

Section 15

Case study – Phillipines

Communities on remote islands in the Philippines typically rely on fossil fuel-based mini-grids. The majority were built under the government’s electrification mechanism, but many of them do not supply reliable electricity, partly due to the very high cost of electricity generation and growing power demand. Transporting fuel to remote islands can add 20 percent to the average cost per litre of fuel. Legislation may assist solar hybrid mini-grids for unserved and underserved communities, if enacted.

15.1 Overview

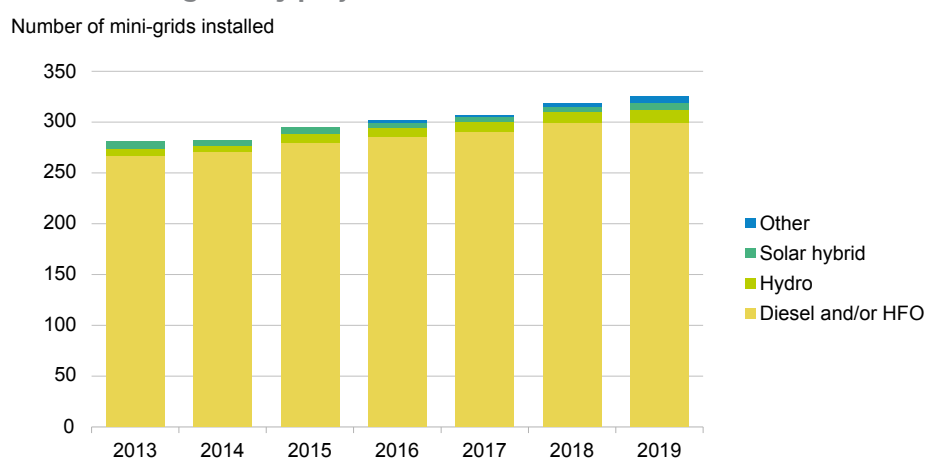
The Philippines consists of 7,641 islands, of which about 2,000 are inhabited. The country achieved an electrification rate of 89 percent by the end of 2018, up from 85 percent in 2010. The majority of the population resides on the large islands of Luzon, Mindanao and Visayas. An estimated 11 mil-

lion people live without access to electricity, most of them on remote islands where there is no grid. The government aims to reach 100 percent electricity access for targeted households identified in the 2015 census by 2022, and universal access by 2040 that includes households beyond the census (Department of Energy, 2016). It recognizes that these targets are unlikely to be met without decentralized energy technologies such as mini-grids.

According to the Department of Energy, a total of 326 mini-grids with a total capacity of 530MW were installed as of February 2020. The majority of these were built within the missionary electrification framework and run on fossil fuels (See Section 16.4). There are many (but unquantifiable) power supply networks on very small islands that are organized informally (Paul Bertheau, 2018). In July 2019, Senator Win Gatchalian, chair of the Senate Committee on Energy, filed Senate Bill 175¹⁹ to promote renewable hybrid mini-grids for unserved and

Figure 125

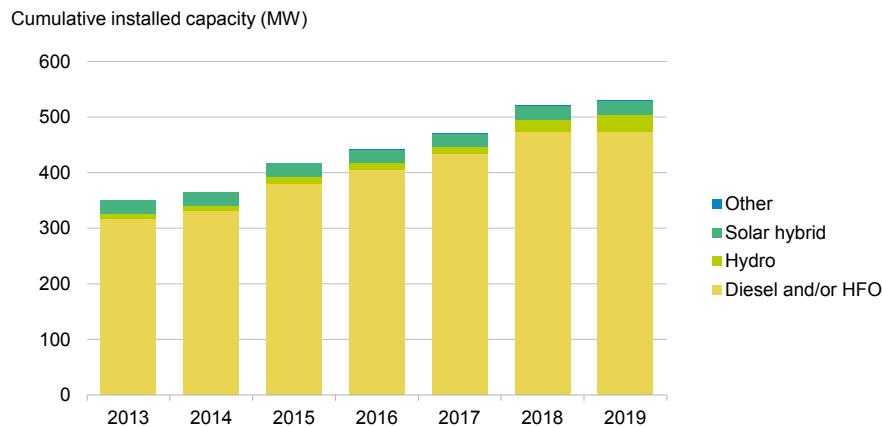
Philippines’ installed mini-grids, by project



¹⁹ Senate Bill No. 2218 in the 17th Congress in May 2019 became Senate Bill No. 175 in the 18th Congress in July 2019.

