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Philippines Power Sector Can Reach Resilience by 2021

COVID-19 Reveals Regulatory Weaknesses and the Need for Improved Incentives and Policies

Executive Summary

The COVID-19 pandemic has exposed serious weaknesses in the design of the Philippines' power market.

As an importer of fossil fuels, locking in long term guaranteed contracts with large scale fossil fuel facilities has *not* delivered a least cost system. Instead, it has led to inflexibility, price instability, and negative effects on the balance of trade. In 2019, coal imports represented 7% of the nation's yearly trade deficit.

The Philippines' hybrid power market structure has large private players that should, in theory, be more responsive to some market trends. Instead, COVID-19 has exposed the reality that:

- residential and commercial consumers in the largest grids remain highly exposed due to an over-reliance on inflexible baseload coal power;
- electric co-operatives with smaller systems lack the negotiating power and funding to adapt quickly and are highly exposed to inflexible capital and technology.

The biggest challenge for the market has been the need to identify more flexible dispatch strategies to address dramatic changes in demand over the past three months.

Of the three main island groups in the Philippines, Luzon experienced the largest load drops during the COVID-19 lockdown period. MERALCO, the largest utility company, experienced a peak demand drop[1] of almost 40% to 4,516 megawatts (MW) in March 2020 and a further drop to 4,289MW in April. The Department of Energy revealed recently that electricity demand fell by 30% in Luzon, 17% in the Visayas, and 25% in Mindanao.

Power tariffs in the Philippines now average between PHP 9 to PHP 10 per kWh (USD 0.18 to USD 0.20 per kWh) in the main grid—among the highest in Asia.

Now grid operators are looking for ways to adjust to the dramatic decline in power demand over the last three months, as well as answers for questions about the

[1] Bloomberg. Manila Electric Halves Spending as Lockdown Weakens Power Demand. April 27, 2020.

volume and type of power[2] that will be needed in the future.

The Philippines government now has an opportunity to re-visit design options for the market to benefit from new lower-cost technologies and to drive power costs down.

The market has been shaped by regulatory incentives focused almost exclusively on generation capacity rather than system-level resourcing. This has prioritized pricing strategies to mobilize capital for large volumes of baseload capacity resulting in inflexible capacity payments and dependence on baseload coal technology.

Green strategies now have the potential to reduce the Philippines' long-term power costs by ending dependence on imported fossil fuels.

This baseload focus, and a reliance on imported fuel, has translated into high tariffs for consumers that can only temporarily be tempered if *force majeure* provisions are invoked.

Decisions regarding new capacity should prioritize the system's lack of flexibility and the need for resilience over a single-minded focus on baseload generation.

Green strategies now have the potential to unlock new sources of donor-backed funding that could meaningfully reduce the Philippines' long-term power costs by ending its dependence on imported fossil fuels.

Timely support for transitioning the energy system to the cost-effective technologies that are currently reshaping global power markets would foster more reliable and competitive power.

If done correctly, the Philippines can come out of the COVID-19 crisis with a focus on recovery and enhanced economic competitiveness. This makes understanding the many cross currents that will shape the Philippines' response to the effects of COVID-19 even more important.

[2] Power types refer to inflexibility and flexibility. Flexibility can take many forms, including the ability to start up and shut down over short periods of time, be run at a low minimum load, rapidly change generation output, and offer ancillary services to support system reliability. Inflexibility runs contrary to this.

IEEFA recommends the following measures.

Stakeholder	Emergency March to May 2020	Recovery June to December 2020	Resilience 2021 Onwards
Department of Energy	Start to push for flexibility and modular systems/grid upgrades (e.g. renewable energy, energy efficiency and grid modernization) Fast-track and implementation of the Green Energy Tariff (auction for renewables)	Continue to push for flexibility and modular systems/grid upgrades (e.g. renewable energy, energy efficiency and grid modernization) Complete and launch Energy Virtual One-Stop Shop to digitize permitting process Moratorium on new inflexible power Fast-track and implementation of the Green Energy Tariff (auction for renewables)	Continue to push for flexibility and modular systems/grid upgrades (e.g. renewable energy, energy efficiency and grid modernization) After technical and economic audit. mandatory closure for inflexible plants that are 25 years old (no damage to credit profile; if not economic viable) Fast-track and implementation of the Green Energy Tariff (auction for renewables)
Energy Regulatory Commission	Competition to include standard *force majeure* provision to ensure risk sharing		
	Remove pass-through costs to end-users and mandatory carve-out (curtailment) for inflexible plants		
	Tariff-Setting Improvements (including running HOMER software to ensure proper power supply planning and power system design optimization)		
	Force majeure Provisions to share the risk between generator, utility, and end-user		
MERALCO	Digitize meter readings and other system management	Change Atimonan Coal plant to a battery storage system	Procure flexible, modular systems (e.g. renewable energy and storage)
Electric Co-operatives	Digitization of system management, meters, and collections	Procure flexible, modular systems/grid upgrades (e.g. renewable energy, energy efficiency, storage, and grid modernization)	Displacement model for fossil fuel (e.g. diesel)
Banks or Government	Offer short-term liquidity facilities for MSME such as ECs and small-scale renewable energy developers	Offer financing for modular renewable energy, energy efficiency and grid upgrades	

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Introduction

The COVID-19 pandemic has significantly accelerated trends that were slowly reshaping Philippine business and society. The resultant economic shocks are exposing weaknesses in the country's power market design, while also revealing an apparent willingness among power sector stakeholders in the Luzon-Visayas grid to share the risk and future opportunities.

The crisis will have a direct impact on how all power sector participants—power system planners, operators, investors and consumers—make the transition from stop-gap responses to new market strategies. Regardless of the precise shape and timing of the recovery, decisions regarding new capacity should now prioritize system flexibility and resilience over a single-minded focus on baseload generation.

The reason for this lack of flexibility is that energy planners historically assumed that large scale fossil fuel facilities, funded by long-term guaranteed contracts, would lead to a least-cost system. Unfortunately, this lock-in for countries such as the Philippines that import fossil fuels, has not delivered a least-cost system. Instead, it has led to inflexibility, price instability, and negative effects on the balance of trade. In 2019, coal imports represented 7% of the nation's yearly trade deficit.

New capacity should now prioritize system flexibility and resilience over a single-minded focus on baseload generation.

Power system planners, operators and investors will have to re-calibrate their assumptions regarding technology, finance, and economic outcomes for consumers and industry.

Green strategies now have the potential to unlock new sources of donor-backed funding that could meaningfully reduce the Philippines' long-term power costs by ending its dependence on imported fossil fuels.

Challenges Due to Dropping Power Demand

The biggest challenge for the market over the past three months has been the need to identify more flexible dispatch strategies to address dramatic changes in demand.

Of the three main island groups in the Philippines, Luzon has experienced the largest load drops during the COVID-19 lockdown period. MERALCO, the largest utility company in Luzon, experienced a peak demand drop[3] of almost 40% during the lockdown to 4,516 megawatts (MW) in March 2020 and a further drop to

[3] Bloomberg. Manila Electric Halves Spending as Lockdown Weakens Power Demand. April 27, 2020.

4,289MW in April. The Department of Energy's (DOE) peak demand forecast[4] for the Luzon grid where MERALCO operates was 12,285MW for May 2020. Because of the pandemic, peak demand is likely to be more than 60% lower than initial expectations. The DOE revealed recently that electricity demand fell by 30% in Luzon, 17% in the Visayas, and 25% in Mindanao.

The massive drop in demand in the Luzon and Mindanao grids reflects the dramatic impact of lockdowns on industry and trade which account for 86% of power demand. By contrast, in areas served by electric co-operatives, demand has largely been stable as the users are predominantly households. However, collection efficiencies in electric co-operatives have fallen from more than 90% to between 30% and 40%.

Not surprisingly, large companies in the main grids have been under pressure to ease the burden on consumers. During a meeting of the Committee on Energy in the House of Representatives on 13 May 2020, it was disclosed that the Power Sector Assets & Liabilities Management Corp (PSALM), a stranded asset vehicle that uses public funds to pay bondholders for uneconomic assets that were commissioned by the National Power Corporation (Napocor) in the 1990s, will defer collections of PHP1.254 billion from end-users for March 2020 and PHP 3.566 billion for April 2020.

Other discussions in the Committee on Energy also touched on consumer groups' concerns about high meter readings and electricity instability, despite the large surplus in supply. Although MERALCO has responded by saying that the recent electricity instability is largely attributable to the spike in residential power consumption due to rising temperatures, research suggests that energy system instability may instead be due to an over-reliance on intractable inflexible[5] fossil fuel plants that are not flexible or adaptable enough to meet consumers' needs.

The Luzon grid is over-reliant on large facilities that are subject to forced or unplanned outages, especially when demand conditions are volatile.

Earlier this month, Luzon was hit by a yellow alert, signaling that power supply is limited. While it is easy to jump to the conclusion that more baseload power is needed; the high concentration of large baseload plants is part of the problem. The Luzon grid is over-reliant on large facilities that are subject to forced or unplanned outages for a variety of reasons which causes a lack of reserve especially when

[4] National Grid Corporation of the Philippines. NGCP urges government to address impending power shortage in 2020. February 20, 2020.

[5] Coal plants are unable to operate below a minimum stable value due to their inherent inflexibility.

demand conditions are volatile.

In this instance, some market participants have been quick to claim that Luzon's system problems can only be solved with more large baseload plants to prevent outages. These claims highlight the way that the fundamentals of system design can be misunderstood, creating the impression that it is a lack of capacity rather than a system problem.

A second pressure point for Luzon's grid operator emerged in mid-May 2020, when MERALCO faced complaints because consumers were billed for more than double their usual monthly consumption. These complaints reached the Energy Regulatory Commission, which ordered MERALCO to explain the huge spike in electricity charges. MERALCO attempted to address these concerns during the most recent Joint Congressional Energy Commission, saying that it was due to its inability to read the physical meter during lockdown so the most recent bill includes consumption for the month and a reconciliation of power used based on an actual reading of the meter.

Now grid operators are looking for ways to adjust to the dramatic decline in demand conditions as well as questions about the volume and type of power[6] that will be needed in the future. So far, MERALCO has sought to reduce its financial exposure to falling demand decline by seeking to invoke *force majeure* clauses in contracts with seven independent power producers (IPPs) owned by the three major conglomerates in the power sector, Ayala, San Miguel, and Aboitiz Power Company. According to the Senate Energy Committee, without *force majeure*, the per kilowatt hour (kWh) rates in Luzon would have increased by 15% and 5% in the Visayas. MERALCO confirms that *force majeure* relief saved its customers PHP1.02 billion (USD20.4 million) in total, PHP 129 million (USD2.58 million) in fixed costs for April and PHP 877 million (USD17.54 million) in fixed costs over May.

In the meantime, electric co-operatives, which serve consumers on small island and isolated grids, are also looking for ways to manage pressing fixed costs. Some 59 co-operatives would like to invoke *force majeure* clauses due to COVID-19 impact that have resulted in higher per kWh costs due to increased fixed charges from the drop in demand. In contrast to MERALCO, however, only two of the 59 have been able to negotiate with their power suppliers so far. Although its user base is financially vulnerable, quick relief may be hard to realize. During the Congressional sessions, the Electricity Regulatory Commission, the ultimate approval authority on *force majeure* clauses, indicated it was unable to give a blanket advisory because the implementation of quarantine was different for each area.

The focus on burden sharing doubtless comes as a shock to those market participants focused solely of pushing ahead with significant additions of new IPP capacity. Prior to the coronavirus pandemic, the National Grid Corporation of the

[6] Power types refer to inflexibility and flexibility. Flexibility can take many forms, including the ability to start up and shut down over short periods of time, be run at a low minimum load, rapidly change generation output, and offer ancillary services to support system reliability. Inflexibility runs contrary to this.

