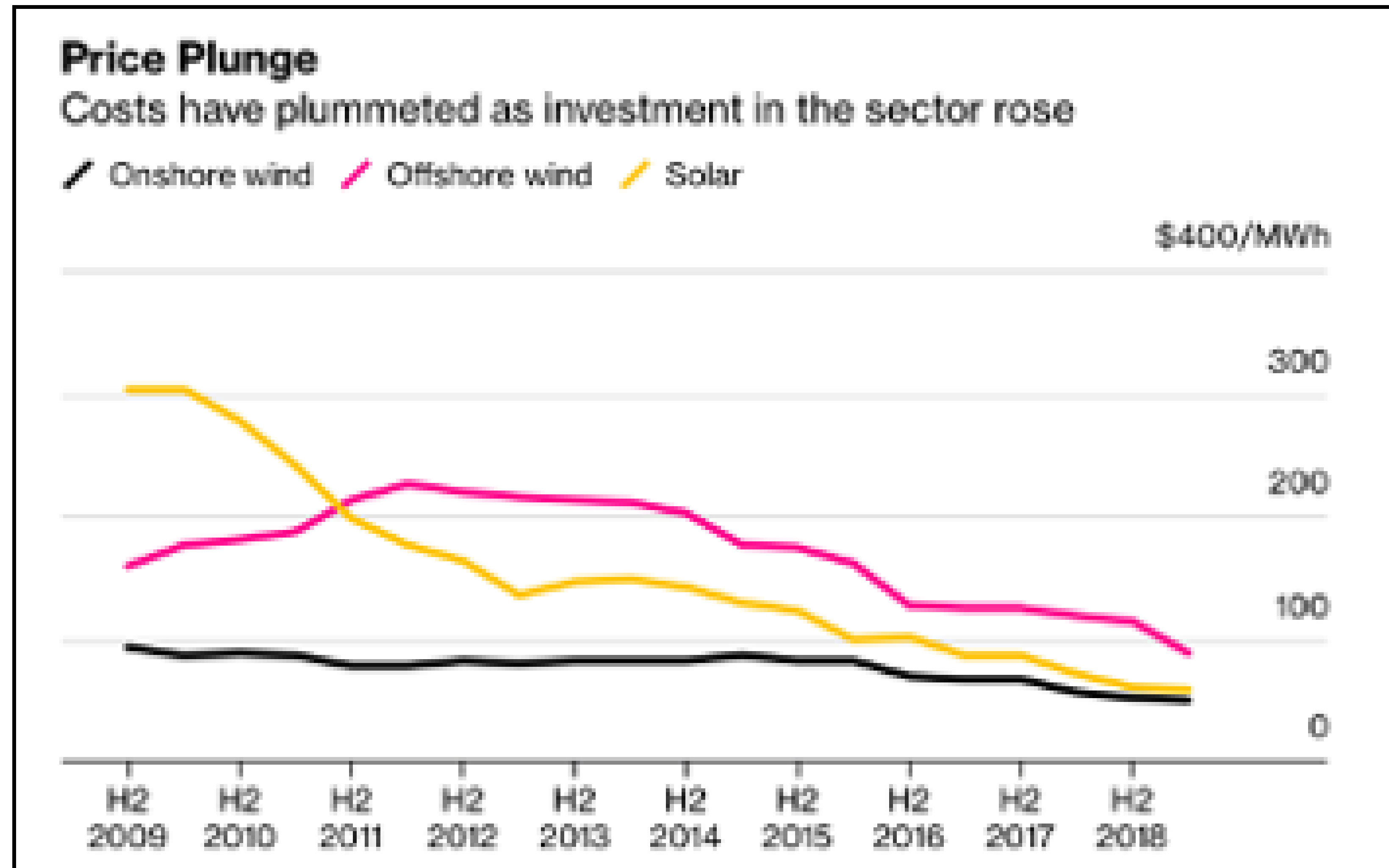
<https://ngcp.ph/Content/uploads/document/operations/Hourly%20Demand%20per%20Grid.xlsx>



The speed of the energy transition in the Philippines will be driven by a combination of endogenous and exogenous factors

1. The rate of technology innovation in power generation technologies.
2. Divestment, restrictions, and cost of capital from capital market and financial regulatory policies.
3. Carbon pricing and air pollution policies.
4. A shift in foreign restrictions to ownership.
5. Grid absorption capability and management.
6. Institutional inertia
7. Availability of viable land due to land scarcity and convertibility issues
8. Volatility and trends in coal and gas prices
9. Regulatory incentive improvements
10. Retail competition's interaction with low-cost renewable energy