Figure 126

Philippines' installed mini-grids, by capacity



Source: BloombergNEF, Department of Energy, the Philippines, National Power Corporation.

underserved areas to achieve the electrification target in a more cost-efficient manner. If the bill is implemented, some existing regulatory hurdles for mini-grids would be lowered.

15.2 Distributed power market structure

The Philippines has 150 franchise areas and each has electricity supplied by a distribution utility that may be an electric cooperative (121 electric cooperatives operate across the country) or a local government- or private investor-owned utility (e.g., Meralco).

Off-grid electricity is mostly supplied by the Small Power Utilities Group (SPUG) under the National Power Corporation (NPC). Some electricity is supplied by New Power Providers (NPPs), qualified third parties (QTPs), distribution utilities or independent power providers (Department of Energy, 2016). The NPC-SPUG is a state-owned entity that pursues the government's missionary electrification plan initiated in 2001 (Department of Energy, 2001) to install decentralized electricity for consumers in remote communities. NPPs are private entities that took over existing assets from the NPC-SPUG either by outright purchase or lease or by installation of new facilities. They are in charge of power generation. QTPs are private entities that generate and distribute electricity in remote villages in areas

where the franchised utility is not able to provide service. The government introduced the NPP and QTP schemes to facilitate private investment in the mini-grid sector.

There are a few examples of private entities that have developed mini-grids outside these three forms. Meralco, the largest private distribution company that covers metropolitan Manila, has installed mini-grids supplying electricity to villages (called barangays) on Cagbalete Island and Verde Island. One developer formed a joint venture with an electric cooperative, installed a mini-grid then transferred the asset to the cooperative.

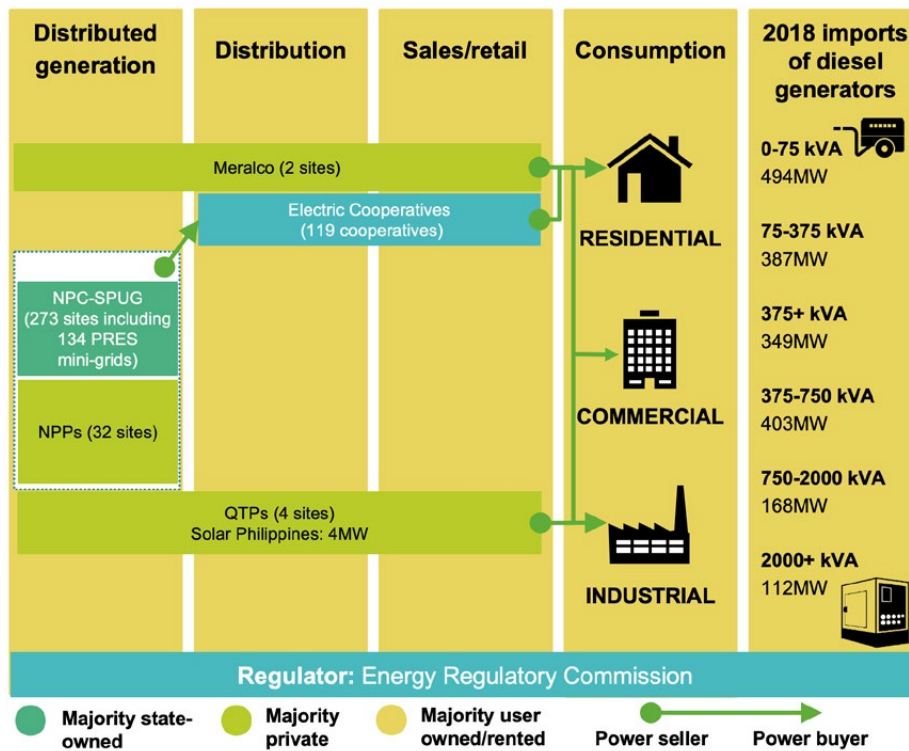
15.3 Market status

Mini-grids are predominantly NPC-owned or under public-private partnership. NPC-run SPUG operates 273 mini-grids of which 134 were installed in mainland Masbate and on Ticao Island under the Philippine Rural Electrification System (PRES) (Figure 128). Private developers need to be approved as NPPs or QTPs or else collaborate with an electric cooperative to develop mini-grids. New solar hybrid mini-grid projects would mostly take one of these forms. QTPs need to build their own distribution system in unserved areas.