Philippines[7] (NGCP) had been prioritizing increases in capacity, calling for an immediate increase in power supply to address the shortages in the Luzon grid expected in 2020. Specifically, NGCP had targeted power capacity addition to meet a 4% increase in peak demand, equivalent to 491MW in regulating power to stabilize the grid, while also needing power equivalent to the largest plant online (647MW) as contingency power to support the grid in case of an emergency power plant shutdown.

The focus on burden sharing doubtless comes as a shock to those market participants focused solely of pushing ahead with significant additions of new IPP capacity.

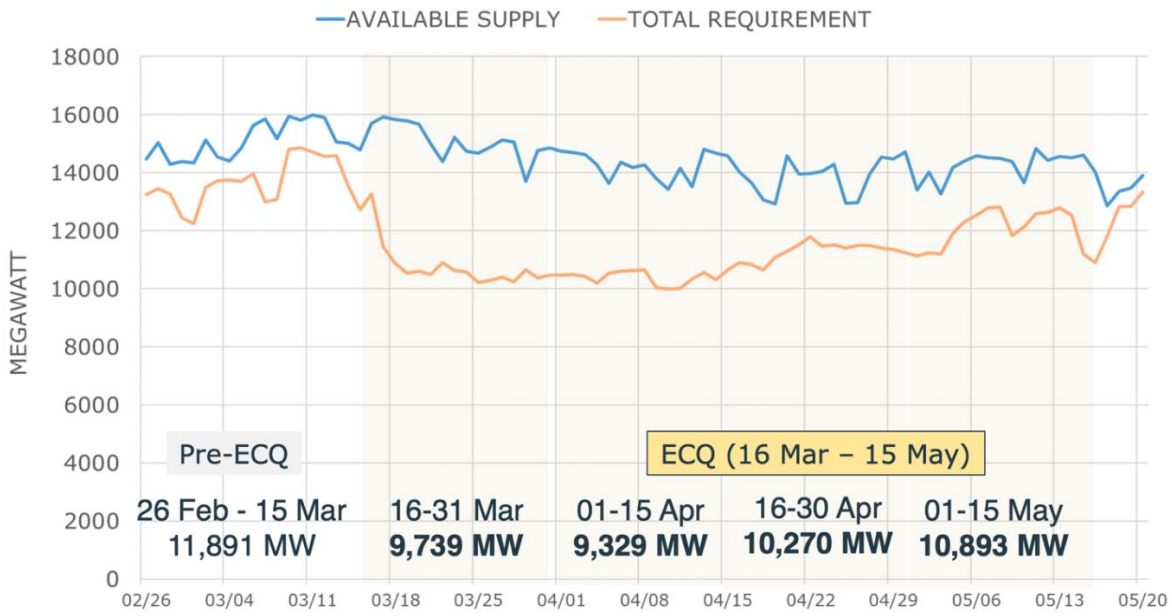
MERALCO has not entirely reversed course but instead has delayed future installation for a year, unwinding its capacity expansion plans by canceling its planned procurement of 1200 MW[8] greenfield baseload capacity to be achieved by 2024. MERALCO plans to conduct a new procurement process for 1800 MW of baseload capacity later, for completion by 2024 or 2025. As emerging markets such as the Philippines navigate re-opening, it is likely two years of demand growth has been lost and will affect forecasts for new capacity additions across the region. Refer to Figure 1 for an overview of available supply versus total requirement.

According to the Independent Electricity Market Operator of the Philippines (IEMOP), the system requirement dropped by an average of 1800MW with demand only increasing slightly from April 16. This fall will affect large plants in the pipeline, including MERALCO's generation businesses.

[7] State Grid of China Corporation (SGCC) acquired a 25-year concession over a 40% stake in the NGCP for US$3.95bn in an effective privatization. The 60% stake is Filipino owned, split evenly between the Calaca High Power Corp. and Monte Oro Grid Resources Corp.

[8] Manila Standard. Meralco cancels plan to auction 1,200 MW. April 28, 2020.

Figure 1: Supply and System Requirements (Demand and Reserve Levels) from Feb 26, 2020 to May 20, 2020



Source: Independent Electricity Market Operator of the Philippines (IEMOP), Market Operations Presentation, Joint Congressional Energy Commission, May 22, 2020.

In the meantime, systems planners are facing a new and complicated challenge from the system's lack of flexibility. The market has been shaped by regulatory incentives focused almost exclusively on generation capacity rather than system-level resourcing. This has prioritized the need for pricing strategies to mobilize capital for large volumes of baseload capacity resulting in inflexible capacity payments and dependence on baseload coal technology. This baseload focus, and a reliance on imported fuel, has translated into high tariffs for consumers that can only temporarily be tempered if *force majeure* provisions are invoked.

Baseload focus, and a reliance on imported fuel, has translated into high tariffs for consumers that can only temporarily be tempered if *force majeure* is invoked.

This doubling down on imported fossil fuels comes at a time when there is much more cost-effective modular renewable energy technology available. Consistent deflation in the cost of renewables include solar and battery storage has seen costs

drop 80 to 90 percent over the last decade. IEEFA expects both to halve in the coming decade.[9]

The Philippines is not alone with struggling to re-calibrate assumptions about system design and to understand what this will mean for the economics of new capacity additions. An example of this is playing out in Indonesia and Bangladesh, where state-owned utility companies, PT Perusahaan Listrik Negara (PLN)[10] and Bangladesh Power Development Board (BPDB)[11] are locked into inflexible capacity payments through power purchase agreements (PPAs).

By 2021, Indonesia's PLN may have to increase its capacity payments to IPPs along with increased fuel costs to an unsustainable USD7.2 billion. In 2018-2019, the overall power capacity utilization in Bangladesh was 43% leading to USD1.1 billion in capacity payments for unused power. Before COVID-19, Bangladesh was anticipating another increase in the subsidy to USD1.1 billion. However, with the pandemic depressing demand, the subsidy for capacity payments will be much larger.

While the Philippines' hybrid power market structure, with large private players, can be more responsive to some market trends, residential and commercial consumers remain highly exposed to problems stemming from poor power system governance. With power tariffs averaging PHP9 to php10 per kWh (USD0.18 to USD 0.20 per kWh)—among the highest in Asia—the Philippines government must focus on new technology and system options to enhance economic competitiveness by driving down power costs. This necessity increases the importance of properly understanding the many crosscurrents that will shape the Philippine market response to the fall-out from COVID-19.

COVID-19 Impacts

The short-term damage of COVID-19 is clearly severe, and the Philippines remains vulnerable to ongoing growth challenges.

In March this year, the Philippines posted one of the largest drops in manufacturing relative to the rest of Southeast Asia.[12] In Luzon, the employment circumstances of 11 million people have been affected,[13] including 4 million in the capital.

The Philippines government must focus on new technology and system options to enhance economic competitiveness by driving down power costs.

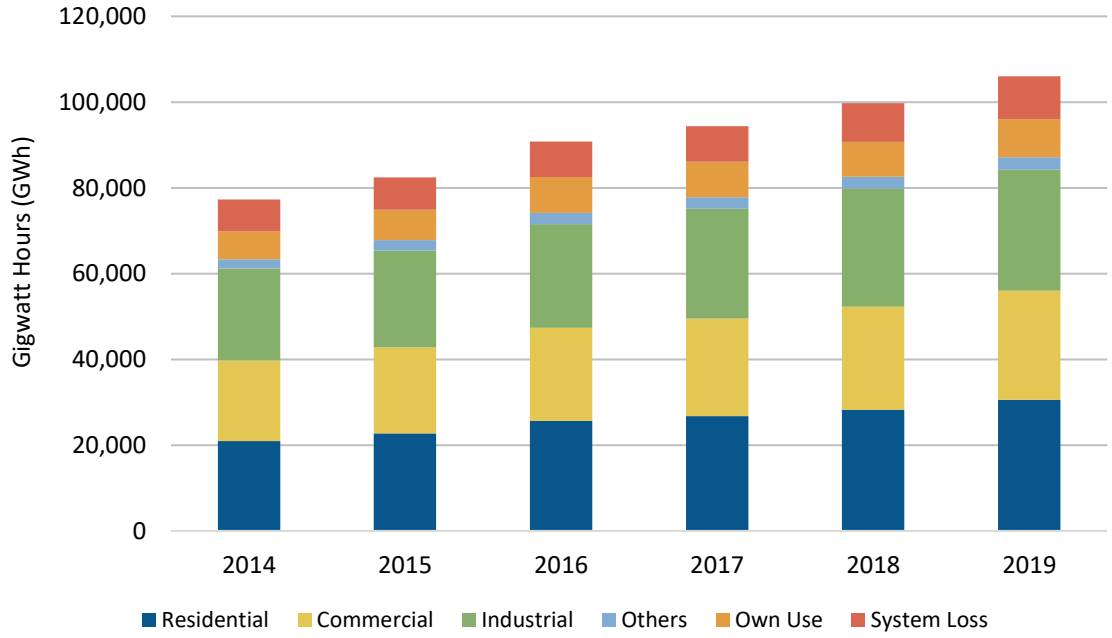
[9] IEEFA, The renewable energy transition is coming to Asia. May 13, 2020.
[10] IEEFA. PLN in Crisis—Time for Independent Power Producers to Share the Pain? April 2020.
[11] IEEFA. Bangladesh Power Review: Overcapacity, Capacity Payments, Subsidies and Tariffs Are Set to Rise Even Faster. May 2020.
[12] Philippine News Agency. PH, Singapore post largest manufacturing drop in ASEAN in March. April 1.2020.
[13] Manila Standard. PH economy to survive COVID-19. April 5, 2020.

According to the Inter-Agency Task Force (IATF) for Infectious Diseases, the government can tolerate a budget deficit of 7% of GDP. The biggest structural issue will be the influx of between 230,000 and 240,000 overseas Filipino workers (OFWs) coming back to the country, weakening remittances and increasing demand for domestic jobs. Remittances are the major or only source of disposable income for many families, fueling consumer spending, which accounts for more than 60%[14] of the country's GDP. The central bank of the Philippines, Bangko Sentral ng Pilipinas (BSP), forecasts -1% to 0% growth[15] in 2020. According to Bloomberg New Energy Finance's snapshot for weeks 11 to 16 of the year, the impact of COVID-19 on power demand has been severe, with demand continuing to fall below historic levels.

National Energy Sales

National sales comprised of residential, commercial, and industrial energy showed consistent growth between the three, keeping the composition of total energy sales the same. In 2019, residential sales accounted for 35% of total sales, commercial accounted for 29% and industrial for 32%, but there are important regional differences that affect grid and market performance. (Refer to Figure 2 for data on national energy sales.)

Figure 2: National Energy Sales and Energy Consumption



Source: DOE 2019 Power Statistics.[16]
Note: Total Energy Sales = Residential + Commercial + Industrial + Others.
Total Energy Consumption = Total Energy Sales + Own Use + System Loss.

[14] Manila Standard. PH economy to survive COVID-19. April 5, 2020.
[15] Philippine News Agency. BSP eyes zero to -1% growth for PH this '20. April 21, 2020.
[16] Philippines Government, Department of Energy. Department of Energy: 2019 Power Statistics. Revised May 8, 2020.

Before COVID-19, average year-on-year growth in power sales from 2015 to 2019 was 6.6% with an average GDP growth of 6.4%. This gives a power sales elasticity of 1.0, showing that power demand growth is identical to national economic growth. (Refer to Table 1 for economic and energy baselines.)

Table 1: Economic and Energy Baselines

	2015	2016	2017	2018	2019	Average
Power Sales (GWh)	67,808	74,153	77,793	82,617	87,118	
YOY % Change		9.4%	4.9%	6.2%	5.8%	6.6%
GDP Growth	6.1%	6.9%	6.7%	6.2%	5.9%	6.4%
Power Sales Elasticity (x)		1.4	0.7	1.0	1.0	1.0

Source: DOE 2018 Power Statistics;[17] *Bangko Sentral ng Pilipinas Statistics;*[18] *Asian Development Outlook 2020.*[19]

The Asian Development Bank's (ADB) original GDP growth forecast for the Philippines before the COVID-19 pandemic was 6.2%. The ADB's revised forecast for the Philippines is 2% with a rebound of 6.5%; this serves as the baseline and a neutral forecast.

