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March 2019

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The Philippine Energy Transition

Building a Robust Power Market to Attract Investment, Reduce Prices, Improve Efficiency and Reliability

The Business Case

Philippine electricity prices are the highest in South East Asia at roughly US$0.20 per kilowatt-hour (kWh) or Php 10 per kWh. Excessive reliance on imported coal and diesel is one of the main reasons the Philippines has the highest electricity prices in the Association of Southeast Asian Nations (ASEAN) region. The low uptake of renewables is surprising given that solar, wind, run-of-river hydro, geothermal and biogas are viable domestic generation options. This is especially true when paired with storage for ancillary services such as frequency regulation providing both enhanced and firm frequency responses, spinning reserves and voltage support. These can be combined to create the type of cost effective and secure energy system that an island nation like the Philippines needs.

Corporates are making strides to divest from coal in favor of renewables. In 2018, Philippine companies, such as the Ayala Corporation subsidiary AC Energy, are set to sell US$1 billion worth of coal assets. According to AC Energy, the sale aims to balance its renewable and thermal portfolios and raise capital to support regional expansion targeting 5 GW of geothermal, solar and wind projects in Vietnam, Indonesia, and the Philippines by 2025. AC Energy has invested in: an 81MW North Luzon wind farm in Pagudpud and a 52MW Northwind Power wind farm in Bangui Bay, as well as the MonteSol, IslaSol and SacaSol solar projects. AC Renewables has also invested in Vietnam's Nin Thuan, Khanh Hoa and Dak Lak solar parks, and in Indonesia's Sidrap wind farm and Salak and Darajat geothermal plants.

Ayala Corporation is not the only player to follow this global trend of fossil fuel divestment and renewable capacity investment. Companies in India, China, Malaysia, and most recently, Vietnam, are increasingly moving towards cancellations and delays involving new coal plants. And Ayala Corporation is not the only player to be following this trend in the Philippines. The Manila Electric Company, more popularly known as Meralco, shares this foresighted strategy and added a carve-out provision, better known as “curtailment,” to all their new coal power purchase agreements including the 1200MW Atimonan coal plant. Meralco realizes it wants to protect ratepayers from the high risk of stranded assets by shifting the cost of bad decision-making to the coal power providers and their investors. Despite leadership from the more successful corporations in the power sector, others, including the San Miguel Corporation, are still locked into legacy strategies and are increasing their coal exposure. San Miguel is doing this through its power arm, SMC Global Power Holdings Corp., which planned to construct a 300-megawatt (MW) coal plant in Negros Occidental. However, this is now cancelled because of leadership from the Governor of the Province of Negros Occidental who

declared the area as coal-free and supportive of renewable energy.[1] This gives SMC Global Power the opportunity to instead build a renewable energy portfolio to complement its current storage/batteries pipeline of 240MW for ancillary services to the grid in Luzon.[2]

Although coal risk remains underpriced in South East Asia, there is increasing investor appetite in capital markets for renewable energy projects. Most recently, AC Energy issued the first ever US dollar climate bond in South East Asia valued at US$410 million on the Singapore Stock Exchange to finance renewable energy projects in the Asia-Pacific region including the Philippines, Vietnam, and Indonesia. AC Energy initially launched an offering of US$225 million for a 5-year tranche and closed at $300 million due to oversubscription. It also issued a US$110 million 10-year tranche.[3]

It is difficult to understand why, despite the systematic deflationary nature of renewable energy prices globally and capital market support, emerging markets like the Philippines continue to lag behind global trends and are locking in long-term exposure to import coal, diesel and liquefied natural gas (LNG) import terminals. According to the Department of Energy (DoE), between 2018 and 2019, the Philippines may expect 5,688 MW of new capacity at least 63% of which will be provided by coal-fired power plants.[4] If renewables are not lagging based on economics and financials, it is clear that they are losing due to a lack of transparency, cost incentives, and Power Purchase Agreements (PPAs), known in the Philippines as Power Supply Agreements (PSAs) that continue to protect fossil fuel interests.

