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The background of the cover is a photograph of a tropical coastline. On the left, there are steep, green mountains. The water is a deep blue, and the sky is light blue with scattered white clouds. In the foreground, the edge of a boat and some dark rocks are visible.

# Current Situation, Challenges and Suggestions on the Development of Renewable Energy in the Philippines

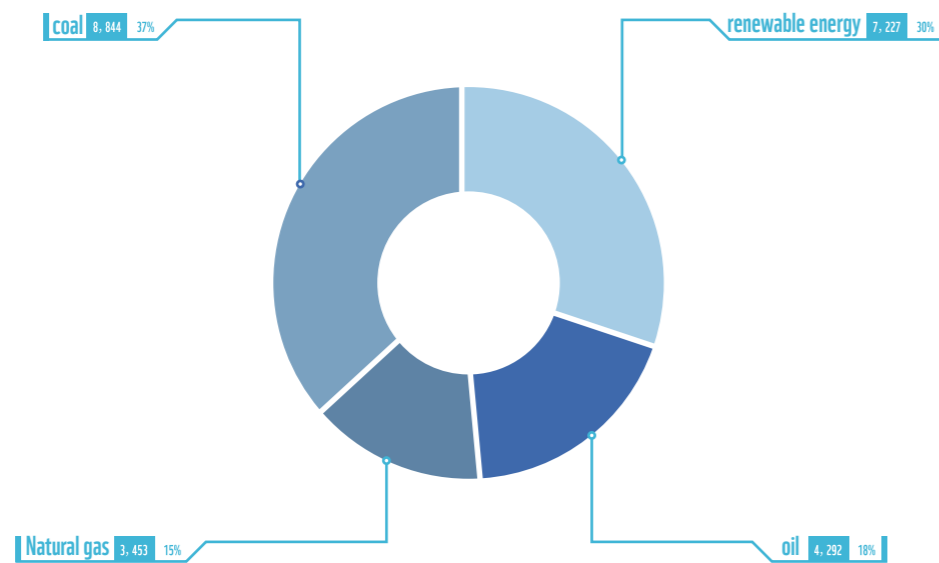
# Overview of the Current Situation of Renewable Development in the Philippines

## 1. An overview of the Current Situation of Renewable Development in the Philippines

By 2018, the total installed capacity of the Philippines was 23,815MW. Compared with 2017, the installed capacity that has been established increased by 993MW, and gross generation in 2018 rose to 99,765GWh. The accumulated installed capacity accounted for 23,815MW, among which the capacity of coal-fired power plants reached 8,844mw, with 4,292mw coming from oil and electricity, 3,453mw from natural gas, and 7227MW<sup>1</sup>

from renewable energy (1,944MW of geothermal power, 3701MW of hydropower, 258MW of biomass power, 896MW of solar power and 427MW of wind power)<sup>2</sup>. In 2018, the Philippines enlarged 934MW of installed capacity, including 720MW of coal power, 87MW of oil power, 12MW of geothermal power, 80MW of hydropower and 34MW of biomass power.