The following IEEFA estimates are based on revised BSP and ADB forecasts including upside and downside scenarios. Specifically, (1) downside scenario of 0% GDP growth in 2020, in line with the BSP's 2020 expectation, and a 50% cut in ADB's 2021 GDP growth forecast to 3.3%; and (2) an upside scenario using ADB's 2020 revised GDP growth forecast of 2% and an optimistic 2021 rebound from a 20 % increase in ADB's 2021 GDP growth forecast to 7.8%. Table 2 summarizes these scenarios.

Table 2: 2020 GDP Forecasts

Forecast Type	Original ADB Forecast	Revised ADB Forecasts		Averages
	2020E	2020E	2021E	2020-2021
Baseline	6.2%	2%	6.5%	4.3%
Downside		0%	3.3%	1.6%
Upside		2%	7.8%	4.9%

Source: Asian Development Outlook 2020[20] *(Downside and 2021 rebound forecasts are IEEFA estimates).*

[17] Philippines Government, Department of Energy: 2018 Power Statistics. Revised March 29, 2019.
[18] BSP. Gross National Income (GNI) and Gross Domestic Product (GDP) by Industrial Origin.
[19] Asian Development Bank. Asian Development Outlook 2020: What Drives Innovation in Asia? Special Topic: The Impact of the Coronavirus Outbreak—An Update. April 2020.
[20] Asian Development Bank. Asian Development Outlook 2020: What Drives Innovation in Asia? Special Topic: The Impact of the Coronavirus Outbreak—An Update. April 2020.

Table 3 illustrates the effects of GDP scenarios on power sector sales.

Table 3: Forecast Effects to Power Sector Sales

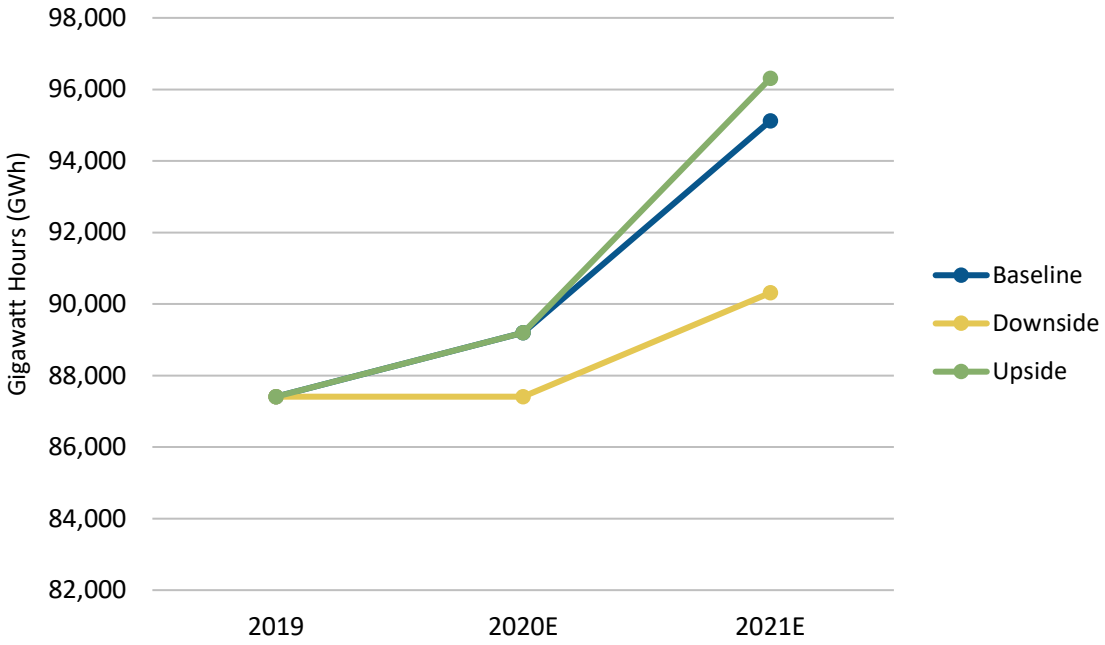
Forecast Type	Power Sector Sales (GWh)		Year-on-Year Change	
	2020E	2021E	2020E	2021E
Baseline	89,196	95,121	2.0%	6.6%
Downside	87,409	90,312	0.0%	3.3%
Upside	89,196	96,307	2.0%	8.0%

Source: Asian Development Outlook 2020. (Downside and 2021 rebound forecasts are IEEFA estimates).

The difference in national energy sales between the upside and downside scenario is 1,787 GWh in 2020 and 6,307 GWh in 2021. At a generation price of PHP 5 per kilowatt hour (kWh), this is equivalent to PHP 8.935 billion (USD 178.7 million) in 2020 and PHP 31.535 billion (USD 630 million) in 2021. Assuming a capacity factor of 63%,[21] the capacity equivalent is 323.80MW in 2020 and 1,142.82MW in 2021. The difference between the two scenarios reflects MERALCO's decision to cancel the 1200MW baseload procurement for this year. Given the wide gap between the two scenarios by 2021, as seen in Figure 3, and the costs associated with over-constructing generation plants, it would be better to build modular renewable energy systems to cope with incremental capacity needs and invest in energy efficiency to better manage demand.

[21] World Bank. Learning from Developing Country Power Market Experiences: The Case of the Philippines. January 2019.

Figure 3: National Energy Sales Scenarios in 2020 to 2021



Source: DOE 2018 Power Statistics;[22] Asian Development Outlook 2020.[23] (Downside and 2021 rebound forecasts are IEEFA estimates).

Grid Instability

Legacy market management decisions and rules have caused excessive reliance on imported coal and ongoing import obligations. Global market trends support renewable energy and flexible power systems, but the Philippines endures a continuing policy-market mismatch stemming from a lack of up-to-date policy guidance, underestimation of fossil fuel risk,[24] and losses from obsolete inflexible technology.

The Department of Energy (DOE) previously put forward a 25% reserve requirement[25] per regional grid. The Energy Regulatory Commission (ERC)[26] approved a reserve margin above peak of 23.4% for Luzon and Visayas, comprised of 2.8% load following and frequency regulation, 10.3% spinning reserve, 10.3% back-up. The reserve margin above peak demand is 21% for Mindanao, comprised of 2.8% load following and frequency regulation, 9.1% spinning reserve, 9.1% back-up.

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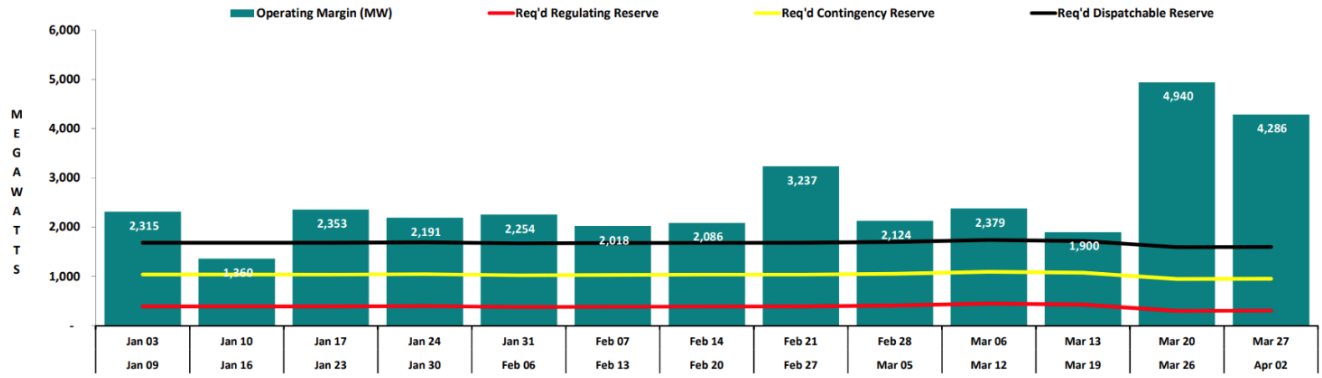
[22] Philippines Government, Department of Energy. Department of Energy 2018 Power Statistics. Revised March 29, 2019.
[23] Asian Development Bank. Asian Development Outlook 2020: What Drives Innovation in Asia? Special Topic: The Impact of the Coronavirus Outbreak—An Update. April 2020.
[24] Undisclosed risk will remain mismanaged.
[25] Business World. DoE targets 25% of reserve power buffer. December 8, 2017.
[26] Philippine Institute for Development Studies. Assessment of the Philippine Electric Power Industry. December 2018.

The National Grid Corporation of the Philippines said that before COVID-19, the average reserve was 18%. However, during the start of the COVID-19 lockdown, the Luzon grid had 4,940 MW in reserve from March 20 to 26 and then 4,286MW in reserve from March 27 to April 02, equivalent to 40% and 36% respectively. (Refer to Figure 4 for the reserve profile in the first quarter of 2020.)

Despite the large surplus in power supply from depressed demand, equivalent to a system load drop of 3000MW during the COVID-19 lockdown, consumer groups have complained to MERALCO about electricity instability.[27]

Figure 4: 2020 1st Quarter Reserve Profile (Actual Data as of April 30, 2020)

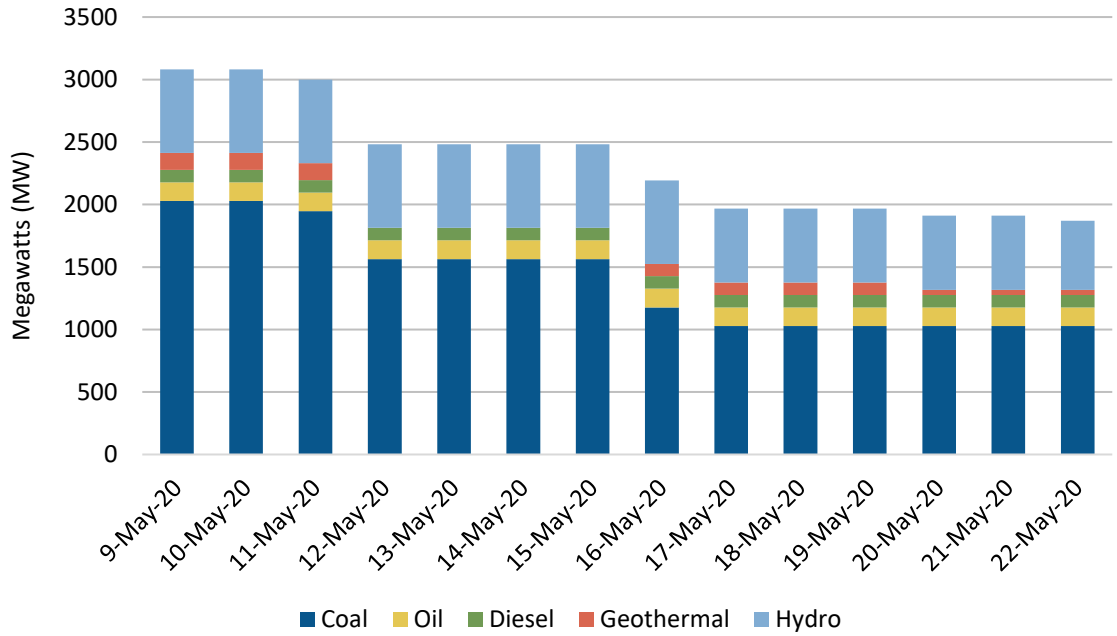


Source: NGCP, April 30, 2020.[28]

Figure 5 illustrates the daily unplanned outages from 9 May to 22 May 2020. Coal made up 60% of these outages. Coal plants are unable to operate below a minimum stable value due to their inherent inflexibility. As a result, they are forced to shut off.

[27] Inquirer.net. Amid high rates, interruptions, group asks: Is Meralco taking advantage of ECQ? May 11, 2020.
[28] National Grid Corporation of the Philippines. Luzon Grid: 2020 1st Quarter Reserve Profile (Actual Data as of Apr 30, 2020).