The Philippines faces a critical policy problem. Outdated market structures are compromising the country's ability to innovate and discouraging adoption of the cleaner and cheaper technologies that it badly needs. The current market dysfunction is hindering rather than helping the transition to more sustainable and affordable domestic solutions. The Philippines government can inject more diversity and more energy security into the electricity system—while helping lower costs to consumers— by taking the following steps:

- Removing the Diesel Fuel Subsidy by the Department of Finance,
- Removing the Automatic Pass-Through by the Energy Regulatory Commission,
- Issuing Stranded Asset Risk Warnings across the financial value chain by the Central Bank of the Philippines and the Securities and Exchange Commission, and

[1] Executive Order No. 19-02, Series of 2019. An Order Declaring the Province of Negros Occidental as a Source of Clean and Renewable Energy and a Coal-Free Province. 6 March 2019.
[2] https://www.doe.gov.ph/sites/default/files/pdf/electric_power/luzon_indicative_jan_2019.pdf
[3] Renewables Now. UPDATE- AC Energy's oversubscribed green bond sale hits USD 410m. February 5, 2019.
[4] Republic of the Philippines Department of Energy. Coal-Fired Plants Are 63% of Projects in Pipeline.

- Overhauling procurement practices by introducing Least-Cost Mechanism auctions by the utilities and the Energy Regulatory Commission.

The Policy Changes:

Remove the Diesel Fuel Subsidy

Via Department of Finance

The country's electricity challenges are an outgrowth of its geography: the Philippines consists of more than 7,000 islands, many of which are small and have traditionally relied on generators fuelled by imported diesel. The true cost of generation by diesel ranges from Php 10 per kWh (US$ 0.20) to Php 165 per kWh (US$3.30),[5] while approved subsidized rates range from Php 4.8 per kWh (US$0.09) to Php 5.6 per kWh (US$0.11).[6] In 2017, the projected budget for diesel fuel alone to small islands supplied by the Small Power Utilities Group (SPUG) under the National Power Corporation (NPC) and other power providers (known as new power provider/NPP), was Php 10.32 billion (US$ 206.4 million).[7]

The table below provides an overview of NPC SPUG price differentials between the true cost of diesel and the approved subsidized rate, with consumers paying the difference. These islands frequently experience rolling blackouts and unplanned power outages because of grid instability, inadequate generation capacity, and unaffordable rates. In many cases, limited market size makes 24/7 service impossible to justify with some operating only between 8 and 16 hours per day. But even worse, this unreliable service is heavily subsidized through what is known as the Universal Charge for Missionary Electrification (UCME) with a planned cost of Php 14.66 billion (US$ 293.2 million)[8] in 2019. The total amount expected to be paid by SPUG consumers is Php 6.67 billion (US$133.4 million) while the expected amount paid for by consumers outside SPUG areas in 2019 will be Php 7.99 billion (US$158 million). In other words, consumers – residential, commercial or industrial – in the Philippines main grids and other small island grids, are being forced to subsidize failing electricity systems.

[5] National Power Corporation Corporate Affairs Group. True Cost Generation Rate, P/k/Wh. As of December 2017.
[6] National Power Corporation. NPC-SPUG Electricity Rates. Small Power Utilities Group Existing Effective Rates. February 2019.
[7] IEEFA, Sara Jane Ahmed. Electricity-Sector Opportunity in the Philippines. May 2017.
[8] Republic of the Philippines Energy Regulatory Commission. ERC Case No. 2018-076RC. August 2018.

Table 1: True Cost of Diesel and Subsidy (Snapshot)[9]

NPC SPUG Area	Plant/Power Barge	True Cost of Diesel (Php per kWh)	Existing Subsidized Approved Generation Rate (SAGR) (Php per kWh)	Difference (Php per kWh) paid for by Subsidies from Consumers	Operating Hours
Masbate	Burias Mini Grid	103.09	5.12	97.97	8
Masbate	Masbate Pres Mini Grid	165.52	5.12	160.40	6-8
Romblon	Sibuyan DPP	25.56	5.64	19.92	24
Bantayan	Doong DPP	30.46	6.26	24.20	24
Tawi-Tawi	Tandubanak DPP	25.53	5.12	20.41	12
Other Visayas	Panay Mini Grid	127.37	5.64	121.73	8
Other Visayas	Almagro DPP, Western Samar	38.28	5.64	32.64	8
Other Visayas	San Vicente DPP, Northern Samar	44.09	5.64	38.45	16
Other Mindanao	Sacol DPP, Zamboanga	36.71	4.80	31.91	16
Other Mindanao	Hikdop DPP, Surigao del Norte	32.81	4.80	28.01	16