Most of the SPUG mini-grids use either diesel or heavy fuel oil (HFO) to generate electricity. This is

Figure 127

Philippines' distributed power market structure



Source: BloombergNEF, Bertheau et al., PGS Consulting. Diesel generator imports are estimated based on unit sales.

costly because delivered diesel fuel costs can be up to 76 percent more expensive than the national average pump price of USD 0.71/litre in 2018.

The solar hybrid mini-grid market has just started maturing with only seven mini-grids installed at the end of 2019. These were generally retrofits of existing diesel generators. The National Electrification Administration (NEA), the Asian Development Bank (ADB) and foreign governments financed the work (Figure 130). There is a mixture of domestic and international players in the market, including both large corporates and start-ups. Most developers are working on one or two mini-grids. The growing participation of mini-grid developers suggests their recognition of the market's growth potential to substitute the use of fossil fuel or to develop green field projects. Still, the market is at a very early stage.

Domestic actors

Solar Para Sa Bayan, a subsidiary of solar developer, Solar Philippines, has installed at least one mini-grid to date. Other domestic energy companies are also

moving towards renewables and decentralized energy. In 2019, Meralco, the largest regional distribution company, switched on its second mini-grid with generation capacity of 120kW to serve more than 800 households on Cagbalete Island, Quezon province. AC Energy, a subsidiary of Ayala Corporation, aims to invest in renewables by targeting 5GW in Southeast Asia by 2025.²⁰ One Renewable Energy installed a 52kW solar hybrid mini-grid serving 200 households on Malalison Island. The island was outside the area served by SPUG, hence, the developer was selected by the local electric cooperative through a competitive bidding process. It handed over the mini-grid system to the cooperative after installation and continues to be involved in billing.

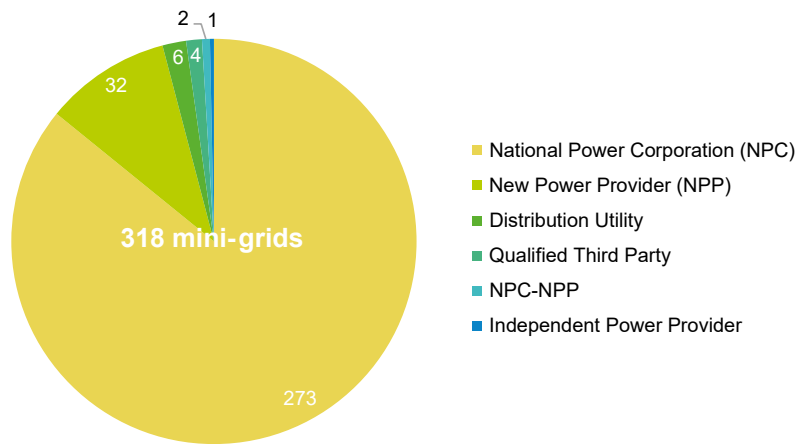
International actors

Singapore-based InFunde Development, on behalf of Infracore Asia, a part of the UK-based Private Infrastructure Development Group (PIDG), aims to deploy both AC and DC-coupled mini-grids for