Figure 5: Forced Outages from 9 May 2020 to 22 May 2020

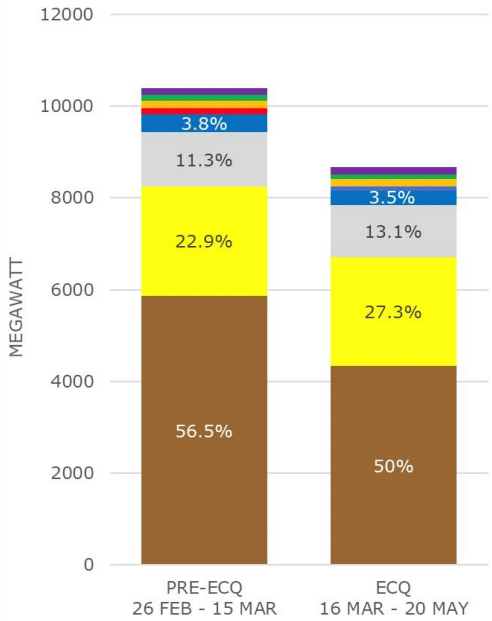


Source: NGCP Weekly Grid Operating Program Monitoring 9 May 2020 to 22 May 2020.[29]

At a meeting of the Committee on Energy[30] in the House of Representatives on 13 May 2020, the DOE announced it was studying a moratorium on inflexible plants. While the DOE no longer provides a supply mix, it previously targeted an energy mix[31] of 70% "baseload" capacity, 20% "mid-merit" capacity, and 10% "peaking" capacity. According to the DOE, the 80% of the country's baseload capacity is inflexible.[32] The regulatory design incentivizes baseload. A parallel point is mentioned in a World Bank report which notes a lack of investment in mid-merit and peaking power plants. Overall depressed demand means more use of mid-merit plants. Figure 6 illustrates the use of more flexible power and the drop in inflexible coal utilization from 70.3% to 52% during the economic lockdown.

[29] National Grid Corporation of the Philippines. Weekly Grid Operating Program (GOP) Monitoring. June 6, 2020.
[30] House of Representatives of the Philippines. Meeting of the Committee on Energy: Update on the actions taken since the start of ECQ: Energy Sectors' Planned Mitigating Measures and Plans for the "New Normal" Part 3. May 13, 2020.
[31] Economic Research Institute for ASEAN and East Asia. Philippines Country Report
[32] Manila Bulletin. DOE wants entry of non-flexible baseload plants moved to 2029. December 10, 2019.

Figure 6: Generation Mix Pre-Economic Lockdown vs. During Economic Lockdown



WESM Generation Mix (Actual Generation)						
Pre-ECQ			Fuel Type	ECQ		
Hourly MW Average	%Share of Total	% of Capacity Used		Hourly MW Average	%Share of Total	% of Capacity Used
5,870	56.5%	70.3%	Coal	4,338	50.0%	52.0%
2,379	22.9%	72.2%	Nat Gas	2,367	27.3%	71.9%
1,180	11.3%	67.4%	Geo	1,139	13.1%	65.1%
396	3.8%	15.7%	Hydro	306	3.5%	12.1%
130	1.2%	5.2%	Oil	101	1.2%	4.0%
164	1.6%	19.8%	Solar	160	1.8%	19.4%
122	1.2%	28.5%	Wind	101	1.2%	23.7%
154	1.5%	32.9%	Biomass	160	1.8%	34.2%
10,394				8,673		

Source: Independent Electricity Market Operator of the Philippines (IEMOP), Market Operations Presentation, Joint Congressional Energy Commission, May 22, 2020. Note: ECQ = Enhanced Community Quarantine.

In order to use coal during current demand conditions, coal plants would have mid-merit plant load factors, which is lower than baseload plant load factors, leading to an increased cost per kilowatt hour (kWh) for end-users, as stipulated in the Power Supply Agreements (PSAs). The PSA ensures capital recovery for coal plants which means that any reduction in utilization translates to higher cost per kWh.

Moreover, noting that forced outages are part of a reimbursable cost payment in standard coal PSAs, it is charged to end-users. The PSAs for inflexible power compound an error in market design that favors baseload over flexible generation. As such, it would be prudent for the DOE to study a medium-term moratorium on new inflexible power and a long-term mandatory closure of inflexible plants that are 25 years old and have already recovered capital costs. This would cause no harm to the credit profile while creating an opportunity for inflexible plants to invest in becoming flexible, assuming they remain cost-competitive with deflationary renewable energy and storage. Part of the assessment can include a technical and economic audit to determine whether the inflexible plant should be retrofitted (if cost-effective) or closed (expensive).

It is important to note that the wholesale spot market where non-bilaterally contracted energy, predominantly renewable energy, was able to offer price stability at the start of the economic lockdown from March 2020 at a price of PHP 2.47 (USD 0.049) per kWh in March 2020, PHP 1.50 (USD 0.03) per kWh in April 2020 and PHP 1.67 (USD 0.033) per kWh in May 2020. Considering low prices and

price stability, it would be an opportune time for the DOE to finalize and execute auctions for renewable energy through the Green Energy Tariff Program by 2020, along with the digitization of permitting through the Executive Oder [EO] No. 30, Energy Virtual One-Stop Shop Act.

Figure 7: Wholesale Spot Market Customer Transactions

	Feb 2020	Mar 2020	Apr 2020	May 2020*	*Mar 2019*	*Apr 2019*	*May 2019*
Metered Quantities (in GWh)	6,428	6,111	5,540	6,204	*5,987*	*6,990*	*7,183*
Bilateral Contracts (in GWh)	5,604	5,457	5,053	5,542	*5,434*	*6,218*	*6,494*
Spot Volume (in GWh)	824 (12.8%)	653 (10.7%)	486 (8.8%)	662 (10.7%)	*553 (9.2%)*	*772 (11.0%)*	*688 (9.6%)*
Price (in PhP/kWh)	3.45	2.47	1.50	1.67	*5.20*	*8.18*	*7.15*

Source: Independent Electricity Market Operator of the Philippines (IEMOP), Market Operations Presentation, Joint Congressional Energy Commission, May 22, 2020.

More recently, in early June, the Luzon grid was under yellow alert, which means power supply is limited. While jumping to the conclusion that there needs to be larger baseload power seems logical on the surface; it is the large baseload plants that perpetuate this lack of power supply. No less than 2,243 MW of coal capacity, 150 MW of oil and 115 MW of geothermal contributed to the yellow alert. See Table 4.[33]

[33] DOE Update, June 4, 2020.

Table 4: Yellow Alert- Forced Outage/Extended Planned Outage/Outside Management Control Outage

TECHNOLOGY Power Plant	Capacity	Cause	Date Out	Estimated Date In
COAL	*2,243*			
SMC Masinloc Power Partners Co. Ltd (MPPCL) Coal Unit 2	344	Ongoing assessment	4-June-2020	TBD
Team Energy Pagbilao Coal Unit 2	382	Boiler Tube Leak	4-June-2020	10-June-2020
Team Energy Pagbilao Coal Unit 1	382	Excitation Fault Alarm	3-June-2020	6-June-2020
SMC Consolidated Power Corporation (SMCCPC) Limay Coal Unit 1	150	Emergency shutdown to rectify hotspot at Lamao Substation & repair of coal feeders	25-May-2020	15-June-2020
San Buenaventura Power Ltd (SBPL) Coal	500	Maintenance outage to perform boiler cleaning/de-slagging	23-May-2020	5-June-2020
Southwest Luzon Power Generation Corp (SLPGC) Coal Unit 2	150	Extended planned outage	6-April-2020	15-June-2020
SMC Masinloc Power Partners Co. Ltd (MPPCL) Coal Unit 3	335	Repair of the HP heater and induced draft fan: on commissioning test	24-May-2020	TBD
OIL	*150*	Malaya Unit 1 (Pmin 150 MW) unavailable	-	-
NATURAL GAS	*0*	-	-	-
GEOTHERMAL	*115*	Tiwi Unit 1 (60 MW) and Makban Unit 5 (55 MW) on low steam	-	-
HYDRO	*0*	-	-	-
BIOMASS, SOLAR AND WIND	*0*	-	-	-

Source: DOE Update, June 4, 2020.

It is becoming more apparent from the data that inflexible baseload is subject to forced or unplanned outages for a variety of reasons which can translate to a lack of reserve. Outdated planning would request even more large baseload plants to compensate for such outages, which means doubling down on import fossil fuels at a time when there is more cost-effective modular renewable energy technology. Smaller and modular plants to begin with means less unnecessary investment in additional large plants which primarily compensate for the inflexibility of large plants. Consistent deflation in the cost of renewables includes solar and battery storage, which have seen costs drop 80 to 90% over the last decade and IEEFA expects both to halve in the coming decade.[34]

MERALCO

As the operator controlling the Luzon grid, MERALCO will inevitably be at the center of any effort to make new system priorities the core of revised power sector

[34] IEEFA, The renewable energy transition is coming to Asia. May 13, 2020.

policies. MERALCO has experienced a peak demand drop[35] by between 35% and 40% during the lockdown to 4,516MW in March 2020 and further to 4,289MW in April. Prior to COVID-19, MERALCO recorded a drop in income by 54% to PHP2.61 billion (US$51.74 million) due to losses incurred[36] from an investment in a fossil gas company in Singapore. On May 18, 2020, S&P affirmed its credit rating of MERALCO, maintaining its BBB- long-term issuer credit rating. However, S&P has concerns over MERALCO's fundamentals, citing the utility's increasing risk appetite for power generation compared to its previous preference of holding large equity shares; this may leave the business with exposure which can lead to reduced earnings. While S&P assumes cost pass-through is maintained, MERALCO has already set the precedent for new contracts to remove cost pass-through. Cost pass-through is maintained in MERALCO PSAs prior to 2019.

As seen in the Table 5, MERALCO has already experienced lower revenues as compared Q1 of 2019. ECQ (Enhanced Community Quarantine) started in March 17 which is only 2 weeks of Q1.

Table 5: MERALCO Q1 Revenues and Expenses for 2019 and 2020

	Q1 2019	%	Q1 2020	%	Growth %
Consolidated Revenues (Million Php)	**75,378**		**70,029**		**-7.10**
Electricity Revenues	73,632	97.7	67,911	96.98	-7.77
Distribution Revenues	14,273	18.9	15,578	22.25	9.14
Generation & Other Passthrough Charges	59,359	78.7	52,333	74.73	-11.84
Non-Electricity Charges	1,746	2.3	2,118	3.02	21.31
Costs and Expenses (Million Php)	**68,520**		**67,215**		**-1.90**
Purchased Power	58,743	85.7	51,823	77.10	-11.78
Operating Expenses	6,331	9.2	6,587	9.80	4.04
Depreciation & Amortization	1,878	2.7	2,080	3.09	10.76
Other Expenses	1,568	2.3	6,725	10.01	328.89
Capital Expenditures (Million Php)	**4,339**		**4,152**		**-4.31**
Sub transmission & Distribution Facilities	3,688	85	2,740	66	-25.70
Others	651	15	1,412	34	116.90
Energy Sales (GWh)	**10,381**		**10,879**		**4.80**
Residential	3,010	29.0	3,366	30.94	11.83
Commercial	4,124	39.7	4,343	39.92	5.31
Industrial	3,212	30.9	3,135	28.82	-2.40
Flat Streetlights	35	0.3	35	0.32	0.00

Source: Meralco Q1 2019 Financials[37] and Meralco Q1 2020 Financials.[38]