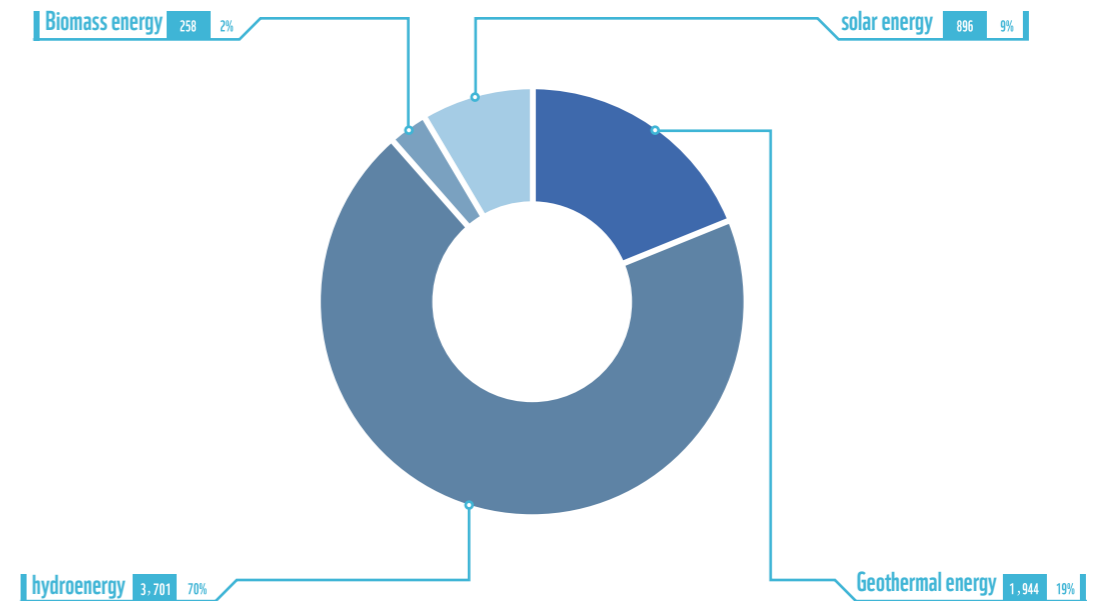
(MW) Installed capacity 2018



<sup>1</sup> 2018 Power Demand and Supply Highlights.

<sup>2</sup>The installed renewable energy power capacity of 7227MW is rounded.

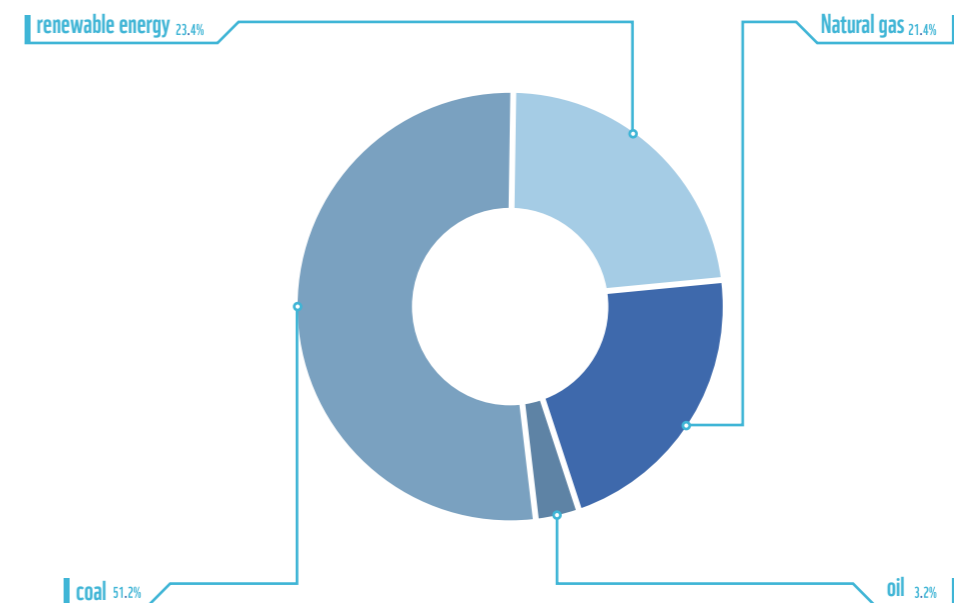
Installed renewable energy capacity (MW)



The overall gross generation of the Philippines rose to 99,765GWh in 2018, from 94,370GWh in 2017, with the growth rate being 5.7%. Of the total generation amount,

coal-fired power generation accounted for 52.1%, natural gas generation 21.4%, oil and electricity accounted for 3.2%, and renewable energy 23.4%.

Proportion of energy sources in 2018



In order to promote the development of Renewable Energy, the energy development plan (2016-2030) was formulated by

the Department of Energy (DoE), and required that by 2030, Renewable Energy production should account for 32% of

the total primary energy production. The Renewable Portfolio Standard (RPS) insists on an annual increase of 1% in the share of electricity generated from renewable

sources. Development targets of 2000MW and 700MW have been set according to the RPS standards for wind and solar power generation.

### Government Departments of Electric Power Industry in the Philippines

The Philippine Department of Energy (DoE) is responsible for the preparation, integration, coordination, supervision and control of government-related plans, projects and activities, which all concern energy development, utilization and protection. In the electrical power industry, the DoE is mainly responsible for guiding and planning the development of electric power, formulating relevant laws and regulations, standardizing and supervising the development, construction and operation of projects, including carrying out a thorough review of products.

The Electricity Regulatory Commission (ERC) is an independent semi-judicial regulatory authority, and was established under the framework of Energy and Petroleum Regulatory Authority (EPRA). It oversees the entire Philippine network of the electric power industry. This includes responsibility for the establishment and adjustment of all relevant rules and regulations in the power industry, industry development planning, project examination and approval, as well as the supervision

of market operation. The ERC is the most important and a key functional institution of the electric power industry. The participation of the ERC, whether direct or indirect, is required for the approval of project construction and development. The signing of the Power Supply Agreement (PSA) is directly approved by ERC.

