COUNTRY UPDATE ON GEOTHERMAL UTILIZATION AND BARRIERS AFFECTING ITS GROWTH-PHILIPPINES

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Abstract

The growth spurts of geothermal energy in the Philippines in the early 1980's and late 1990's can be attributed to government support through the enactment of laws. Despite the passage of the Renewable Energy Act in 2008, the installed geothermal capacity had declined from 1,972 MW to 1,917 MW with decommissioning of plants and small capacity development in the last 5 years. This stalled growth can be attributed to regulatory barriers and current electricity market conditions. Simplification of permitting requirements, implementation of the Renewable Portfolio Standards (RPS) and Green Energy Options, incentives through grant of Feed-in-Tariffs (FIT) for geothermal emerging technologies and small-scale development, and priority dispatch are deemed beneficial that will spawn its growth to meet the government roadmap.

1.0 INTRODUCTION

The oil crisis in the early 1970's set off geothermal development in the Philippines. From a 2.5-kW plant in 1967, the Philippines became the 2nd largest producer of geothermal energy in the world (Fig. 1).

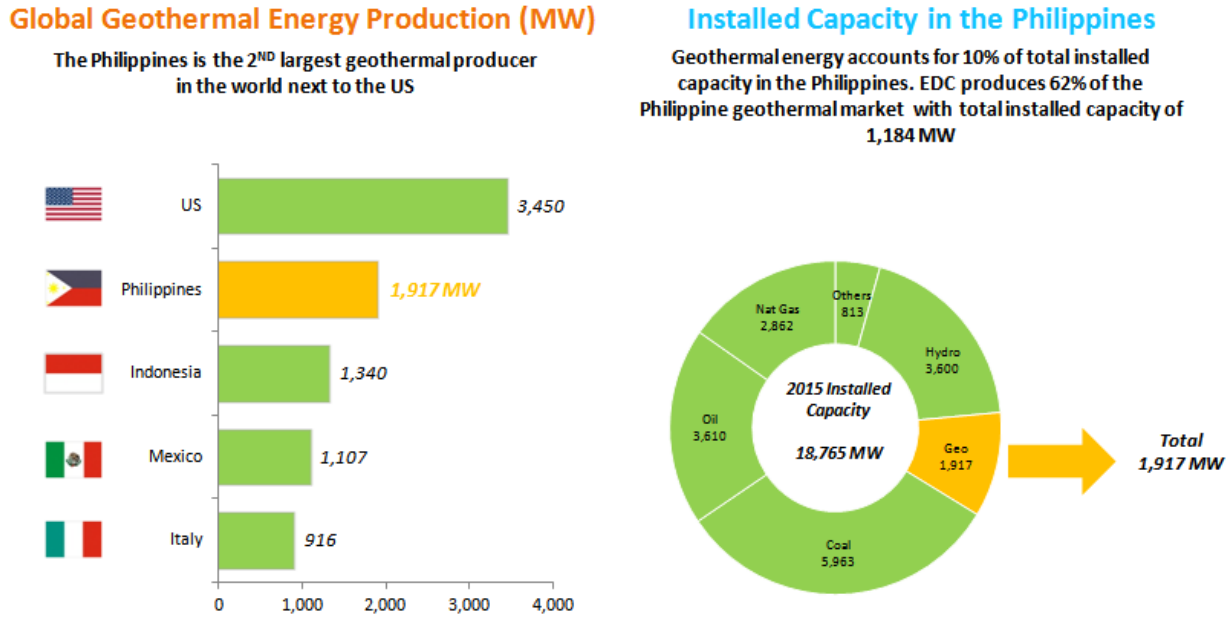

Fig. 1. Updated Information Based on Data Obtained from the 2015 World Geothermal Congress

The growth of geothermal power production was mainly driven by government interventions (Fig. 2). From the mid-1970's through early 1980's, the oil crisis prompted government to develop indigenous resources through the National Power Corporation who tied up with UNOCAL to develop the Tiwi and MakBan geothermal power plants and PNOC Energy Development Corporation who developed the Tongonan and Palinpinon geothermal power plants. In the 1990's, another spurt of geothermal energy growth, was brought about by the enactment of a law allowing the Build-Operate-Transfer (BOT) scheme whereby the power plant infrastructure facility will be built and operated by a proponent, with guaranteed income for a fixed

period and subsequent transfer of ownership to the government after the end of the BOT contract. PNOC Energy Development Corporation took advantage of the BOT law that led to the development of the Mt. Apo Geothermal Field, to augment the power supply in the island of Mindanao, and expansion of the Leyte Geothermal Field, with the interconnection of the Leyte Island to the Luzon and Visayas grids through submarine cables.