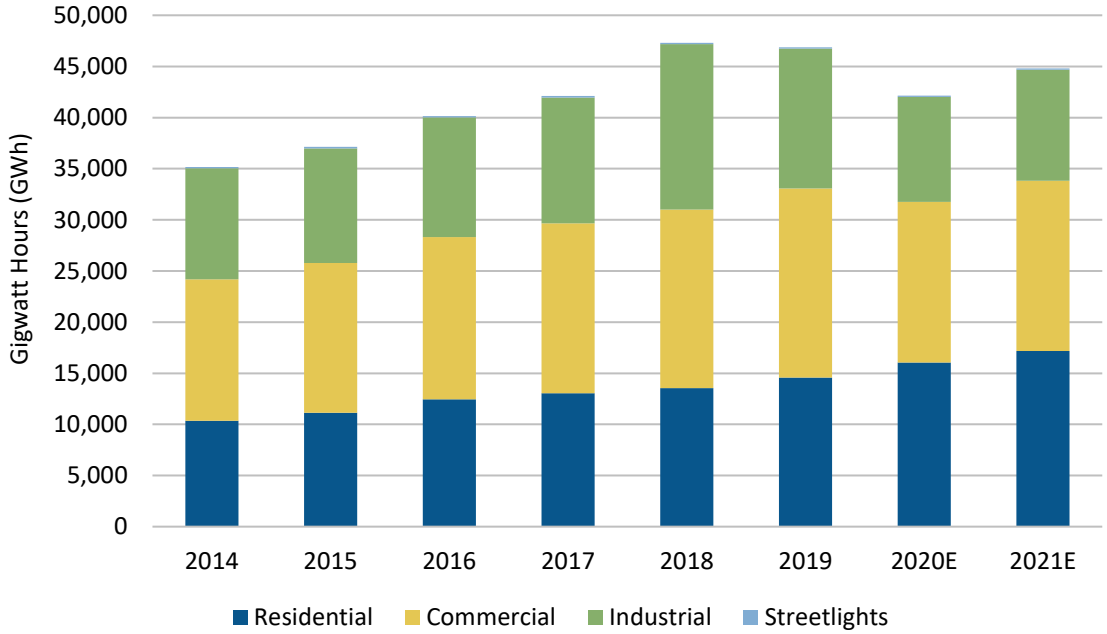
[35] Bloomberg. Manila Electric Halves Spending as Lockdown Weakens Power Demand. April 27, 2020.
[36] Manila Standard. Meralco's net profit dropped 54% to P2.6b in first quarter. April 27, 2020.
[37] Meralco. Meralco Financial Highlights Q1, 2019.
[38] Meralco. Meralco Financial Highlights Q1, 2020.

The impact on MERALCO's revenue from the demand drop, coupled with deferred bill payments, may affect its ability to pay fossil fuel power suppliers with power supply agreements (PSAs) prior to 2019. The MERALCO PSA structure prior to 2019 is described the latter part of this section.

Although MERALCO is forecasting a sales volume of only 10% below 2019 levels, it is important to realize that the shape of the recovery hinges on the lifelines provided to households and businesses.

For 2020, IEEFA estimates a 10% increase in residential consumption, in line with the increase in temperatures and likelihood of some industries implementing flexible work-from-home arrangements and some municipal-level social distancing rules. Commercial consumption is estimated to decline by 15% and industrial consumption by 25%. This leads to a cumulative reduction equivalent to 10% below 2019 levels. In 2021, assuming a rebound and taking average increases from 2014 to 2019, residential consumption increases by 7.07%, industrial consumption increases by 6%, and industrial consumption increases by 5.74%. Refer to Figure 8 for an overview of MERALCO's energy sales.

Figure 8: MERALCO Energy Sales



Source: Meralco 2018 Annual Report[39] and Meralco 2019 Sustainability Report.[40]

A 10% decline in sales volume in 2020 is equivalent to 4,687 GWh, a value of PHP 23.436 billion (USD 468.71 million) at generation price of PHP 5 per kWh. So far, MERALCO's *force majeure* clauses in contracts with 7 independent power producers (IPPs) owned by the three conglomerates in the power sector, Ayala, San Miguel,

[39] Meralco. Meralco 2018 Annual Report.
[40] Meralco. Meralco Sustainability Report 2019.

and the Aboitiz, saved consumers PHP 1.02 billion (USD 20.4 million) in total, PHP 129 million (USD 2.58 million) in fixed costs for April and PHP 877 million (USD 17.54 million) in fixed costs for May. Without the force majeure, per kWh rates in Luzon would have increased by 15%.

However, if MERALCO is unable to execute *force majeure* or reduce the amount it must purchase due to the inflexible nature of the PSAs or if *force majeure* is not implemented, the liability may be passed on to end-users or it may have to absorb these losses. Before going into the financial burden to end-users, it is important to unwind the tariff in fossil fuel power supply agreements (PSA), which has six different cost items for end-users.

A standard PSA between a fossil fuel power supplier and a distribution utility breaks down the supply cost into a fixed capacity cost (local and foreign denominated), fixed operation and maintenance cost (also foreign and local currency denominated), and variable cost—mainly fuel. The standard contract specifies capacity and a load factor.

PSAs include:

- Capacity payments, which is a payment to ensure that the coal investor recovers their capital at 14-15% project IRRs, as per ERC approval. The capacity payments are used to enable project financing from banks. The capacity payment is a function of variations in the US consumer price index from the date that the PSA is finalized.

- Operating fee, where a portion is stated in local currency and the other in US dollars. This fixed portion can be set at USD 0.0085 per kWh while the variable potion is adjusted considering variations in the US and Philippine consumer price indices. This estimated base rate from previous PSA agreements is 14,486 per kW, equivalent to PHP 2.065 per kWh at an exchange rate of PHP 50 per USD 1.

- Fuel payment for contracts signed prior to 2019, fuel costs are automatically passed through to consumers, and is subject to changes based on the prevailing index coal price. For example, fuel payment can be calculated based on Guaranteed Net Plant Heat Rate at 91.25% plant load factor. In the previous draft of the Atimonan PSA, the price using the Newcastle Index was set at USD 50.38 per metric tonne, a freight price of USD 5.90 per metric tonne, and forex rate of PHP 46.07 per USD. These are gross underestimations because the prevailing Newcastle coal price due to drop in commodity prices is USD 52.79 per metric tonne[41], the lowest since June 2016, and down 24% from this a peak in mid-January this year of USD 69.59 per metric tonne. The exchange rate has not been at PHP 46.07 per USD since June 2016. Depreciation since then means that it is more expensive to buy imported fossil fuels.

[41] Reuters. COLUMN-Seaborne thermal coal prices slide as India takes coronavirus hit. April 28, 2020.

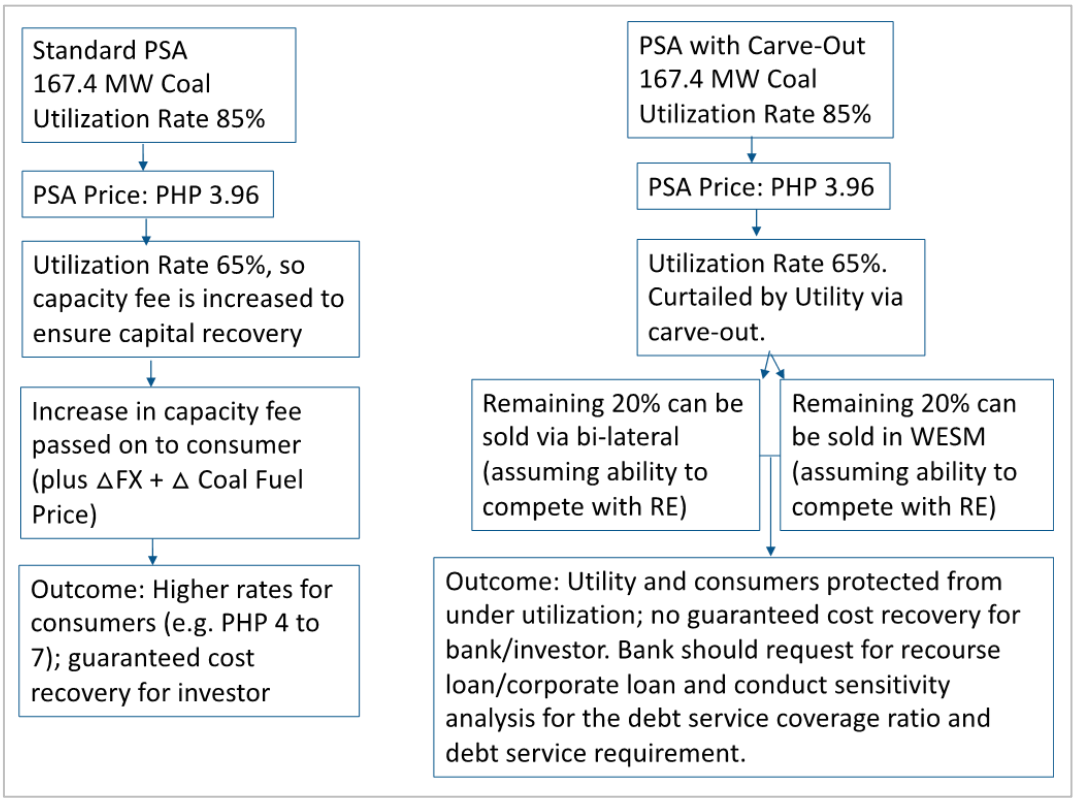
- Energy payments are costs incurred for procuring fuel per million British thermal units (BTUs), multiplied by the product of the net output in kWh at USD 0.0022 per kWh. Energy payments are based on an 80% plant capacity factor

- Interconnection facilities payment is to recover the cost of interconnection facilities and can be priced at USD 0.0006 per kWh

- Reimbursable cost payment includes the recovery of the plant's real property tax payment, fuel costs incurred by any start-up and shutdown of the plant, energy and environmental taxes, local business taxes, energy charges based on landed fuel cost, variable operation and maintenance payments, and the replacement of power before the commercial operations date.

Although the capacity fee ensures that low utilization punishes end-users, it is designed to ensure IPPs can recover their capital costs and repay their loans on a timely basis. This means that neither the financial sector nor the power sector is liable for the risk they take, as these are passed on to end-users who are ill-equipped to manage such risk. Though MERALCO has taken steps to improve procurement practices by requesting a fixed price and thus removing automatic fuel pass-through and including a curtailment clause (locally known as a carve-out provision) to protect end-users from paying for unused power (stranded risk). PSA contracts prior to 2019 and contracting by other distribution utilities do not include these in procurement. Figure 9 gives an overview of the implications of the carve-out provision to the inflexible power plant and the investor (both debt and equity).

Figure 9: Example Implications of Curtailment (Carve-out Provision)



As mentioned earlier, a 10% decline in sales volume in 2020 is equivalent to 4,687 GWh, a value of PHP 23.436 billion (USD 468.71 million). If power is from fossil fuel plants with the standard PSA structure, this could translate to additional costs to end-users of at least PHP9.679 billion (USD 193.573 million) in 2020.

MERALCO has taken the initiative by calling for a *force majeure* which it will likely spread over a basket of independent power producers (IPP). However, the Philippine Independent Power Producers Association (PIPPA) has rejected efforts to invoke the *force majeure* clause[42] as it will affect their ability to pay for fuel, operation costs, and bank loans.[43] Though the ERC ultimately will decide, it is important that these *force majeure* clauses go to protecting end-users from the inflexible

It is clear from the tariff structure that the end-user subsidizes the poor economics of fossil fuel plants as it subsidizes underperformance.

[42] Power Philippines. PIPPA turns down force majeure claims of DUs, ECs. April 17, 2020.
[43] Equally important to assess is whether the grid operators have over-built and/or have a flexible cost-effective grid design. Transmission and distribution costs more than 40% of the total power bill.

standard clauses of PSAs. Moreover, on the grid operator side, end-users may be left with high tariffs if the grid is over-built or if the grid is badly designed, allowing only for inflexible power plants. Transmission, distribution, and system losses are equivalent to over 40% of the electricity bill, equivalent to just over PHP 4 per kWh (USD 0.08 per kWh).

In order to ensure equitable risk sharing between end-users and power generators, improved options on *force majeure* clauses to protect the interests of end-users, while incentivizing utilities and power generators to procure flexible and least cost generation, could be included in an upcoming competition bill (SB1653) prepared by the Senate Committee on Energy.