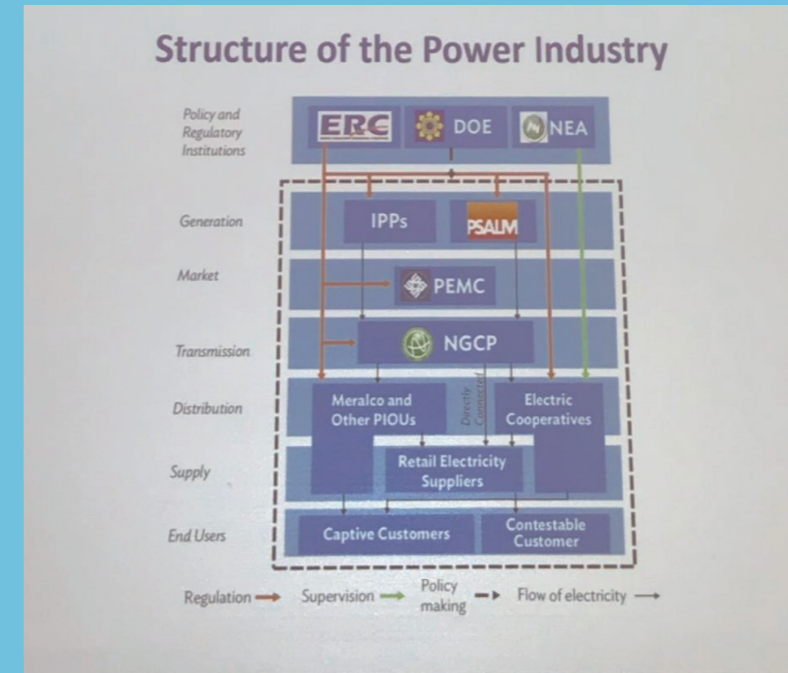
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The Department of Environment and Natural Resources (DENR) is responsible for the approval of EIA (Environmental Impact Assessment) permits for power projects. Its subsidiary, the Environmental Management Bureau, is specifically

responsible for the approval of Environmental impact assessments for industrial projects. EIA approval is

an essential aspect, with rare permits for the development of power plants in the Philippines.



### Challenges in the development of renewable energy in the Philippines

#### 1. Strategic position of renewable energy is not fully reflected

The Philippines is lacking in conventional energy resources and relies heavily on coal imports. Indonesia, a major coal exporter to the Philippines, is already discussing a policy to limit their coal export, which would pose a major challenge to the reliability and sustainability of the Philippines' energy supply.

The renewable energy target is relatively low. Although renewable energy production

in 2030 will aim to account for 32% of the total primary energy production, the main energy output is geothermal, biomass and hydropower (geothermal 13.7%, biomass 13.3%, Hydropower 4.9%). The development of geothermal energy and hydropower will impose a high demand on the development of local resources and the economy, and its extension and replication in areas without electricity are limited.

#### 2. Inadequate supporting mechanisms for the development of renewable energy

The Renewable Energy Law and its supporting rules have been promulgated, such as Rules for Renewable Energy Feed-

in-tariff, Rules for the Net Measurement of Renewable Energy and Rules and Guidelines for the Establishment of the Quota System for Renewable Energy, and other measures, such as the benchmark tariff of Renewable Energy and the target for installing technology. There are a lack of supporting policies to implement the Renewable Energy Law. After numerous field visits, the author claims that the most necessary mechanism for renewable energy development in the Philippines is market supervision and innovation. The Philippines intends to issue a renewable energy quota policy in 2020. Market supervision mechanism is the main supporting policy for the implementation of the quota system. Firstly, in the renewable energy quotas policy, the subject of mandatory quota is defined. Quota monitoring and assessment mechanisms are related to the subject being organized, information management, development mode, rewards and punishments of quota trading, and lack of operational documentation. Secondly, the implementation of renewable energy quotas involves the calculation and evaluation of quota indicators, the assignment and distribution of quota indicators and other practical supporting policies on the implementation of allocation schemes. Such policies are important operational documents for agencies at all levels in order to implement renewable energy quotas. Renewable energy generation forecasting, cross-regional trading mechanisms and implementation schemes for calculating renewable energy power consumption currently have flaws.