At a time when renewable energy enhances affordability, neither the government nor consumers should be footing the bill for diesel subsidies. In fact, the government has access to a viable pathway to transition because these financially burdened small island grids represent a largely overlooked opportunity for investors in renewable energy and storage that can readily replace imported diesel generation in locations spread across the Philippines. The business case for such investment is strong. Local deployment of renewables would lead to the dismantling of outdated and unnecessary infrastructure and outmoded forms of electricity generation that rely on diesel imports. Upgrading small island power systems through the uptake of renewables will advance the spread of secure, more affordable, and cleaner power.

[9] Refer to Appendix 1 for Expanded Table.

The key to implementing this transition would be a phased program of replacing diesel by hybridizing existing plants with renewable energy through a variety of strategies:

I. Fuel Displacement Model - On grids where peak demand is now fully met by diesel plants, and where the average cost of renewable energy is less than the variable costs of diesel generation (which consists mostly of fuel and lubes), electricity produced by run-of-river hydro, biomass, solar, and wind is now positioned to compete economically and to progressively displace imported diesel-fired generation by way of hybridization initiatives. Viable renewable-generation prices today indicate that diesel dependence can be reduced as the grid takes on increasing renewables. The economics of transition through hybridization are compelling. The main tool that can enable this transition is a technology-neutral procurement process for new power where technologies will compete on a per kilowatt hour (kWh) price basis via auctions. Hybridization can enable a reduction in total price per kWh for consumers.

II. Meeting Incremental Capacity - An incremental capacity approach brings additional electricity-generation capacity at a lower cost than the fuel-displacement model, at a quicker pace, and with a greater degree of stability. Adding solar and wind capacity incrementally to the electricity-generation mix across the many islands of the Philippines makes economic sense, because renewables now offer lower average energy costs compared to diesel generation. Enticing investment to meet incremental capacity can occur via auctions. But this strategy also suggests a greater renewable-energy-to-imported-diesel capacity ratio than that of the fuel displacement model. Some island grids may reach 100% renewable energy either when diesel contracts expire, or even sooner, as cost thresholds are crossed. Moreover, continual improvements in the commercial viability of battery storage and access to affordable financing structures will accelerate the uptake of renewables.

The current system subsidizes both diesel fuel cost and the capacity payments of diesel generation, making it too expensive, having surpassed a certain cost-effectiveness threshold. These thresholds are highlighted above through the Fuel Displacement Model, where average cost of renewables is less than the variable cost of diesel, and Meeting Incremental Capacity (new capacity), where the average cost of renewables is lower than the total cost of diesel generation. The above thresholds highlight a case without much change to the current system. However, there comes a point where subsidies no longer make sense and it is time for the Philippine government to allow the markets to work by removing subsidies that are no longer needed, given techno-economic improvements. The next threshold, Fuel Renewable Energy, highlights the most cost-effective strategy for the system via the removal of unnecessary diesel subsidies while enabling a competitive environment for investment in more affordable generation.

III. Fuel Renewable Energy - When average cost of renewable energy technologies plus residual (inertial) capital recovery cost from extant thermal contracts are less than the true cost of generation from NPPs with diesel generation, all thermal generation will be displaced. How quickly this develops depends on how the Energy

Regulatory Commission (ERC) and the Department of Energy (DoE) can assure the NPPs of cost recovery. In any case, ratepayers will still be burdened by paying more than the average cost of comparable technologies.

An added policy problem that needs to be addressed is the financial condition of some electric cooperatives. A number of them are heavily indebted due to inefficient collections, mismanagement, or high transmission and distribution losses. To ensure a low-cost power system for consumers where affordability leads to greater electrification, the Philippine government would be smart to remove the diesel subsidies and forgive the debt of cooperatives that switch to renewables, improve efficiency and management, and reduce transmission and distribution losses.

Investment Opportunity - A full transition to renewable energy among small island grids is possible in the short term without financial support from the national government. Such a transition, driven mainly by natural economic forces, could spur private investment of at least US$1 billion in 5 years from groups like Meralco, Ayala Corp, and other international power sector investors, with financing from capital markets. Furthermore, the transition would lead to a significant reduction in cross-subsidies from ratepayers in the mainland grids through the aforementioned UCME.