20 IEEFA, *The Philippine Energy Transition*, March 2019

Figure 128

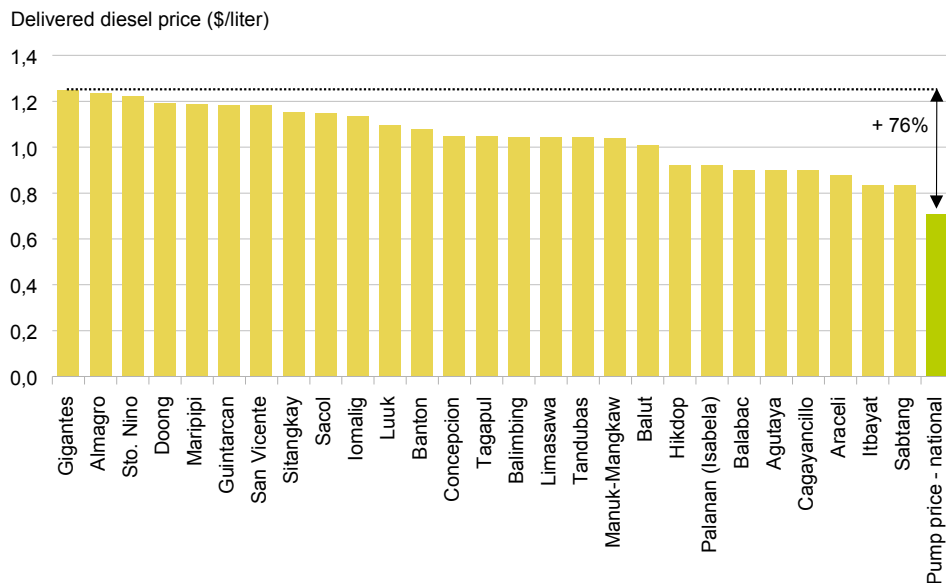
Philippines' installed mini-grids by ownership



Source: BloombergNEF, Department of Energy, the Philippines, National Power Corporation. **Note:** Includes only projects with ownership information available.

Figure 129

Estimated Philippines' delivered diesel prices for select NPC-SPUG diesel mini-grids in 2018



Source: Silver Navarro, Jr, BloombergNEF, Climatescope 2019. **Note:** USD 1 = PHP 51.783. The average is of all the diesel mini-grids shown in the chart.

off-grid communities. The company partnered with Cambodia-based start-up Okra Solar, and completed a pilot project to provide DC-coupled mini-grids to connect 62 households in Busuanga, Palawan Island. The technology allows electricity to be directed to where it is needed and to use DC appliances. InFunde Development is also developing a 1.2MW AC-coupled mini-grid to supply electricity to around 4,000 households. It has a pipeline of projects to cover about 200,000 households.

In January 2019, Singapore-based developer WEnergy Global announced a new investment entity with Tokyo Electric Power Co. Power Grid (Tepco PowerGrid), ICMG Partners and Greenway Grid Global called CleanGrid Partners with a total investment of USD 60 million,²¹ The developer aims to duplicate the model in other parts of Indonesia,

²¹ WEnergy Global, Singapore's WEnergy Global, ICMG Partners and Japan's TEPCO-PowerGrid working together on a \$100 million Fund for Clean Energy Projects in SEA, 22 January 2019

Figure 130

Mini-grid developer landscape in the Philippines



Source: Companies, BloombergNEF.

Myanmar and the Philippines. The Sabang Renewable Energy Corp (SREC), a consortium of WEnergy Global, Vivant Energy Corp and Gigawatt Power, launched a 2.4MW PV mini-grid on Sabang, Palawan Island, in November 2019 (WEnergy Global, 2019). Pilipinas Shell Foundation is developing 20 mini-grids for rural communities on Palawan Island.

15.4 Policy and regulations

Missionary electrification

The core of the rural electrification framework in the Philippines is missionary electrification. According to Republic Act 9136, which came into force in 2001, the National Power Corporation performs “the missionary electrification function through the Small Power Utilities Group (SPUG) and shall be responsible for providing power generation and its associated power delivery systems in areas that are not connected to the transmission system.” Missionary areas refer to designated off-grid, unviable, and underserved areas. SPUG serves 242 missionary areas (Asian Power, 2016). The NPC discloses locations of the SPUG plants (referred to as mini-grids in this report) on its [website](#).

The electrification scheme is funded by two revenue sources: electricity sales in the missionary areas and universal charges for missionary electrification (UCME) collected from all rate payers in the country as determined by the Energy Regulatory Commission (ERC). The UCME covers the gap between the true cost of the mini-grids operated by SPUG and

the subsidized approved generation rate (SAGR) that is determined by the ERC. In the Philippines, the true cost of these generation plants on remote islands is USD 0.20–0.72/kWh according to the NPC, as most of the assets burn expensive diesel or HFO. This is well above the tariffs of USD 0.11–0.12/kWh charged to grid consumers (Figure 131).