### 3. Weak financing capacity in renewable energy projects

The low on-grid price, taking the current PV power station bid price of 2.35Php (0.3131RMB) / kWh into account, is lower than the price of coal-fired desulfurization in most parts of China. It is equivalent to the domestic PV bidding minimum price in the 'Three Gorges Sunshine, Golmud project' (0.31 yuan/kWh). Even if the bidding price meets project income requirements; it will inevitably reduce the project's ability to resist risks, resulting in an increase in the sensitivity projects. In addition, it was gathered from field visits that the current financing forms of renewable energy development projects are single, mostly bank loan models. There are no application cases for financing services with a high degree of marketization and low policy dependence. An example is China's mature financial leasing, industrial funds, contract energy management and asset securitization.

### 4. Weak supporting of electric power infrastructure

According to the Chinese embassy, electricity in the Philippines is still in short supply. Although the central and Luzon islands have been connected to the power grid, the generation and distribution of electricity power are still imbalanced. At present, the Manila region's per capita GDP is more than ten times that of the south, and accounts for half of the local electricity consumption. The degree of industrialization in the south is low, and isolated networks are oversupplied, with low voltage levels of power networks and a high rate of loss for long distance transmission. Poor dispatching

capacity makes it difficult to support high-permeability renewable energy installations,

and the cost of supporting renewable energy to the grid is high.

### Introduction of Power Transmission companies

*The transmission, distribution and the sale of power in the Philippines are separated. The Transmission network consists of three regions: Luzon (northern and southern power networks), Visaya and Mindanao. The Assets are owned by the National Transmission Corporation (Transco), a subsidiary of Power Sector Assets and Liabilities Management Corporation*

*(PSALM). In 2009, Transco granted the franchise operation rights for 50 years of High Voltage Transmission Grid to the National Grid Corporation of Philippine (NGCP). The State Grid Corporation of China owns 40% of the shares in NGCP, and the other 60% of NGCP is owned by two local enterprises, each with 30%.*

### Introduction of Distribution Companies

*Distribution companies are primarily responsible for the construction and operation of the distribution network and delivering electricity to captive customers. According to the property*

*of ownership, Philippine distribution companies are divided into Private Distribution Utility, PDU and Electricity Cooperative, EC.*

### 5. The lethargic renewable energy project development process

With a long project approval process and high EIA standards, a project from the approval to completion stage can take up to 5 years. Such a long cycle increases the uncertainty factors in the project development stage, such as the extension of receiving project income. This issue severely affects the project financing ability and project yield rates. The land in the

Philippines is also highly privatized. If the owner has disputes with local residents with regards to land leases or migration problems during the development of renewable energy, non-technical costs of project development, investment risks and hidden dangers are increased. Additionally, the development cycle of the project is prolonged, and implementation of the renewable energy project is damaged and subsequently terminated.

### Power station development process

Power station project development companies develop their own projects according to their market research, appropriate land searches, applications for approval (such as government support letters, the DoE's record, conversion of land properties, SIS and

ECC), feasibility studies and self-development projects of Pressure Swing Adsorption (PSA) process. Chinese enterprises can download the Indicative List in the early stage of development from the website of the DoE, in order to select suitable projects for further information.

### 6. Restriction of share proportion of foreign-funded enterprises from the protection of local enterprises

In projects which involve the development and utilization of energy and resources, the share of foreign-funded enterprises shall not exceed 40%. This regulation limits the enthusiasm and technological input

of China's large state-owned enterprises in developing the Philippines' market. In addition, the local monopoly of power generation and distribution markets in several regions have been formed, which has a deep political impact, and it is difficult for new enterprises to enter, especially foreign enterprises.

### Relevant Cases

Located in Agusan del Sur province on Mindanao, Lake Mainit, the Hydropower 25MW Project is developed by Philippine local companies. Berkeley Energy Ltd. Company is willing to invest in the project through mergers and acquisitions, but requires to own a large share of the project. In order to legally control the target company, Berkeley Energy Ltd. Company has entrusted a well-known Philippine law firm. The Romulo-Mabanta Law

firm has issued legal opinions and assisted Berkeley Energy Ltd. Company in completing the merger and acquisition of the project company. The legal model given by Romulo-Mabanta Law includes dividing the original project company into two subsidiaries, namely company A and company B. Berkeley also acquired 95% shares in company A, and the local owner of the original project retained 5% of the shares. Company A owns the hydropower

project to the plant and switch station, including all the equipment in the entire plant. In comparison, 60% of Company B is owned by the original local owner, whereas Berkeley holds 40%. Company B owns the hydropower project from the pressure pipe to the dam whereas Company A controls the operation of the entire

project, including the designation of subcontractors to build the dam, and controls the income from future plant operations. The original local owner issued a legal document stating that it only obtained 5% of the power generation income of the project, and no longer enjoyed other power generation income from the project.