Remove the Automatic Pass-Through of Fossil Fuel

Via Energy Regulatory Commission

The Philippines is still betting big on coal with 4,785 MW of coal projects committed in 2019 alone.[10] But in the face of rapidly declining costs and technological advances in renewable energy and storage, reliance on coal makes increasingly little sense.

Like its diesel problem, the Philippines' growing dependence on imported coal can be tied directly to government-approved contracts, namely the Power Supply Agreements, that perpetuate market distortions.

For example, the power supply agreement (PSA) of the Panay Energy Development Corporation, a Meralco power supplier, dictates a delivered rate of Php3.96 (US$0.08) per kWh. But because the company is allowed to pass on fuel costs and foreign exchange fluctuations directly to consumers, the actual generation rate for August 2017 was 37% higher, at Php5.41 (US$0.11) per kWh. This PSA, like others approved by the ERC, unfairly penalizes consumers who have no bargaining power. As the system is currently structured, ratepayers absorb all the risk while utilities and power generators remain insulated from ongoing market changes and, as a result, have no incentive to transition away from coal or hedge against price variations and currency risks.

Removing the ability for generators to automatically pass-through fuel and foreign exchange fluctuations would help level the playing field among competing energy providers. This change has been suggested by both the DoE and ERC and they have

[10] Private Sector Initiated Power Projects (Luzon) Committed. As of 31 December 2018; Private Sector Initiated Power Projects (Visayas) Committed. As of 31 December 2018; Private Sector Initiated Power Projects (Mindanao) Committed. As of 31 December 2018.

backed competitive bidding for fixed price delivery. If this were to be the case, the Panay Energy Development Corporation PSA with Meralco would be locked at the PSA price of Php3.96 per kWh, not Php5.41 per kWh, which was the generation rate for August 2017.

Stranded Asset Risk Warning Across the Financial Value Chain

Via the Central Bank and Securities and Exchange Commission

While the concept of stranded costs may seem obscure to some, in truth, it is straightforward: Costs become stranded when a company is unable to charge enough for its product to recover its investment and production costs. In the Philippines coal generation sector, this means utilities and other producers will need to be able to recover the cost of building 4,785 MW of coal projects committed in 2019 alone,[11] amounting to a potential stranded risk of US$9.5 billion, with a broader pipeline of 10,423 MW amounting to US$20.9 billion of stranded risk.

Given the sharp and sustained declines in renewable energy costs over the past few years, as well as projections for continued declines in the years ahead, the country's coal backers should no longer assume they can recover these costs, and instead diversify their power holdings.

Meralco, for example, is underwriting an 85MW solar power supply deal for Php 2.99 per kWh. Geothermal runs from Php3.5 to Php4.5 per kWh. Run-of-river hydro costs range from Php3 to Php6.5 per kWh, and removing the permitting red tape, which currently takes about five years for project approval, could drive that price even lower. These prices, coupled with the recent success and sharp price reduction in offshore wind, point to continued renewable energy cost deflation and raise serious questions about the economics of new coal generation.

Stranded costs are already being crystalized in Mindanao, even without retail competition enabled by the presence of a wholesale electricity spot market. A surplus of coal-fired generation on the island has pushed utilization rates down compared to developers' initial expectations, leading to Php 3 billion (US$60 million) in unrecovered or stranded costs from 2014-2016.[12]

While generators and developers ultimately may back away from coal, the market's current structure, pushing most of the risk to consumers, needs to change to ensure that this transition takes place sooner, rather than later.

Meralco, for example, is at the forefront of protecting consumers and industry from stranded assets via its carve-out clause in the PSAs, known as "curtailment clauses." A carve-out clause can reduce the amount of power a utility must buy from a power

[11] Private Sector Initiated Power Projects (Luzon) Committed. As of 31 December 2018; Private Sector Initiated Power Projects (Visayas) Committed. As of 31 December 2018; Private Sector Initiated Power Projects (Mindanao) Committed. As of 31 December 2018.
[12] IEEFA, Sara Jane Ahmed & ICSC, Jose Logarta Jr. Carving out Coal in the Philippines: Stranded Coal Plant Assets and the Energy Transition. October 2017.

generator and exempt distribution utilities from the consequences of coal plant overbuilding and high coal costs. This could protect captive Philippine industry and other ratepayers from having to foot the bill for generator costs when other companies, under the country's retail competition and open access program, turn to cheaper suppliers. Stranded asset risk is thus shifted to the coal power providers and their investors.