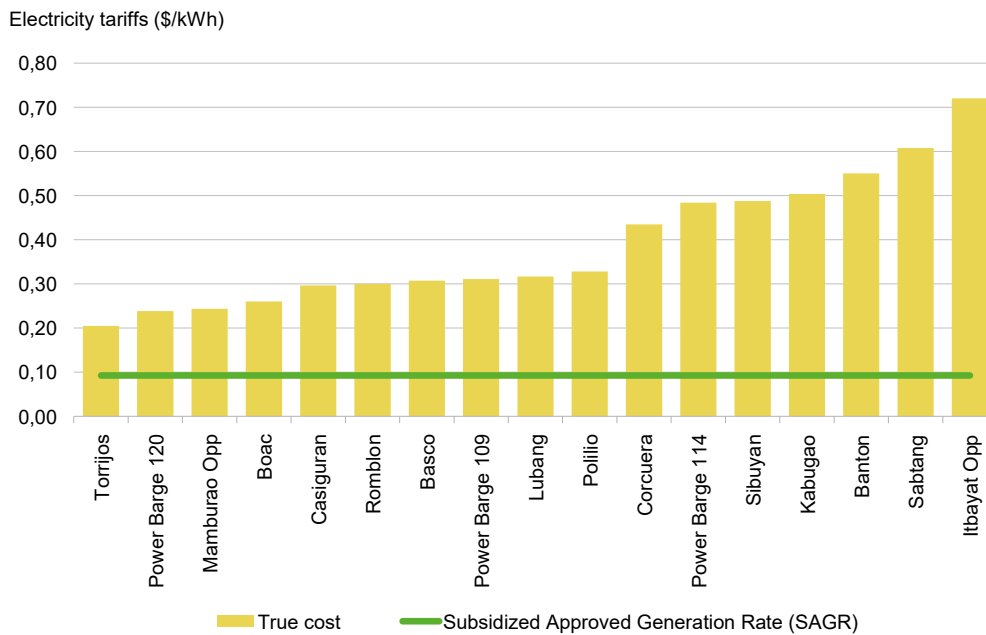
The country’s electricity access rate improved from 76 percent to 89 percent between 2001 and 2018. While the missionary electrification programme has supported rural electrification to some extent, it has also increased the cost of electrification, due to high generation costs coupled with the increase in mini-grid installations, as well as population and power demand growth in the missionary areas. The number of mini-grids installed using fossil fuel grew to 301 between 2001 and 2019.

Another issue is the relatively low reliability of mini-grids. More than 55 percent of the country’s mini-grids supplied electricity for less than eight hours a day as of December 2019, according to the Department of Energy (DOE). Of this figure, the 134 PRES mini-grids installed in mainland Masbate and on Ticao Island supplied electricity for five hours per day. This is due to several factors including the high cost of generation, the timings of fuel delivery to the islands and unreliable payment of UCME by the government.

On 16 December 2018, the DOE announced that the country plans to phase out the UCME gradually, depending on economic conditions in the remote areas. It said that if such a fund is needed, it should be charged to the government, not grid ratepayers.

Figure 131

Gap between true costs and the SAGR in the Philippines



Source: BloombergNEF, National Power Corporation. Note: USD 1 = PHP 51.856.

It is currently unclear whether the phase-out will actually happen, and, if it does, what the timeline for the phase-out would be. However, reaching a 100 percent electrification rate within the next two years is unlikely without some form of public funding as electrification on the remote islands is not otherwise financially viable.

Use of solar hybrid systems has the potential to reduce generation costs, particularly on remote islands, as solar hybrid systems use much less fossil fuel than diesel generators. However, there are some practical challenges. The missionary electrification mechanism does not distinguish between different technologies. For the local electric cooperatives that handle retail distribution, solar hybrid systems are a relatively new technology while diesel generators are already established. It is also challenging for the cooperatives to access funds from financiers or private sector partners as they perceive a lack of business track record and creditworthiness (Paul Bertheau, 2018).

