A Study on Socio-Economic Impacts of an Introduction of a Sustainable Energy Flow System in the Philippines

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1. Introduction

For the past few decades, the Philippines has been experiencing problems related to electricity quality (5% of areas have no electricity, major cities experience electricity fluctuation), at the same time, Filipinos pay a high price (50% of the price is from electricity generation, and about 8% goes to system loss) on dismal electricity quality. Similar to most developing countries, CO_2 emissions have been increasing, 50% of which comprise the electricity generating sector.

In order to address these concerns, the Philippine energy sector recently reformed itself towards energy independence and reduction of carbon emissions by implementing the Renewable Energy (RE) Act of 2008, and to address the acute power supply problem and high energy prices by implementing the Electricity Power Industry Reform Act (EPIRA) of 2001. Electricity generating assets, once owned by the government, are now 70% privatized, in an attempt to bring down prices, and make electricity generation and distribution more efficient.

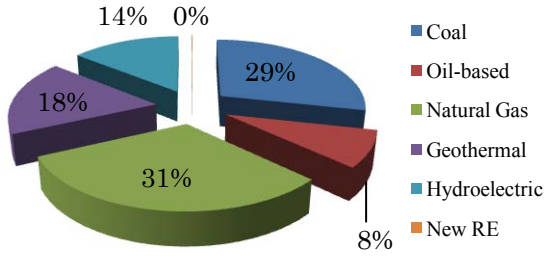

Fig. 1 Power generation mix of the Philippines as of 2009

The objectives of this study are (1) to investigate the causes of power fluctuation, lack of electricity in some areas, power outage, and high electricity price that has persisted the Philippines for many years, and (2) to provide a study for a sustainable energy flow development in the country, that may contribute to creating a long-term strategic for the development of the electricity industry in the Philippines.

2. Method

This study examines the means to attain sustainable energy flow system by: (1) defining the scopes of framework, (2) envisioning the future situation in three scenarios (a) Business-as-usual wherein the electricity industry continues to depend on fossil fuels (b) High growth, wherein the GDP growth is high that the industry invests and develops high cost solar, wind and biomass sources, and (c) Moderate development, wherein the GDP growth is moderately optimistic that the market opts to further develop hydroelectric and geothermal means to generate electricity. (3) Assigning appropriate technology, economic, policy & regulatory instruments for each scope of framework. Three scopes of framework for sustainability are tackled: (1) electricity quality, (2) electricity price, and (3) carbon emissions.

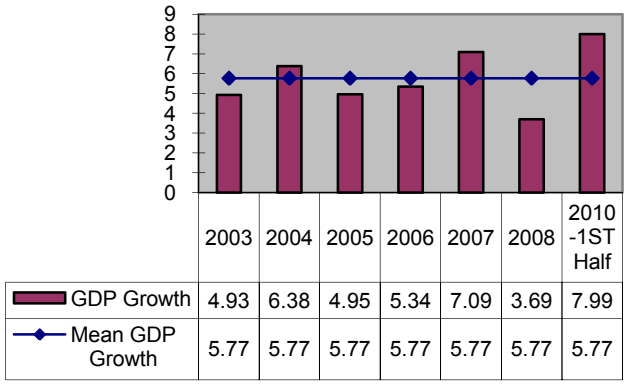

Fig.2 Philippine Mean GDP Growth in %

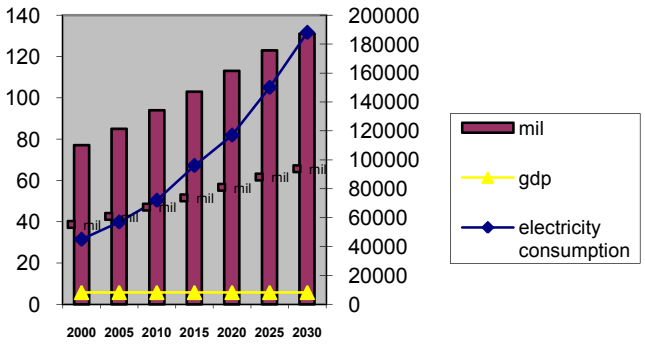

Fig.3 Relationship between population, GDP, and energy consumption.