Though Meralco claims that all its new coal contracts have it, the carve-out clause needs to become the mandatory policy of the ERC to protect all consumers and industry from stranded asset risk. Without this, the market is burdened by the type of moral hazard that came with over-selling of mortgage products in the run-up to the global financial crisis. Too many developers believe they will be able to pass on the risk of their flawed technology and fuel decisions because the regulatory structure insulates them from market risk.

This regulatory problem is aggravated in the Philippines because banks do not incorporate stranded-asset risk in project finance underwriting, either by negligence or by design, and continue to support policies that transfer risks to the industry and consumers instead. It is time for the government to equitably redistribute such risk.

Overhaul of Procurement Practices– Least-Cost Mechanisms (Auctions)

Via Distribution Utilities and Energy Regulatory Commission

Enforcement of transparent auctions would put an end to self-negotiated generation rates and be a significant step toward open competition for the procurement of the lowest-cost option for power production. Procurement also must be conducted on a technology-neutral basis. In the case of coal and diesel, future PSAs could be awarded based on how much a power producer is willing to step back from the traditional automatic cost pass-through model and shoulder more fuel-price risk.

For example, many such deals in India now have power generators agreeing to limit fuel-price passthroughs to 30% instead of 100%. In some cases, power generator proposals are also being presented now with fuel hedge contracts, which reduce exposure to fuel cost volatility. Such contracts are already widely used by airlines, cruise lines and trucking companies, and can certainly be tapped by the electric power industry.

An appropriate auction mechanism could be developed in the Philippines with the following mechanics in mind:

1. The distribution utility issues a call for technology-neutral tenders to install a certain amount of electricity. Ceiling prices should not be disclosed to project developers that want to participate to ensure greater competition. Streamlined administrative procedures, with communication and transparency provided equally to all project developers, are essential.

2. Participating project developers submit a price per unit of electricity at which they will build the project. Utilities can use one of two ways to entertain submissions:

    a) Project developers simultaneously submit their price at which the electricity would be sold under a PPA. A third-party manager, or the utility, ranks and awards projects until the sum of the quantities that they offer covers the volume of energy being requested. This option has the benefit of simplicity, is easy to implement, fosters competition and avoids collusion. Post tender award disclosure of all final submissions also would improve transparency.

    b) In the initial round, the third-party manager or the utility offers a price, and developers submit the amount of power they would be willing to provide at that price. The third-party manager or the utility progressively lowers the offered price in successive rounds until the quantity submitted matches the quantity to be procured. This option is more difficult to implement but allows for fast price discovery as well as greater transparency.

3. Each offer is screened by the utility for viability (including proof of financial and technical capability, secured land, environmental license, grid connection, etc.) and subsequently selected based on price, starting with the least-cost project, until the utility reaches its megawatt-hour (MWh) limit for that round. Each offer is subject to strong compliance rules (including penalties, submission bonds, project completion guarantees, etc.) that reduce the risk of under-submissions, project delays, and project failure.

4. Capacity remaining at the end of each round is added to the next round.

5. Winning submissions are given a standard contract from the utility, which can then go through an expedited regulatory review process.

6. The regulatory body evaluates the contract based on the auction price and other criteria the regulator deems relevant.

Conclusion

The existing system has failed to protect electricity ratepayers. However, with the implementation of the above recommendations, the reduction of moral hazard, correction of market distortions, and levelling of the playing field, more affordable power provision will be able to advance the electrification goals of the country and make energy more affordable for both consumers and industry.