Despite additional government intervention through the enactment of the Renewable Energy Act in 2008, a law that was intended to bring down the power rates, open the electricity sector to the private sector, and promote the development of renewable energy by granting fiscal incentives and feed-in-tariff rates, the installed capacity from geothermal power has declined from 1,972 MW in 2008, to its present installed capacity of 1,917 MW from decommissioning of plants and small capacity (20MW) development in the last 5 years.

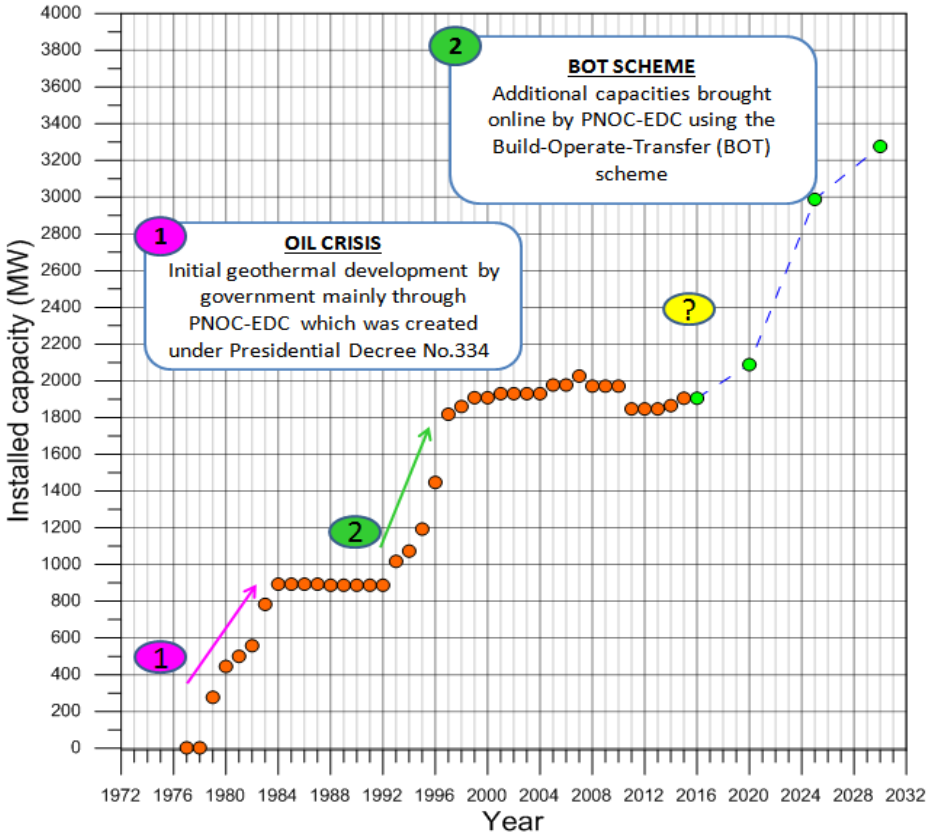

Fig. 2 - Geothermal energy growth in the Philippines (de Guzman, et. al. 2016)

2.0 BARRIERS TO GEOTHERMAL ENERGY UTILIZATION

The Philippine's Department of Energy (DOE) crafted a roadmap in 2013 (Fig.3) for the exploration, development, and utilization of geothermal energy in the country. It targeted an additional installation of 1,090 MW through year 2020, 1,040 MW of which will come from the development of new areas while the remaining 50 MW will come from the expansion of existing geothermal production areas.