The rate of technology innovation in power generation technologies continues



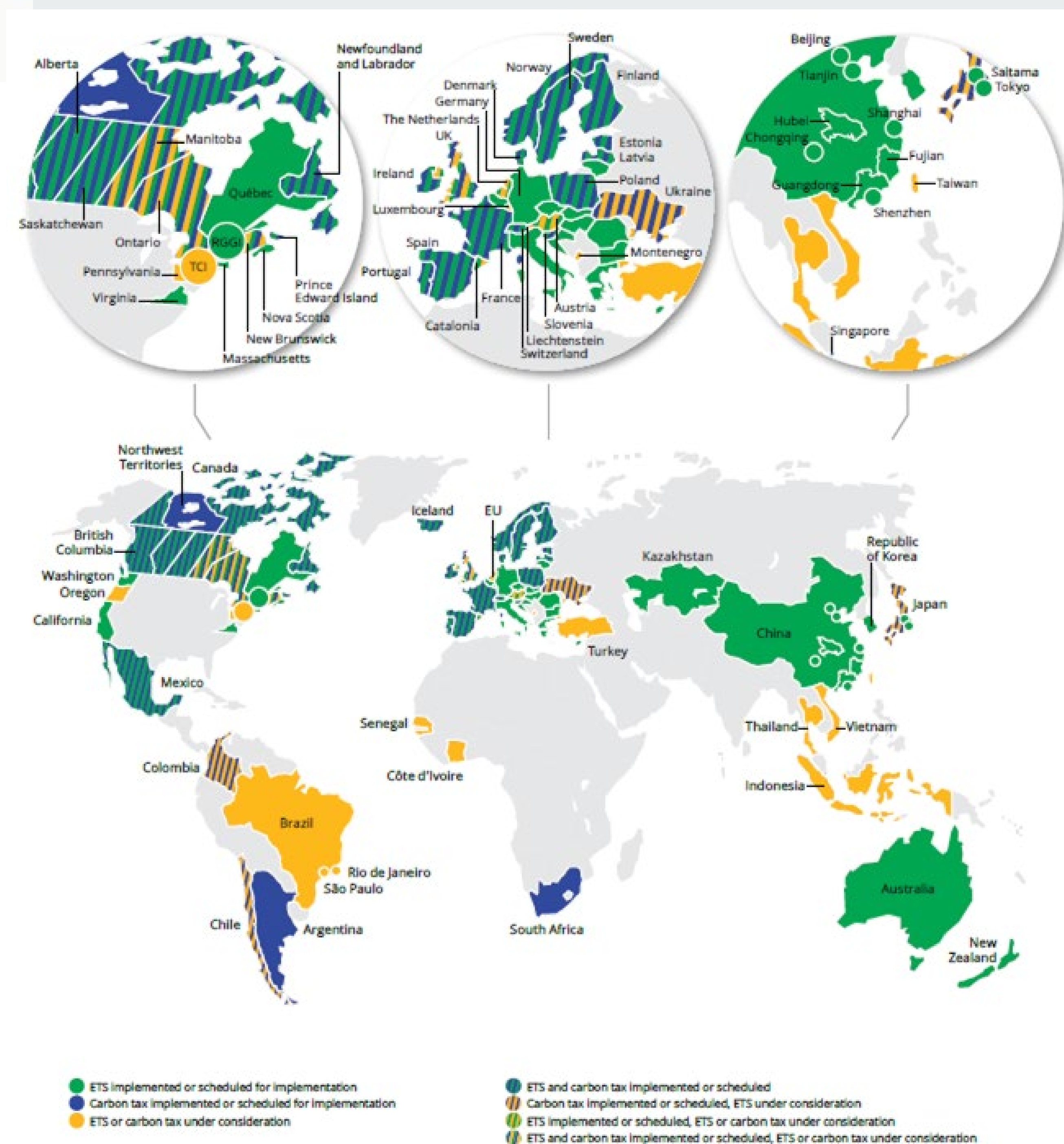


Divestment, restrictions, and cost of capital from capital market and financial regulatory policies

YEAR	POLICY ANNOUNCEMENT
2016	NBIM divested from Aboitiz Power to reduce exposure to coal assets.
2018	AC Energy sold its stake in the 552 megawatt (MW) GNPowder Kauswagan's (GNPK) coal-fired power project to its partner, Power Partners Ltd., and more recently completed a partial sale of its 600MW AA Thermal coal-fired power plant to Aboitiz Power Corp.
	The Securities and Exchange Commission (SEC) issued the ASEAN green bonds standards.
2019	The SEC launched ESG reporting guidelines, which will be mandatory for publicly listed companies in 2020. The guidelines include four of the globally accepted frameworks for reporting sustainability and non-financial information.
	The Philippines issued USD 2.02 billion of green bonds, the third largest issuer in Southeast Asia after Singapore (US\$6.20 billion) and Indonesia (US\$2.88 billion).
April 2020	Ayala Corporation, through its subsidiary AC Energy, is driving the energy transition in the Philippines, with a divestment plan by 2025 and a full coal exit by 2030.
	The Monetary Board of the Central Bank of the Philippines (Bangko Sentral ng Pilipinas) approved the Sustainable Finance Framework to safeguard the financial system from the evolving material hazards of physical climate risk and transition risk including stranded assets.
June 2020	The largest conglomerates in the Philippines announced their sustainability commitments via a webcast, including the Aboitiz Group and San Miguel Corporation.