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Appendix 1

True Cost of Diesel and Subsidy (Expanded)

NPC SPUG Area	Plant/Power Barge	True Cost of Diesel (Php per kWh)	Existing Subsidized Approved Generation Rate (SAGR) (Php per kWh)	Difference (Php per kWh) paid for Subsidies by Consumers	Operating Hours
Mindoro Area	Occidental Mindoro San Jose Grid	12.89	5.64	7.24	24
Mindoro Area	Occidental Mindoro Mapsa Grid	9.60	5.64	3.96	24
Mindoro Area	Lubang DPP	13.52	5.64	7.88	24
Mindoro Area	Cabra DPP	38.47	5.64	32.82	8
Marinduque	Marinduque Grid	10.41	5.64	4.77	24
Marinduque	Marinduque Mini Grid	44.66	5.64	39.02	8
Mainland Palawan	El Nido DPP	11.00	5.64	5.36	24
Mainland Palawan	Taytay DPP	10.71	5.64	5.07	24
Mainland Palawan	San Vicente DPP	15.21	5.64	9.57	24
Mainland Palawan	Rizal DPP	13.25	5.64	7.61	24
Catanduanes	Catanduanes Grid	10.83	5.64	5.19	24
Catanduanes	Palumbanes DPP	45.65	5.64	40.01	8
Masbate	Ticao DPP	12.90	5.12	7.78	24
Masbate	San Pascual DPP	17.89	5.12	12.78	16
Masbate	Masbate Mini Grid	41.68	5.12	36.56	8
Masbate	Burias Mini Grid	103.09	5.12	97.97	8

Masbate	Masbate Pres Mini Grid	165.52	5.12	160.40	6-8
Romblon	Romblon Grid	14.45	5.64	8.81	24
Romblon	Sibuyan DPP	25.56	5.64	19.92	24
Romblon	Banton DPP	26.36	5.64	20.72	16
Romblon	San Jose DPP	15.84	5.64	10.20	16
Romblon	Corcuera DPP	21.69	5.64	16.05	16
Romblon	Concepcion DPP	25.00	5.64	19.36	16
Bantayan	Doong DPP	30.46	6.26	24.20	24
Bantayan	Guintarcan DPP	28.96	6.26	22.71	16
Camotes	Camotes Grid	15.75	6.26	9.49	24
Tawi-Tawi	Tawi-Tawi (Mainland) Grid	14.08	5.12	8.96	24
Tawi-Tawi	Balimbing DPP	23.41	5.12	18.30	16
Tawi-Tawi	Tandubas DPP	29.18	5.12	24.06	8
Tawi-Tawi	Sibutu DPP	19.37	5.12	14.26	16
Tawi-Tawi	Sitangkai DPP	21.76	5.12	16.65	16
Tawi-Tawi	West Simunul DPP	22.31	5.12	17.19	14
Tawi-Tawi	Languyan DPP	47.95	5.12	42.83	8
Tawi-Tawi	Mapun DPP	21.26	5.12	16.14	16
Tawi-Tawi	Tandubanak DPP	25.53	5.12	20.41	12
Basilan	Basilan Grid	14.90	5.12	9.79	24
Sulu	Jolo DPP	11.14	5.12	6.02	24
Sulu	Pangutaran DPP	66.97	5.12	61.85	8
Sulu	Siasi DPP	16.46	5.12	11.34	24
Other Visayas	Pilar DPP, Cebu	18.32	5.64	12.68	24
Other Visayas	Gigantes DPP, Iloilo	22.31	5.64	16.67	24

Other Visayas	Caluya DPP, Antique	22.82	5.64	17.18	24
Other Visayas	Panay Mini Grid	127.37	5.64	121.73	8
Other Visayas	Bohol 1 Mini Grid	42.17	5.64	36.53	8 & 24
Other Visayas	Bohol 2 Mini Grid	50.66	5.64	45.02	8
Other Visayas	Maripipi DPP, Biliran	25.29	5.64	19.65	24
Other Visayas	Limasawa DPP, Southern Leyte	24.90	5.64	19.26	24
Other Visayas	Zumarraga DPP, Western Samar	21.66	5.64	16.02	24
Other Visayas	Tagapul-An DPP, Western Samar	40.57	5.64	34.93	8
Other Visayas	Almagro DPP, Western Samar	38.28	5.64	32.64	8
Other Visayas	Sto. Niño DPP, Western Samar	29.59	5.64	23.95	8
Other Visayas	Camandag DPP, Western Samar	61.78	5.64	56.14	8
Other Visayas	Almagro Mini Grid	101.30	5.64	95.66	8
Other Visayas	Sto Nino Mini Grid	33.99	5.64	28.35	8
Other Visayas	Catbolagan Mini Grid	79.23	5.64	73.59	8
Other Visayas	San Antonio DPP, Nothern Samar	24.84	5.64	19.20	24
Other Visayas	Capul DPP, Northern Samar	24.01	5.64	18.37	24
Other Visayas	San Vicente DPP, Northern Samar	44.09	5.64	38.45	16
Other Visayas	Biri DPP, Northern Samar	25.85	5.64	20.21	16
Other Visayas	Batag DPP, Northern Samar	71.56	5.64	65.92	8
Other Mindanao	Sacol DPP, Zamboanga	36.71	4.80	31.91	16