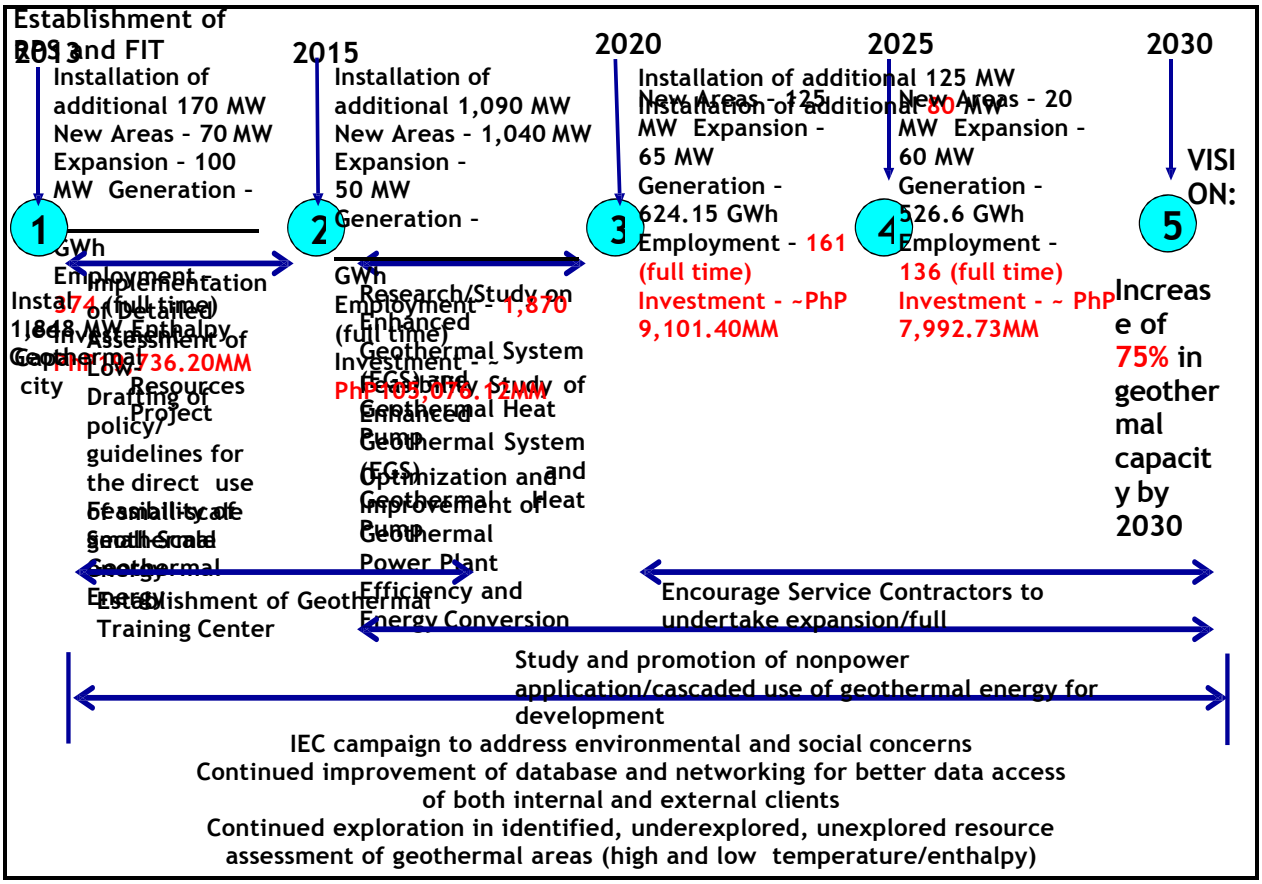

Fig 3. DOE Roadmap for the Exploration, Development and Utilization of Geothermal Resources in the Philippines (2013-2030) (from Foronda (2014))

Geothermal concessions with an estimated power potential of 1,124 MW had been granted by DOE from 2010 to 2014. Despite said granting of concessions to private entities, only two of several concessions areas, namely Biliran and Naujan, had progressed to exploration drilling activities. Based on current exploration and development activities, the target expansion of DOE by 2020 will unlikely be realized, based on the current pace of geothermal development and power plant construction activities. The gestation period from construction to power plant commissioning normally takes two years, thus development and power plant construction activities should have actively started by now.

The major barriers that impeded geothermal power development, though numerous, can be classified into three (3) major factors: regulatory, risk and market.