In addition to calling for *force majeure*, the tariff-setting methodology of the ERC needs to improve as it does not enable least-cost power options. The ERC approves tariffs based on cash adequacy for operating and maintenance costs, with an arbitrary cap on capital expenditures. The ERC does not vet tariffs to include additional costs resulting from fuel price changes or exchange rate changes. To level the playing field, time of day pricing can be utilized for the main grids. The ERC should also make fixed-cost procurement and carve-out provisions mandatory to ensure equitable risk sharing between end-user and power generator. Renewable energy tariff structures are free from the above costs and are instead based on a fixed price, adjusted for inflation. Moreover, part of ERC's process should include running HOMER software to ensure proper power supply planning and power system design optimization.

Electric Co-operatives

The COVID-19 pandemic not only affects the main grid but has also affected electric co-operatives which cover smaller franchise areas which include isolated and island grids. There are approximately 121 electric co-operatives in the Philippines serving more than 56 million people. While their demand has remained largely unchanged due to most of their end-users being households rather than industry, the immediate impact of COVID-19 is on the cash flows of electric co-operatives as their collection efficiencies declined to levels between 30% and 40%. Most end-users are dependent on fishing, agriculture or other jobs with daily wages contributing to collection issues. The lack of digitization of the payment systems is also causing a delay in collections.

The current electric co-operatives are member-owned non-profits instead of corporatized entities, which means they do not aim to maximize profits and thus are financially vulnerable. Electric co-operatives have two months of working capital[44] on average, which is over the one-month working capital fund needed to get a high credit rating from the National Electrification Administration (NEA). Electric co-operatives, much like micro, small and medium-sized enterprises (MSMEs) lack access to credit or timely liquidity facilities. So far, NEA has been encouraging electric co-operatives to approach other financial institutions such as banks for working capital. However, electric co-operatives are unable to get these funds in a

[44] National Electrification Administration. Compliance Report on the Performance of Electric Cooperatives: For the Third Quarter of 2019.

timely manner. Moreover, some are too small and/or too risky to interest the formal banking sector, while they may be too large for micro-lenders. This inability to raise working capital is causing severe liquidity stress. As a result, most electric co-operatives are delaying payment for generation to prioritize paying wages.

NEA told a Joint Congressional Energy Commission meeting on May 22, 2020, that prices of power generation inputs are likely to increase due to scarcity of supplies and additional cost of delivery and storage. In some isolated island areas, deliveries cannot be made because there is no transportation. Because NEA has had to remit PHP 1.26 billion (USD 25.2 million) of unutilized subsidy for remaining village electrification and PHP 250 million (USD 5 million) of unreleased Emergency and Resilience Funds, NEA's ability to help electric co-operatives may be limited. More recently, there are nine towns in Eastern Samar with ongoing power restoration efforts after they were hit by Typhoon Ambo.[38] The electric co-operatives' and NEA's lack of financial capacity electric leave co-operatives ill-prepared for future shocks.

Inability to raise working capital is causing severe liquidity stress. As a result, most electric co-operatives are delaying payment for generation to prioritize paying wages.

Even with record-low global oil prices, according the Philippine Rural Electric Co-operatives Association (Philreca), 59 electric co-operatives out 121 have had per kWh electricity rates raised due to a drop in demand. Only two of the 59 electric co-operatives have managed to negotiate with their suppliers. Through NEA, electric co-operatives are seeking flexibility in the fixed charges and minimum energy off-take provisions in the PSAs. Specifically, they ask that the minimum contracted capacity and other fixed costs such as the Capital Recovery Fee (CRF) is based on actual power consumed, rather than the standard minimum threshold written in the PSA, which drives up the per kWh price. Electric co-operatives are requesting the minimum energy off-take (MEOT) provision be waived, not lifted, for end-users who have little or no income.

Electric co-operatives are engaging ERC for assistance on the *force majeure* clause to trigger negotiations to ensure that "penalty provisions on the failure to comply with MEOT" is suspended.

During the Joint Congressional Energy Commission hearing this month, the ERC pledged to deal with the problems of the co-operatives on a case-to-case basis. However, it may be more sensible for the ERC to aggregate the needs of the 59 electric co-operatives considering that the major supplier of power is the government-owned National Power Corporation's Small Power Utilities Group (NPC-SPUG). The DOE and Department of Finance (DOF) could also ask NPC-SPUG to better support electric co-operatives in the wake of the COVID-19 shock.

The co-operatives' precarious financial position and lack of formalization warrants government attention to better support and incentivize the sub-sector.

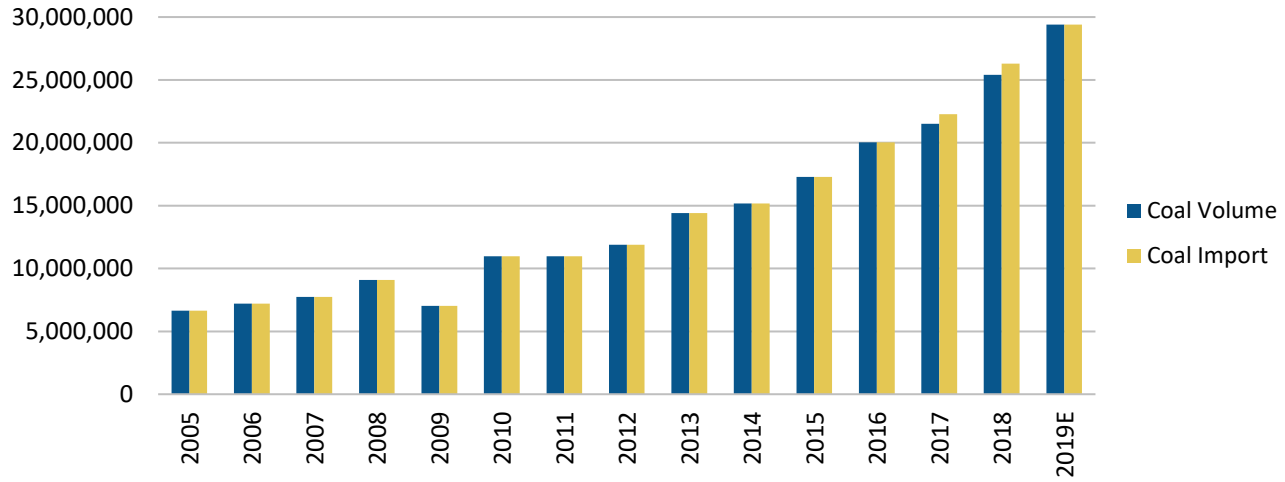
A rapid-response liquidity facility is also needed and must be quickly deployed to help electric co-operatives build resilience against shocks such as COVID-19, climate disasters and natural catastrophes. Considering the impact of COVID-19, it would be prudent to engage with electric co-operatives to build a bigger financial buffer than the current single-month's working capital. The co-operatives' precarious financial positions and lack of formalization, due to their member-owned and, non-profit structure warrants government attention to better support and incentivize the sub-sector.

The Implications of Coal Price Volatility and a Lack of Stability

The role of fossil-fuel-dependent IPPs is at the heart of any discussion on how to reform the Philippines' power market. To put this into context, in less than 10 years, the Philippines nearly tripled its thermal coal imports[45], growing from 11 million tons imported in 2011 to 29.4 million tons expected for 2019. (Refer to Figure 10 for coal import volume.) These open-ended fossil fuel import obligations have implications on the country's trade balance as the Philippines is a net importer of fossil fuels.

[45] Dry Cargo International. Assocarboni Discloses 2018 Coal Data.

Figure 10: Coal Import Volume from 2005 to 2019E



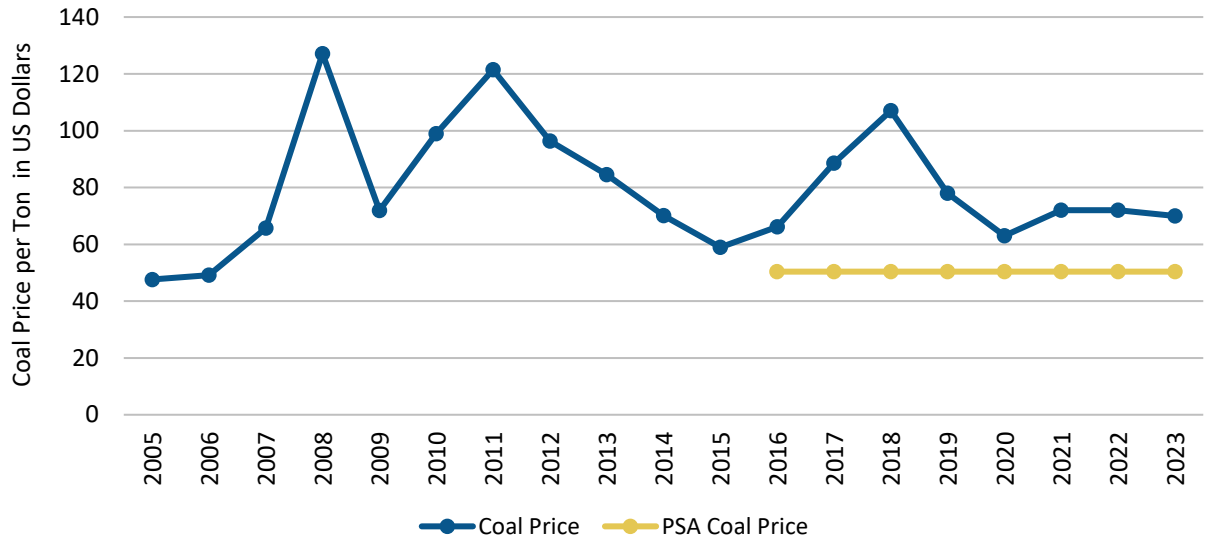
Source: Department of Energy Coal Statistics, Assocarboni.[46]

The power supply agreement between the utility and the independent power producer (IPP) stipulates that fuel cost adjustments charged to ratepayers are indexed against the Australian Newcastle Coal Price Index, a benchmark for seaborne thermal coal in the Asia-Pacific region. The exposure to international volatility is illustrated in Figure 11.

Coal price assumptions used in PSAs in the Philippines are still higher than current coal prices while Indonesian coal miners are operating at close to breakeven or below breakeven. For example, the previous Atimonan coal PPA draft set the Newcastle Index to USD 50.38 per metric tonne and a freight price of USD 5.90 per metric tonne. The current Newcastle Index coal price, which is considered low due to a drop in commodity prices globally, is USD 52.79 per metric tonne[47], the lowest since June 2016, and down 24% from this a peak in mid-January this year of USD 69.59 per tonne. But the low coal price may still translate to higher prices than is assumed in the PSAs, leaving end-users to pay for ERC-approved mispricing. Eliminating imported fuel costs avoids the ups and downs of volatile commodity markets, providing valuable price stability.

[46] Founded in 1897, Assocarboni is an association, with more than 80 member companies. It is the only association representing the entire coal value chain from coal mining groups to electricity and steel producers.
[47] Reuters. Seaborne thermal coal prices slide as India takes coronavirus hit: Russell. April 28, 2020.

Figure 11: Newcastle Average Coal Price



Source: International Coal Report;[48] *Coal Week International; Coal Week; Bloomberg; IHS McCloskey Coal Report; World Bank.; 2020 and 2021: Fitch Ratings.*[49]

This month, the Independent Electricity Market Operator of the Philippines (IEMOP) indicated that there have been logistical constraints in the delivery of imported coal. The operator of the Wholesale Electricity Spot Market (WESM) has flagged that this contraction in the supply of imported fuel for coal-fired power plants may increase electricity prices[50] in coming days and weeks. While the DOE has guaranteed that it will manage logistics, it may have difficulty managing the logistics of the country from where the coal is imported. The Philippines imports more than 80% of its coal from Indonesia. (Refer to Table 6 for import volume from Indonesia.)