Fig. 3 explains the Philippines' GDP and population is generally increasing, thereby demand for electricity for household, commercial, and industrial consumption is increasing, basing on historical data.

3. Results and Discussion

Addressing grid expansion is a challenge because of geographic consideration, most especially islands and small, rural communities. Business-as-usual scenario least likely to happen because of increasing price and scarcity of fossil fuels. High growth development likely to occur if GDP hits 10%. Moderate growth development most likely to happen among all scenarios, provided that the balance of expansion of hydro and geothermal sources is balanced with solar, wind, and biomass to decrease dependence in fossil fuel.

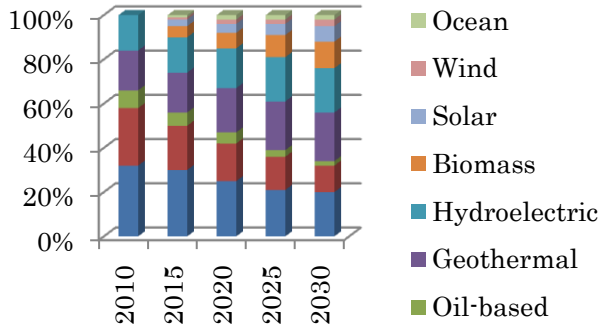

Fig. 4 Energy mix forecast for high development growth

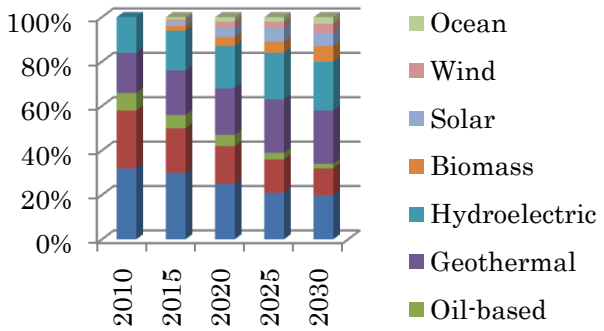

Fig. 4 Energy mix forecast for moderate development growth

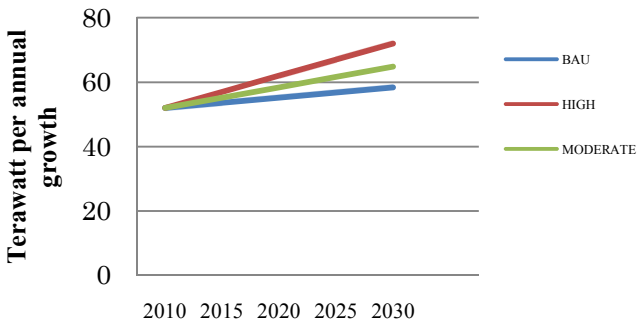

Fig. 4 Forecasting terawatt per annual growth relating future demand for energy

Both high development and moderate development growth have increase their RE share of the power mix to 70%; main difference is the allocation of type of renewable energy sources. Despite abundance in solar energy and raw materials, technologies that can harness these sources are relatively expensive. Subsidy may be a short-term option to consider to enable initial development and investment from the private sector.

Demand for energy will most likely increase in the future, and for such demand to be met in order to contribute to further economic growth, policy, technology and economic instruments are needed. For electricity quality, upgrading of transmission and distribution lines, creating performance guarantees, and implementing Build-Operate-Transfer schemes should be in place. To address high electricity price, balance in the electricity generation mix, transparent and continuous benchmarking of electricity price, address system loss cap to transmission company and distributors, and strong regulatory enforcement and promotion of indigenous energy sources should be implemented. As for CO_2 emissions, adoption of "waste-to-energy," financial schemes such as carbon taxes, credits and trading, system penalties, as well as encouragement to invest on renewable technologies and strong promotion of the Clean Air Act.

4. Conclusions

Achievement of energy efficiency and energy diversity can go hand-in-hand with reduction of carbon emissions and lowering down costs in the long run. Confidence for attaining sustainable energy flow system is high if there is good governance. Well defined and executed policies encourage or provide incentives to create changes to strengthen generating capacity and transmission lines. Better quality electricity would mean competitiveness, and thereby drive down prices for the benefit of consumers of all sectors.

Reference

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