2.1 Government regulations are major barriers in the exploration and development of geothermal areas

There are several laws that are deemed counterproductive but must be complied with, in developing geothermal energy in the Philippines:

- Indigenous Peoples' Rights Act (RA 8371, 1997) which identified that indigenous communities also have ownership to resources in their land and that the developer must secure free and prior consent before commencing exploitation activities

- Philippine Mining Act (RA 7942, 1995) which defined geothermal resources as minerals and that all mineral resources in private and public lands are owned by the state
- National Protected Areas Act (RA 7586, 1991) where exploitation and utilization of energy sources found within the protected areas shall only be allowed through a law passed by Congress

The bureaucratic processes in obtaining permits and clearances result to significant delays in the start of exploration and/or expansion projects. In the Philippines, there are approximately 150-200 permits and authorizations which have to be secured from various government agencies to be able to operate in geothermal areas, aside from the need to deal with non-government organizations who oppose any development due to its perceived environmental impact. These processes and hindrances prolong the gestation period of projects from surface exploration to commercial operations that results to additional costs.

2.2 Exploration and Development Risk

Scientific surveys used in geothermal exploration have considerably improved over the years. However, as in any exploration, there is still uncertainty in successfully finding an economically viable resource that can be developed for geothermal energy utilization.

The cost of geothermal exploration exponentially increases once a potential geothermal area has been identified for possible exploration drilling. Expenses for exploration drilling will cost from US$30-50 Million, for site development and exploration drilling of 3-4 wells. Substantial capital is further required to develop a field for commercial operations.

On the assumption that exploration drilling is successful, the cost of development and eventual operating costs will be dependent on several factors:

- size and productivity of the area which will determine the number of wells to be drilled
- fluid enthalpy, i.e. whether the resource is high, medium, or low enthalpy which will affect the type of geothermal power plant and efficiency to extract the heat
- quality of the fluids, i.e. reservoir produces acidic fluids or high gas which will affect the type of materials and hence cost of piping and facilities that will be installed
- operation and maintenance costs
- terrain of the geothermal area (geohazard risks)
- proximity to the national grid system

2.3 Market Condition

The low prices of oil and coal, have dampened the profitability of developing geothermal concessions in the Philippines. Aside from the current low prices of fossil fuels, the geothermal industry also has to compete with other renewable energy sources such as wind and solar which can be developed with lower risks and shorter development period. Under the Renewable Energy Law, these renewable technologies are priority dispatch to the grid, but not geothermal.

The Philippine government, in recent policy statements, has tended to accept coal power generation because of the faster construction, commissioning period, and lower cost of produced electricity. It is deemed that short-term beneficial impact to consumers of lower prices is given importance over long-term environmental effects and health risks, i.e. pollution and contribution to climate change. These externalities are not factored in to the artificial low prices of electricity from coal plants.

The power from so-called "conventional" geothermal energy production, due to its existence in the Philippines since the 1970's, was not included in the list of renewable energy sources, (i.e. solar, biomass, wind, hydro, and ocean energy) in the Renewable Energy Law, that have been provided with feed-in-tariff rates and prioritized dispatch. In the past, geothermal power was able to compete with other energy sources such as oil, coal, solar, and wind because of costlier generation tariffs from the latter sources. However, with the current low price of coal and oil, and feed-in-tariffs and priority dispatch provided to other renewable energy sources, geothermal developers tend to delay any construction of new geothermal power plants due to their inability to compete in this market regime.

4.0 CURRENT INITIATIVES

To promote the development of geothermal energy in the Philippines, it is perceived that there is a need again for government to step in. In a geothermal summit last July 2016, the local geothermal association, the National Geothermal Association of the Philippines (NGAP) whose membership comprises representatives from both the government and private geothermal energy companies and developers, is strongly lobbying for the following:

1. Revisit of the existing laws that will allow granting of feed-in-tariff to "emerging" geothermal technologies such as low temperature and acidic reservoirs, including small-scale development.
2. Implementation of all mechanisms and incentives under the Renewable Eenergy Act - Renewable Portfolio Standards, Green Energy Option, Renewable Energy Trust Fund (Maniego, 2016)
3. Market and tariff support, i.e. FIT and/or subsidy and priority dispatch, for existing and new "conventional" geothermal energy production specially if current fossil fuel costs remain at current levels
4. Prioritizing interconnection of geothermal power plants to the national grid
5. Simplification of permitting and authorization requirements for geothermal exploration and development.
6. Revision by Congress of existing or enactment of new laws that will facilitate geothermal exploration and development in concession areas that are located in protected and/or lie within indigenous peoples' areas.
7. Declaration of Geothermal Development as projects of National Importance to facilitate its development within multiple government agencies.

It is hoped that through concerted initiatives by the Department of Energy and the private sector, the necessary policies, regulations, and laws will be put in place that will promote and accelerate again geothermal development in the Philippines.

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