Table 6: Philippines Coal Import Volume from Listed Indonesian Companies

Company	Stock Code	Tonnes (millions)
Bumi Resources	BUMI.JK	5.94
Bayan	BYAN.JK	5.84
ITMG	ITMG.JK	1.77
PTBA	PTBA.JK	1.11
Toba Bara	TOBA.JK	0.25
Harum	HRUM.JK	0.08
Total		**15.00**

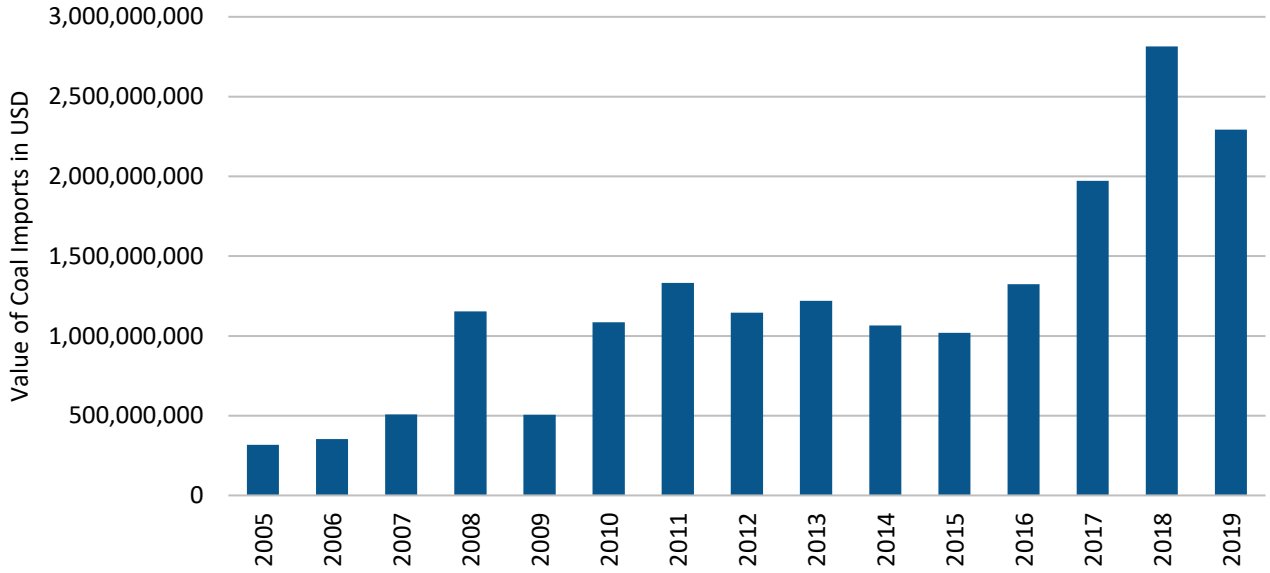
Source: IEEFA Indonesia, 2020.

[48] World Bank. Global Economic Monitor Commodities.
[49] Fitch Ratings. Fitch Affirms Adaro Indonesia at 'BBB-'; Outlook Stable. April 20, 2020.
[50] Manila Bulletin. Delays in coal deliveries to trigger power rate spikes. May 8, 2020.

The value of coal imports in 2005 was USD 317 million and tripled to over USD 1.0 billion in 2010. In 2016, the value of coal imports climbed to over USD 1.3 billion to over USD1.9 billion in 2017. In 2018, coal imports reached over USD 2.7 billion and USD 2.3 billion in 2019.

According to the Philippines Statistics Authority, the Philippines had a balance of trade deficit in 2019,[51] equivalent to USD 37 billion. Coal imports represented 7% of the nation's yearly trade deficit. (Refer to Figure 12 for an overview of the value of imports and Figure 13 for an overview of the negative trade balance.)

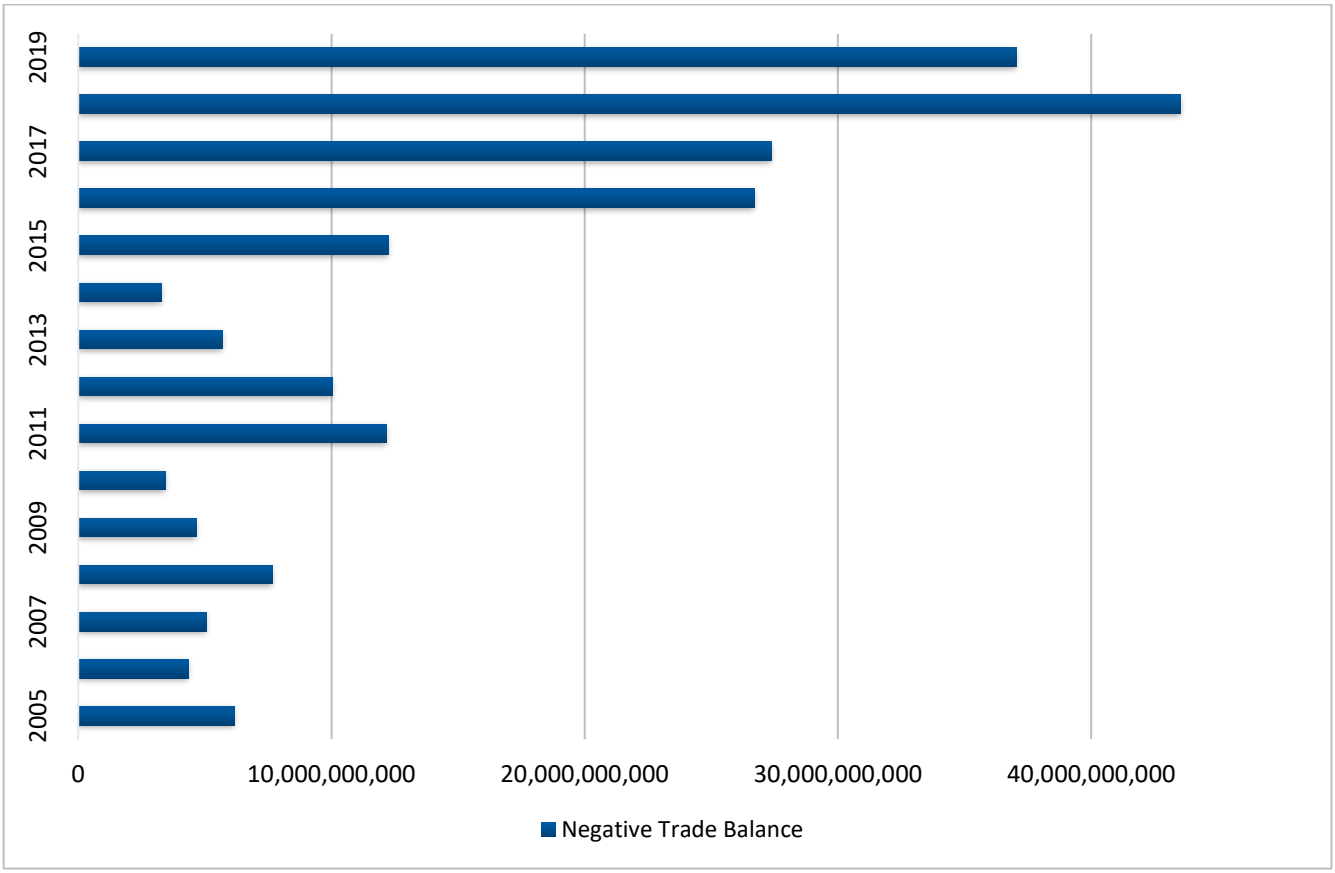
Figure 12: Value of Imports



Source: IEEFA calculation based on coal import volume and average Newcastle coal price.

[51] Philippine Statistics Authority. Highlights of the Philippine Export and Import Statistics March 2020 (Preliminary). May 6, 2020.

Figure 13: Negative Trade Balance



Source: PSA Foreign Trade Statistics.

Trade-Offs: Large Imported Gas vs. Modular Domestic Renewable Energy and Storage

The Philippines' financial and economic managers, the DOF and the National Economic Development Authority (NEDA) have been able to successfully reallocate national funds and source external finance to help the sectors most affected by the pandemic. Assistance mainly addresses liquidity problems through time-bound loans and conditional equity infusions. The funding conditions are still unclear, but there is nonetheless an opportunity to support a recovery that will not result in more import dependency on commodities such as coal, fossil gas and oil, when there are viable domestic renewable energy options. The Chair of the Senate Committee on Energy has already flagged logistical constraints as an issue for all imported fuels, including oil and gas, and implications for energy security. Moreover, it would be an opportunity for the recovery to reduce large-scale system lock-in by supporting a more flexible power system.

Power sector planners assumed that a large system lock-in such as coal would lead to a least cost system. Unfortunately, this lock-in for countries that import coal has led to inflexibility, price instability and high prices as well as negative effects on the trade balance. Large-scale system lock-in includes infrastructure to import fossil

gas. Conglomerate First Gen is currently seeking DOE approval to allow construction of a fossil gas terminal in Batangas, Luzon, by 2022. The aggregated investment for the terminal is USD 1 billion to USD 1.3 billion, plus an additional USD 200 million to USD 400 million for the floating storage and gasification unit. The DOE had already approved the suspension of a proposal by Phoenix Petroleum and China National Offshore Oil Corporation (CNOOC) to build a USD 2 billion fossil gas onshore terminal and power projects.

The DOE is expected to finalize discussions about importing fossil gas, or liquefied natural gas (LNG), this year, but are serious implications for investment and energy security. Importing fossil gas is neither an incremental decision nor is it economical without scale. Fossil gas requires major infrastructure investment which in turn will require from consumers the same capital recovery guarantees as coal- and oil-fired generation.

Before deciding to pursue fossil gas, it is prudent to understand what gas will look like in eight to 10 years vis-à-vis other technology options, and whether the experience of COVID-19 encourages power sector planners to specify greater domestic energy security and system flexibility. The deflationary price trajectory of renewable electricity generation and storage triumphs over the cost of generating and moving electricity from a large fossil-fueled power plant.

The deflationary price trajectory of renewable electricity generation and storage triumphs over the cost of generating and moving electricity from a large fossil-fueled power plant.

Sending power via a high-voltage line in one direction towards low-voltage wires and eventually to consumers has not delivered on the country's electrification goals. There is still a lack of energy access for over 2.3 million households and a lack of reliable power for millions more. Considering these issues along with energy security and price instability, it does not make sense to lock in large-scale infrastructure for more imported energy.

For smaller island and isolated grids, modular domestic renewable energy and storage is a cost-effective solution while also being a good substitute for grid infrastructure. It can supply power at the point of demand in areas that lack energy access or reliable power. For bigger networks, modular renewable energy without capacity payments, and with storage and grid investment, can meet demand growth. Renewables can also reduce overall system cost while improving domestic energy security, resilience, and job creation.