Mini-grid regulations

For developers, becoming an NPP or QTP is a bottleneck as the process to obtain a permit is

cumbersome and lengthy and makes it difficult for them to secure financing for mini-grid projects. New legislation however intends to address this challenge.

Licensing

No explicit licensing process for mini-grids exists in the Philippines, making the application process at least as long and costly as that for utility-scale projects. Even small projects need to go through the cumbersome licensing process, which disadvantages smaller developers that lack the overhead resources of large developers.

In March 2019, President Duterte signed the Energy Virtual One-Stop Shop (EVOSS) Act that aims to streamline the process of permits for power generation, transmission and distribution in the country. The EVOSS is an online portal that allows energy developers to apply for permits or licenses, submit all the required documents and monitor the approval process (ZICO, 2019). The law also requires all the government bodies involved to follow a strict timeline. Their failure to act within the timeframe results in the automatic approval of an application and a potential penalty against pub-

lic officers. As of February 2020, EVOSS had yet to include NPP and QTP licensing processes, but it should cover them once the software work has been completed.

As part of the implementation of Senate Bill 175, the DOE and the ERC aim to establish a streamlined process to approve the licence for a micro-grid system provider.

Grid connection rules

Developers initially pay the costs of grid connection, but this is paid back to them over time by the ERC.

Net metering

A net metering programme was launched in 2014 to allow end users to produce power at facilities 100kW or smaller and export excess energy to the grid. Exported energy is paid at rates corresponding to the blended generation charge of the distribution utilities (DUs). Like the feed-in tariff mechanism, surplus electricity generated under net metering agreements has priority of dispatch ahead of other forms of generation.

Microgrid Systems Act

Senate Bill 175 (the Microgrid Systems Act) currently under legislation will, if enacted, set up a new policy framework to promote renewable hybrid mini-grids to provide reliable electricity to communities on remote islands. At the beginning of January 2020, the Senate Committee on Energy was finalizing the Committee Report on the bill, which will then go through the necessary legislative processes before it becomes law.

The bill targets unserved and underserved areas nationwide, thus, any areas without access to reliable electricity are within the scope including those designated under the missionary electrification policy (see below). However, there can be changes to this depending on the results of the discussion in the Technical Working Group meetings in the Senate. According to the DOE, approximately 900 areas are currently unserved in the Philippines.

There was no definite timeline for the passage of the bill into law as of the beginning of January 2020. The government would need to urge on enactment of the bill to achieve its electrification goal by 2022.

Table 27

Key duties under the Philippines Microgrid Systems Act (Senate Bill 175)

Duties of Energy Regulatory Commission (ERC)	Duties of Department of Energy (DoE)
<ul style="list-style-type: none"> • Within six months from its enactment, the ERC is to establish and disclose: <ul style="list-style-type: none"> • New mechanisms to accredit entities that install mini-grid systems as micro-grid system providers (MSPs) • The maximum total capacity of mini-grids that can be connected to a specific distribution system • Technical and service standards for mini-grid systems • Rules for grid-connected mini-grids to trade electricity with the main grid. • Determine benchmark rates (so the maximum retail rate or generation rate) for different mini-grid systems that MSPs will collect from their customers • Monitor contracts and the operations of all awarded MSPs. 	<ul style="list-style-type: none"> • Release an updated list of potential areas for mini-grid development (such as off-grid areas and unreliable grid areas). • Establish and conduct a streamlined competitive selection process of MSPs and announce an annual schedule of the process. • Determine a detailed procedure for the transition of electricity services from distribution utilities to awarded MSPs in unreliable grid areas.

Source: Congress of the Republic of the Philippines, BloombergNEF. **Note:** The listed duties are not exclusive. See the [bill](#) for more details.

15.5 Other barriers

In July 2019, President Rodrigo Duterte signed into law House Bill 8179 granting a 25-year franchise to Solar Para sa Bayan, built by the founder of Solar Philippines (CNN Philippines, 2019). The bill allows the company to establish distributed

energy systems, including micro-grids, in off-grid and unreliable grid areas. Stakeholders including the Philippine Solar and Storage Energy Alliance (PSSEA) and Meralco strongly opposed the legislation, arguing it would give Solar Para sa Bayan a competitive advantage in the mini-grid market.