### 3. Opportunities for renewable energy development in the Philippines

With regards to the innovation mechanism, most renewable energy developers and EPC manufacturers in the Philippines expect the government to re-issue a FIT policy for photovoltaic and wind power. However, an equivalent price in the same network with a high electricity rate is appropriate for the development of renewable energy projects in the form of generating power for their own use, and the expansion of diversified

applications for renewable energy. Due to a lack of relevant guidance and advice in promoting the development and application of the renewable energy industry, the application forms of renewable energy in the Philippines are relatively unitary. Also, the market development level is not high, and the innovation ability is insufficient. Developers have a wait-and-see attitude toward the development of applications of renewable energy other than ground power stations and rooftop power stations.

### 4. Industrial Promotion and Policy Recommendations

#### 1. Redefine targets of renewable energy development

First, the government should make it perfectly clear the significance of renewable energy to the energy structure adjustment of the Philippines. They should also promote the importance of Power penetration, in order of achieving electricity access in all regions of the Philippines by 2022. Combined with the renewable energy development road map,

the government and energy management departments should redefine the strategic position of renewable energy development, formulate the overall development goals, and increase the proportion of wind and light in the application of renewable energy. Furthermore, the government should encourage the construction of renewable energy power stations and micro-grids in areas without electricity, promote the comprehensive utilization and absorption of renewable energy, and reduce the proportion of fossil fuel utilization.

## Power grid structure in the Philippines

*The Philippines has split its power sector into generation, transmission, distribution and retailing sectors and liberalized state control at all levels, allowing private companies to be involved in all aspects (transmission assets are owned by the state but run by private companies). Power generation companies can sign power purchase agreements with a wide*

*range of targets. These include power distribution companies, large consumer and power selling companies, and they can also directly bid for WESM. They are high in efficiency (the large power distribution companies in the Philippines are all private enterprises, and the largest one Meralco has an international rating above investment grade).*

## 2. Improve supporting policies for renewable energy development

The primary purpose of gradually improving the supporting policy system for the development and application of renewable energy is to improve the utilization rate of renewable energy, along with ensuring quality applications and enhancing market competitiveness of renewable energy. The establishment of market supervision and management mechanisms for renewable energy is an important link in perfecting the supporting policies of renewable energy. In addition to the establishment of power data collection and monitoring, and assessment mechanisms are in line with the implementation of quota systems, quality standard controls and safety early warning mechanisms. This is for the development, construction and operation of renewable energy power stations, while micro-grids should also be enhanced. The government

should allow full play to market regulation and regulatory functions, improve the level of renewable energy information management, while guiding the orderly, safe and efficient renewable energy development.

## 3. Encourage Innovative Application of Renewable Energy

▶ Explore the business model and price mechanism of localized development and diversified applications of renewable energy (pilot renewable energy power generation projects with a high proportion of generating power for their own use and contract energy management application form).

▶ Explore the scale development of renewable energy in the southern island and areas without electricity (initiate an integrated application technology of renewable energy that can be popularized. Sustainable electricity pricing mechanisms in order to improve the power supply capacity of areas

without electricity according to the resource conditions and load demand of areas).

▶ Encourage the use of small-scale wind power or photovoltaic power supply in the fields of communications, transportation, lighting, and expand the scale of renewable energy applications.

▶ The climate of the Philippines is hot and humid all year round. The energy consumption of refrigeration and dehumidification is the main cause of electricity shortage in the Philippines. The application of renewable energy refrigeration and dehumidification technology can be one of the main means of building energy conservation.

## 4. Deepen international cooperation on renewable energy

- ▶ Utilize loans and assistance from international organizations
- ▶ Learn from the experience of other countries in the development of renewable energy
- ▶ Study and formulate policy systems for renewable energy development
- ▶ Support technological progress
- ▶ Establish industrial system
- ▶ Identify demonstration projects and gradually achieve efficient and commercialized renewable energy development.

<sup>1</sup> Power Development Plan 2016-2040.