An Investment Opportunity for MERALCO's Atimonan Coal Plant to Switch to Modular Storage

A good way to monitor current trends is to track how MERALCO—the owner of the country's largest distribution franchise in Metro Manila and an IPP investor—adapts to market pressures and reforms. MERALCO's Atimonan coal fired power plant has been a focal point for analysts because it is the first greenfield coal–fired power plant to go through a competitive selection process (CSP), moving away from bilaterally contracted power supply agreements and into more transparent and open competition.[52]

The Atimonan plant, owned by MERALCO's subsidiary generation company, started out as a 1200 –1750 MW liquefied fossil gas plant in 2012[53] and ultimately become a 1200MW coal plant expected to sign a PSA in 2016. The project was stopped because the promoters had not followed competitive procurement rules set by ERC in 2015.[54]

In early 2020, it was expected that the Atimonan coal plant would bid in MERALCO's 1200MW greenfield baseload tender, but the tender was cancelled because of COVID-19. The Atimonan plant has likely incurred project expenses since 2012, an 8-year investment to date. This is a good time for MERALCO to do its part in delivering a flexible power system by converting the Atimonan project into a battery storage facility. The Atimonan coal plant is estimated to cost USD 3 billion with an area of 139 hectares. Grid storage battery costs have fallen[55] to USD 500 per kWh. Tesla' new energy storage system, the Megapack, has a peak of 3MWh.[56] Calculations show that the land area of the Atimonan coal plant can accommodate 1800 Megapacks with working clearance space.[57] This would have a capacity of 5.4GWh. While import fossil gas is relatively cheap for now, due to many producers selling at below their breakeven price,[58] many areas in the Philippines do not have the necessary infrastructure to take the gas. But modular battery systems can replace

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[52] IEEFA. Prospects Improve for Energy Transition in the Philippines. In November 2016, the consumer group, Alyansa para sa Bagong Pilipinas, Inc. (ABP) filed a petition/complaint against the commissioners of the ERC for failure to protect consumers from high electricity rates. It called on the Supreme Court to direct the ERC to void the PSAs of distribution utilities submitted after 7 November 2015, including the 3.5GW Meralco coal pipeline (including the Atimonan power plant), for failure to conduct the Competitive Selection Process (CSP). In May 2019, the Supreme Court ruled in favor of ABP, which means that the 3.5GW Meralco coal pipeline is effectively paused and subject to competition under terms that include the Fixed Bid Price.
[53] Inquirer.net. Meralco, Japan firm in talks to build LNG plant in Quezon. August 13, 2012.
[54] ABS-CBN News. SC affirms with finality ruling requiring power supply deals to undergo bidding. August 8, 2019.
[55] IEEE Spectrum. How Inexpensive Must Energy Storage Be for Utilities to Switch to 100 Percent Renewables? September 16, 2019.
[56] Electrek. Tesla's new Megapack to debut at giant energy storage project in California. December 15, 2018.
[57] Each Megapack has a peak of 3MWh, for an area of 65.03m2 (11.53m x 5.64m), it has enough space for 2 Megapacks and working clearance. Tesla's new Megapack to debut at giant energy storage project in California.
[58] IEEFA. Origin pulls the plug on gas exploration in the Northern Territory. Who's next?. March 27, 2020.

fossil gas imports and support infrastructure. This should be more cost-effective as its ability to scale on a modular basis negates large investment lock-in. Although it may well be possible to devote the entire Atimonan land area to storage, it would be wise for MERALCO to size the system based on, and to support, the recovery and resilience stages outlined by the Government of the Philippines.[59]

Conclusion

Pandemics are a feature of climate change, and there are bound to be more shocks of differing duration and intensity, including extreme heat. The Philippines' worst human discomfort heat index so far this year was 41 degrees Celsius (105.8 Fahrenheit).[60]

There will be a clamor for cheaper power to address extreme heat and to attract foreign manufacturing businesses looking to diversify their supply chains.

One of the key takeaways from this pandemic is the inability of the power sector to deal with shocks because of its inflexible financing and inflexible technology. The system needs faster-acting reserves.

As the rebound in demand emerges, power sector planners must improve grid flexibility and manage peak demand without rushing to add new baseload capacity. Instead, distribution utilities should look to adding modular renewable energy systems.

Power sector planners and stakeholders have an opportunity to reset energy development policy to enable more renewable absorption by grid systems and redirect resources to support economic fundamentals and energy price stability.

[59] Philippines Information Agency. NEDA 'We Recover As One' Report details road to new normal. May 29, 2020
[60] Manila Bulletin. Metro posts highest air temperature. May 4, 2020.

Appendices

Appendix 1: National Sales Data (GWh) and Growth in Energy Sales (%)

	Total Energy Sales	Residential	Commercial	Industrial	Others
2014	63,345	20,969	18,761	21,429	2,186
2015	67,808	22,747	20,085	22,514	2,462
2016	74,153	25,631	21,770	24,117	2,634
2017	77,793	26,782	22,768	25,573	2,670
2018	82,617	28,261	24,016	27,587	2,753
2019	87,118	30,552	25,476	28,194	2,897

Source: DOE 2019 Power Statistics.[61]

	Residential	Commercial	Industrial	Others	Total Energy
2014	-	-	-	-	
2015	8.48%	7.06%	5.06%	12.63%	7.05%
2016	12.68%	8.39%	7.12%	6.99%	9.36%
2017	4.49%	4.58%	6.04%	1.37%	4.91%
2018	5.52%	5.48%	7.88%	3.11%	6.20%
2019	8.11%	6.08%	2.20%	5.23%	5.45%
				Average	**6.59%**

Source: DOE 2018 Power Statistics.[62]

[61] Department of Energy. Philippines Government, Department of Energy: 2019 Power Statistics. Revised May 8, 2020.
[62] Department of Energy. Philippines Government, Department of Energy: 2018 Power Statistics. Revised March 29, 2019.

Appendix 2: Power and Economic Data

	Philippines Sales[1] (MWh)	Sales Growth	GDP[2 3] (2000 Prices)	Real GDP[2 3] Growth	Inflation[4] Rate
2014	63,344,785		7,170,285	6.20%	3.60%
2015	67,807,747	7.05%	7,593,828	5.90%	0.70%
2016	74,152,507	9.36%	8,113,170	6.80%	1.30%
2017	77,792,810	4.91%	8,665,818	6.70%	2.90%
2018	82,617,102	6.20%	9,206,889	6.20%	5.20%
2019E	87,408,894	5.80%	9,750,598	5.90%	2.50%

Source: 1) DOE 2018 Power Statistics.[63]
2) BSP Annual Report 2016.[64]
3) BSP GNI and GDP data 201.[65]
4) BSP Inflation Rates 2018.[66]

Appendix 3: MERALCO Sales (GWh)

	2014	%	2015	%	2016	%	2017	%	2018	%	2019	%
Total Energy Sales	35,160		37,124		40,142		42,102		44,313		46,871	
Residential	10,364	29.48	11,121	29.96	12,444	31.00	13,060	31.02	13,555	30.59	14,589	31.13
Commercial	13,814	39.29	14,654	39.47	15,867	39.53	16,597	39.42	17,463	39.41	18,483	39.43
Industrial	10,850	30.86	11,216	30.21	11,697	29.14	12,309	29.24	16,156	36.46	13,659	29.14
Streetlights	132	0.38	133	0.36	134	0.33	136	0.32	139	0.31	140	0.30

Source: MERALCO 2018 Annual Report[67] *and MERALCO 2019 Sustainability Report.*[68]

[63] Ibid.
[64] BSP. Bangko Sentral NG Pilipinas: Annual Report 2016.
[65] BSP. Gross National Income (GNI) and Gross Domestic Product (GDP) by Industrial Origin.
[66] BSP. BSP Inflation Rates.
[67] Meralco. Meralco 2018 Annual Report.
[68] Meralco. Meralco Sustainability Report 2019.

Appendix 4: MERALCO Historical and Forecasted Supply and Demand

Supply Demand	ACTUAL	FORECAST									
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Peak Demand, MW [a]	5,506	5,658	5,783	5,924	6,134	6,355	6,557	6,815	7,045	7,270	7,477
Supply Contracted, MW	5,175	5,300	3,372	3,207	3,207	3,207	2,803	2,803	1,248	1,248	710
Baseload Supply	3,330	3,835	2,255	2,305	2,455	2,545	1,945	1,945	845	845	525
Quezon Power Phil. Ltd. (QPPL)	460	460	460	460	460	460	460	460			
SEM-Calaca Power Corp. (SCPC)	250										
Masinloc Power Partners Co. Ltd (MPPCL)	260	260									
Therma Luzon Inc. (TLI)	250	250									
San Miguel Energy Corp. (SMEC)	330	330									
Panay Energy Development Corp. (PEDC) [b]	70	70	70	70	70	70	70	70	70	70	70
San Buenaventura Power Ltd. Co. (SBPL)		455	455	455	455	455	455	455	455	455	455
First Gas Power Corporation (FGP - Sta - Rita)	640	840	710	740	840	900	640	640			
FGP Corp. (FGP - San Lorenzo)	320	420	350	370	420	450	320	320	320	320	
First NatGas Power Corporaiton (FNPC)	210	210	210	210	210	210					
South Premiere Power Corporation (SPPC)	540	540									
Mid-merit and Peaking Supply	1,845	1,465	1,117	902	752	662	858	858	403	403	185
First Gas Power Corporation (FGP - Sta - Rita)	455	255	385	355	255	195	455	455			
FGP Corp. (FGP - San Lorenzo)	218	118	188	168	118	88	218	218	218	218	
First NatGas Power Corporaiton (FNPC)	204	204	204	204	204	204					
South Premiere Power Corporation (SPPC)	525	525									
Therma Mobile Inc. (TMO) [c]	200	165	165								
Panay Power Corp. (PPC)	45										
Toledo Power Corp. (TPC)	28										
1590 Energy Corp. (1590EC)	170										
Millennium Energy Inc. (MEI) [d]		73									
Solar Philippines Tanauan Corp. (SPTC)			50	50	50	50	50	50	50	50	50
Power Source First Bulacan Solar, Inc. (PFBS)		50	50	50	50	50	50	50	50	50	50
Solar Phil. Tarlac Corporalton (SPTC)		75	75	75	75	75	85	85	85	85	85
Supply for PSA Approval, MW	-	-	50	50	50	50	50	50	50	50	50
Solar Phil. Tarlac Corporalton (Phase 2) [e]			50	50	50	50	50	50	50	50	50
Supply for CSP, MW	0	0	1,900	2,000	2,100	2,300	3,000	3,200	5,100	5,100	5900
CSP for Baseload Supply	0	0	1,200	1,200	1,200	1,200	1,900	2,100	3,400	3,400	3,900
Baseload (1,200 MW) [CSP Schedule 2019]			1,200	1,200	1,200	1,200	700	900	1,200	1,200	1,200
Base load (1,200 MW) [CSP Schedule 2019]							1,200	1,200	1,200	1,200	1,200
Baseload (1,000 MW) [CSP Schedule 2020]									1,000	1,000	1,000
Baseload (500 MW) [CSP Schedule 2020]											500
CSP for Mid-merit and Peaking Supplies	0	0	700	800	900	1,100	1,100	1,100	1,700	1,700	2,000
Mid-merit (500 MW)iCSP Schedule 2019]			500	500	500	500	500				
Mid-merit (600 MMICSP Schedule 2020)							600	600	600	600	600
Mid-merit (600 MW)[CSP Schedule:to be determined]									600	600	600
Peaking (200 MW) for 2020 [CSP Schedule: 2019) [f]			200								
Peaking (300 MW) for 2021 [CSP Schedule: to be determined] [f]				300							
Peaking (400 MW) for 2022 [CSP Schedule: to be determined] [f]					400						
Peaking (600 MW) for 2023 [CSP Schedule: to be determined] [f]						600					
Peaking (500 MW) for 2025 [CSP Schedule: to be determined] [f]								500			
Peaking (500 MW) for 2026 [CSP Schedule: to be determined] [f]									500		
Peaking (500 MW) for 2022 [CSP Schedule: to be determined] [f]										500	
Peaking (800 MW) for 2028 [CSP Schedule: to be determined] [f]											800
Uncontracted Demand	331	358	461	667	776	797	703	762	647	871	817

Source: ERC Case No. 2019-079 RC.

[a] Forecasted captive demand figures assumes a contestable customer migration under a voluntary RCOA regime.

[b] Power supply agreement with PEDC is continued until Motion for Reconsideration against SC Decision In GR No.227670 has attained.

[c] Power supply agreement with TMO implemented starting April 26, 2019.

[d] Power supply agreement with MEI implemented starting April 26, 2019.

[e] Indicative SCOD assumes approval by ERC on July 2019.

[f] Contracted annually for summer months with term of up to 5 months only (IPSAs).

[g] Actual uncontracted demand represents difference between supply and captive demand, and may not be consistent with actual WESM purchases of MERALCO. Projected uncontracted demand (2019 to 2028) depends heavily on RCO implementation. Such uncontracted demand may be sourced from WESM, depending on prevailing prices. This uncontracted demand will only occur during the annual peak demand.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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