Other Mindanao	Dinagat Grid	13.52	4.80	8.71	24
Other Mindanao	Hikdop DPP, Surigao del Norte	32.81	4.80	28.01	16
Other Mindanao	Kalamansig DPP, Sultan Kudarat	10.94	4.80	6.14	24
Other Mindanao	Sen. Ninoy Aquino DPP, Sultan Kudarat	12.67	4.80	7.87	16
Other Mindanao	Palimbang DPP, Sultan Kudarat	20.78	4.80	15.98	16
Other Mindanao	Balut DPP, Davao Occidental	23.93	4.80	19.13	16
Other Mindanao	Talicud DPP, Davao del Norte	17.42	4.80	12.62	16

Appendix 2

Below is an overview of committed private sector initiated projects in Luzon, Visayas, and Mindanao, as of December 2018.[13]

Committed Coal Projects with Target Commercial Operation by 2019

Name of Project	Project Proponent	Main Contractor	Location	Rated Capacity	Offtake	Estimated Project Cost	Target Commissioning Date	Target Commercial Operation
Limay Power Plant Project Phase II	SMC Consolidated Power Corporation	Awarded EPC to Formosa Heavy Industries (FHI)	Brgy. Lamao, Limay, Bataan	150	On-going electric power supply contract negotiation with prospective off-takers (DUs)		Unit 4 - January 2019	Unit 4 - February 2019
Masinloc Expansion Project	AES Masinloc Power Partners Co., Inc.	POSCO Engineering and Construction Co. Ltd, Korea (Offshore - Engineering Procurement); Ventanas Philippines Construction Inc. (Onshore Construction Main Contractor)	Zambales	300		Php 49.45 billion	Unit 3 - January 2019	March 2019
San Buenaventura Power Ltd. Co. (SBPL) Project	San Buenaventura Power Ltd. Co. (SBPL)		Barangay Cagsiay 1, Mauban, Quezon	500	20 years + 5-year extension PSA with MERALCO as offtaker; • SBPL has signed a PSA with Meralco on 29 May 2014; PSA approved by ERC on March 27, 2015 and released May 19, 2015	Php 37.88 billion	October 2018	December 2019
RPEI Coal-Fired Power Plant	Redondo Peninsula Energy, Inc / • 52% owned by Meralco PowerGen Corp. (MPGC)		Sitio Naglatore, Cawag, Subic Bay Freeport Zone	600	Meralco	Php 50 billion / US$ 1.2 billion	Unit 1 – October 2018 Unit 2 – December 2018 (Target Commencement of Construction will be Dependent on Supreme Court decision on Writ	2019

[13] Private Sector Initiated Power Projects (Luzon) Committed. As of 31 December 2018; Private Sector Initiated Power Projects (Visayas) Committed. As of 31 December 2018; Private Sector Initiated Power Projects (Mindanao) Committed. As of 31 December 2018.