Carbon pricing & air pollution policies

World Bank reports that there are now **61 carbon pricing initiatives** in place or scheduled for implementation globally, consisting of 31 emissions trading systems and 30 carbon taxes



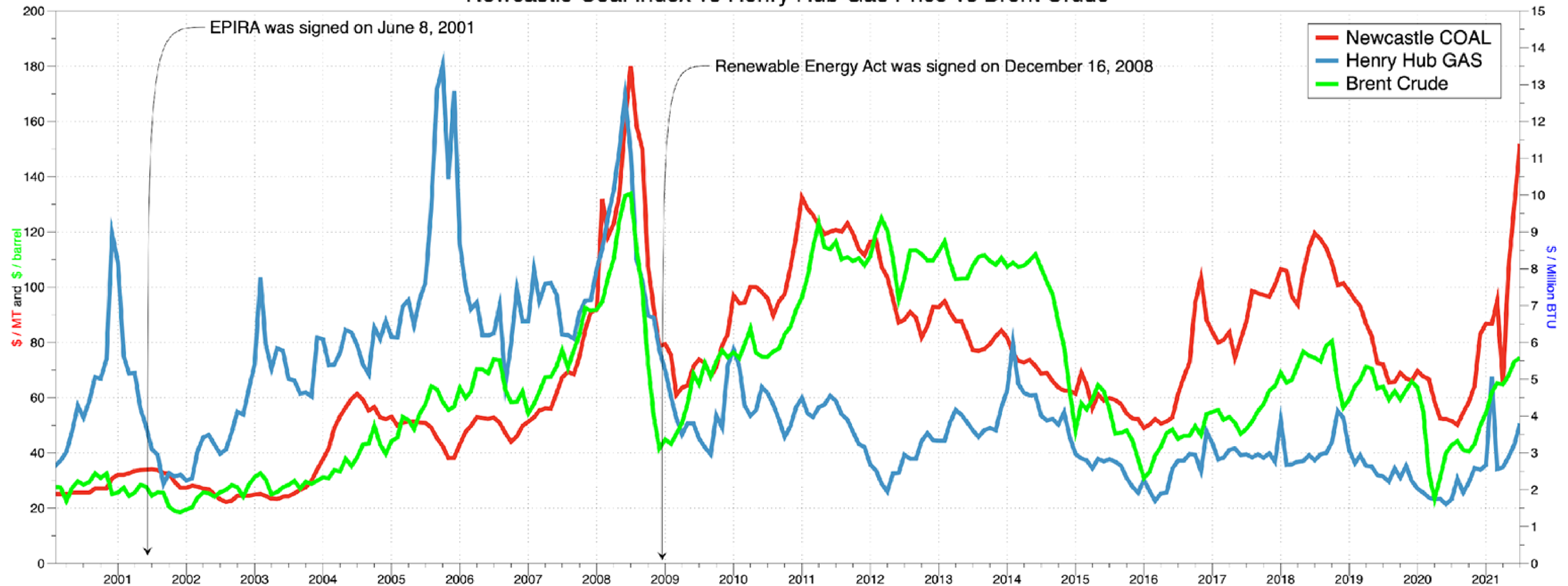


DOE & NGCP recent actions towards accelerating energy transition in the Philippines

- **A shift in foreign restrictions to ownership**
 - Geothermal and Biomass now open for 100 percent foreign ownership
 - DOE is seeking to extend the incentive to solar and wind
- **Grid absorption capability and management.**
 - Latest transmission development plan (TDP) sees the interconnection of Visayas to Mindanao and expansion of key island grid interconnections
 - Competitive Renewable Energy Zones and smart grid development and demonstration are now part of the TDP

Volatility and trends in coal and gas prices

Newcastle Coal Index vs Henry Hub Gas Price vs Brent Crude





Proactive policymaking is needed to minimise stranded cost risk and ensure a least-cost power system

1. Fast-track auctions to ensure new capacity decisions are cost-competitive and complementary to grid flexibility.
2. Enforce mandatory removal of cost pass-throughs to end-users.
3. Improve tariff setting to ensure least-cost and flexibility generation.
4. Build on the current moratorium by implementing a permanent moratorium on new inflexible power.
5. Increase clarity on who pays for stranded asset risk.



DOE has released the guidelines for the Green Energy Auction (GEA)

- The GEA will use the Feed-In Tariff mechanisms but without the ERC-approved tariffs per technology. The DOE will issue installation targets per region (Luzon, Visayas and Mindanao) and per technology
- It shall be a reverse auction and winning bidders shall be paid as bid.
- The first Auction Round Procedures (ARP) is expected to be released in lates August 2021 with an estimated installation target of 2,000 MW.
- The guidelines call for annual ARP not later than August.