							of Kalikasan Case)	
GNPower Dinginin 2 x 600 MW Supercritical	GNPower Dinginin Coal Plant Ltd. C		Mariveles, Bataan	1200	Signed contracts with a group of electric cooperatives and retail electricity suppliers; On-going sales and marketing to electric cooperatives, private distribution utilities, RES and large end-users in the Luzon and Visayas Grid	US$1 billion	Unit I - June 2019 Unit II - Dec 2019	Unit I - October 2019 Unit II - June 2020
AOE Coal-Fired Power Plant	Atimonan One Energy	Owner's Engineer has been appointed	Atimonan, Quezon	1200	Energy to be sold to DUs and electric cooperatives		Unit 1 - March 2023 Unit 2 - TBD	Unit 1 - March 2023 Unit 2 - TBD
Pagbilao Combined Cycle Gas Fired Power Plant (3 x 200 MW)	Energy World Corporation	Siemens Energy for gas turbines	Brgy. Ibabang Polo, Grande Island, Pagbilao, Quezon	650	100% WESM	US$ 300 million	2018	March 2019
Therma Visayas Energy Project	Therma Visayas Inc.	EPC Contract awarded to Hyundai Engineering Co., Ltd. and Galing Power & Energy Co	Brgy. Bato, Toledo City, Cebu	300	On-going discussions with target off-taker	Php 23 billion	January 2019	Unit 1: 1st Q 2019 Unit 2: 2019
Palm Concepcion Coal-Fired Power Plant	Palm Concepcion Power Corp. (Formerly DMCI Concepcion Power Corp.)		Brgy. Nipa, Concepcion, Iloilo	135		Php 26.356 billion	Unit II - January 2019	Unit II - 2019
Modular Diesel Ancillary Service Power Plant	Isabel Ancillary Services Co. Ltd. (Formerly Marubeni Diesel Genset Facility)		Isabel, Leyte	70	All generating capacity is to be dedicated to provide Ancillary Services to the National Grid Corporation of the Philippines (NGCP). Terms of the Ancillary Services Procurement Agreement with NGCP are near to finalization. To be executed upon the completion of Accreditation Test, which is expected on April 2019.	Finance to be provided through equity contribution by the parent companies; Marubeni Corporation and Desco Inc.	April 2019	July 2019

GNPower Kauswagan Clean Coal-Fired Power Plant	GN Power Kauswagan Ltd. Co.		Kauswagan, Lanao del Norte	600	-330MW sold to ECs arranged by AMRECO PSAG; -ANECO-25.0MW, ASELCO-17.7MW, BUSECO-18.2MW, CAMELCO-2.7MW, DORECO-7.0MW, DASURECO-34.3MW, FIBECO-21.6MW, LANECO-5.0MW, MOELCI I-6.8MW, MORESCO I-34.1MW, COTELCO-5.0MW, SIARELCO-2.0MW, SOCOTECO I-25.6MW, SUKELCO-14.3MW, SURNECO-23.8MW, SURSECO I- 8.4MW, SURSECO II-13.0MW, ZANECO-25.0MW, ZAMSURECO I-24.2MW, ZAMSURECO II-16.3MW; -GNPK is currently negotiating with other ECs as well as non-DU customers for sale of additional capacity		Unit 1 - January 2019 Unit 2 - January 2019 Unit 3 - January 2019 Unit 4 - January 2019	Unit 1 - March 2019 Unit 2 - May 2019 Unit 3 - June 2019 Unit 4 - August 2019
Southern Mindanao Coal Fired Power Station Phase 2	Sarangani Energy Corporation	Conal Holdings Corporaion (CHC) and Alsons Consolidated Resources(ACR); Supply Contract (Engineering and Procurement Works for Offshore Portion) between Sarangani Energy Corporation and JGC Corporation Construction Contract (Engineering, Procurement and Construction Works) between Sarangani Energy Corporation and JGC Philippines, Inc.	Brgy. Kamanga, Maasim, Sarangani	100	ANECO-1.0MW, ASELCO-10.0MW, BUSECO-2.0MW, CEPALCO-20.0MW, COTELCO MAIN-10.0MW, COTELCO PPALMA- 4.0MW, CLPC-5.0MW, DANECO-15.0MW, DASURECO-10.0MW, DLPC-100.0MW, DORECO-5.0MW, MOELCI 1-3.0MW, MORESCO I-5.0MW, SOCOTECO I- 2.0MW, SOCOTECO II-5.0MW, SUKELCO-10.0MW, SURNECO-5.0MW, SURSECO 1-3.0MW, SURSECO 2-5.0MW, ZANECO-5.0MW, ZAMSURECO I-12.0MW, ZAMSURECO 2-10.0MW, ZAMCELCO-1.0MW, PILMICO-1.0MW, PHILSINTER-4.0MW	Php 14,979,221,000.00 Banks - Consortium led by BDO Trust and Investments	January 2019	February 2019

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Sara Jane Ahmed, energy finance analyst for IEEFA, is the author of several studies on island grid transition to renewables, coal stranded asset risk, and rooftop solar. She is a former investment advisor specializing in originating and structuring energy opportunities in emerging markets.