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Communication

Potentials and challenges in implementing feed-in tariff policy in Indonesia and the Philippines

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HIGHLIGHTS

- Both countries are unsuccessful in finalizing a fixed Feed-in-tariff payment.
- Both have the same aims from FiT but they have different mechanisms.
- The Philippines has shown good ability in managing geothermal energy.
- Indonesia's energy generation from biomass is better managed than the Philippines.
- Both do not have significant energy production from the wind, solar and biogas.

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ABSTRACT

Located in Southeast Asia, Indonesia and the Philippines are characterized by a tropical climate and high amounts of rainfall that render their high potential for hydro-power and wind energy deployment. The volcanic geography of both countries also indicates their high geothermal potential compared with that of other countries, and their high solar radiation level makes them suitable areas to establish power plants. The present study is an archival-statistical overview of the potential generation of renewable energy in Indonesia and the Philippines and the implementation of the Feed-in-tariff (FiT) policy. This research focuses on the challenges encountered by politicians and policymakers and confirms the insufficient production of energy from wind, solar, and bio-gas sources despite the potential and the attempts to deploy FiT. Results show that the role of the government in providing support to investors is not clear in both countries. In addition, inflation rates have not been calculated. However, FiT has benefitted both countries by preventing degression during the primary years.

1. Introduction

With a population of more than 330 million people, which is almost equal to the population in North America and the Middle East (World Bank, 2012a, 2012b, 2012c, 2012d, 2012e), the Republic of the Philippines and the Republic of Indonesia have a more than 1.5-trillion-dollar economy (Publicdata, 2012). These countries are the centers of production and energy consumption in Asia. Supplying energy, especially electricity generation, has become an important issue in the Philippines and in Indonesia because of high population, industrialization, and increased consumption.

Both countries, which are members of the Association of South East Asian Nations (ASEAN) (Aseansec, 2011), are considering the implementation of the feed-in tariff (FiT) policy, a new mechanism under the law for renewable energy. The purpose of this policy is to accelerate the production of renewable energy (Bakhtyar et al., 2012). The Philippines and Indonesia have many similarities in geography, climate, resources, and economic features. Many active volcanoes are found in both countries, including Mayon Volcano, Mount Pinatubo, and Taal Volcano in the Philippines; and Krakatoa and Tambora in Indonesia (Withman, 2005). Both countries are composed of a variety of islands, leading to difficulties in the distribution of energy and infrastructures such as roads and power grid connections.

The Philippines is made up of 7,107 islands, and measures 308,000 sq. km. It is located in the South China Sea and the West Pacific Ocean (Phillipines.gov, 2012), and has a population of more than 93 million people. The population density of the Philippines is almost 302 people per sq. km. Volcanoes, massive typhoons, and earthquakes are part of the lives of Filipinos (CIA, 2012).

Indonesia, with a population of almost 240 million, comprises five major islands and more than 13,500 small islands. More than 6000 islands are inhabited, and all need infrastructures for the

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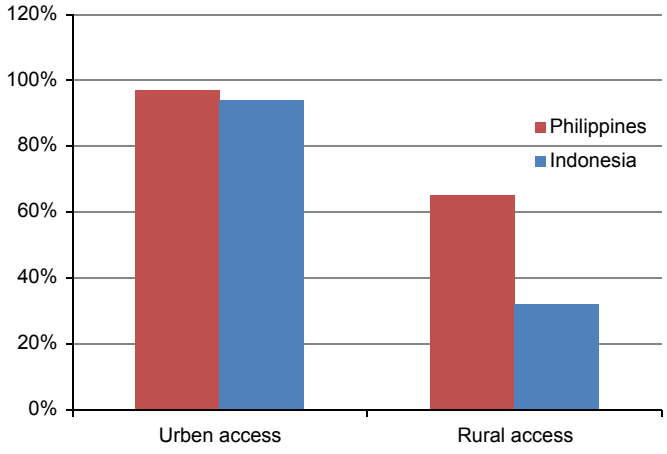

Fig. 1. Urban and rural access to public energy in Indonesia and the Philippines.

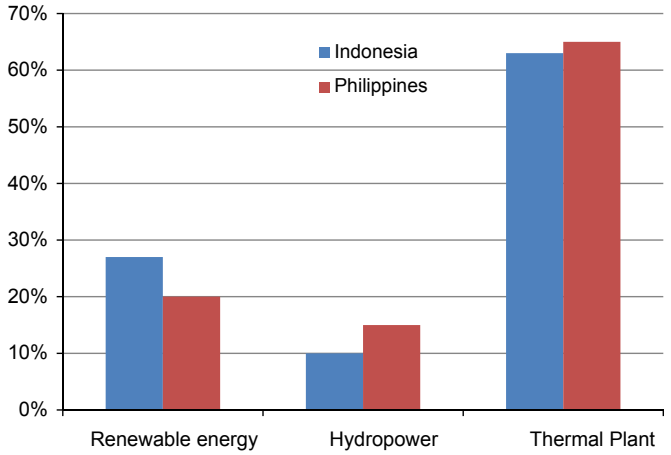

Fig. 2. A comparison among different energy sources in Indonesia and the Philippines.

residents (World Bank, 2012a, 2012b, 2012c, 2012d, 2012e). The total land area of Indonesia is 1919,440 sq. km., and it has a population density of 125 people per sq. km. The longest and largest volcanic mountains are in Java and Sumatra (Asiarooms, 2012), where most Indonesian hot springs are located.

2. Energy specifications of Indonesia and the Philippines

Public electricity is accessible to 97% of the urban population of the Philippines whereas only 65% of rural residents can use public electricity. Each person in the Philippines uses 586 kW h annually. The price of petrol is $0.91 for one liter and the price of one liter of diesel is $0.81 (ATM, 2010). The energy efficiency index of the Philippines is 0.09 t of oil, which is equal to 1000 U.S. dollars of the gross domestic product (GDP).

Meanwhile, 94% of urban residents in Indonesia have access to public grid connections. However, the percentage of villagers who can use public energy is not more than 32% Fig. 1.

Each Indonesian uses an average 566 kW h energy per year. The price of gasoline in Indonesia is $0.50 and diesel is sold at $0.42 (ATM, 2010). The energy efficiency index for this country is 0.32 t of oil which is equal to 1000 U.S. dollars of GDP.

Almost 20% of energy in the Philippines is produced from renewable resources, with 15% coming from hydropower, whereas the rest is generated in thermal plants (Lidula et al., 2007). In Indonesia, 27% of the generated energy is based on renewable sources, with hydropower providing around 10%. Meanwhile, thermal plants supply 63% of the energy demands of Indonesians Fig. 2.

The Philippines can generate 5.1 kW h/m^2/day of energy from solar panels. This country currently uses radiation from the sun to produce approximately 1 MW of energy. The radiation rate in Indonesia, which is 4.8 kW h/m^2/day, is relatively less than that in the Philippines. However, generated electricity from solar power amounts to almost 13.5 MW in Indonesia (Kuncoro and Arief, 2011).

The Philippine islands experience numerous storms throughout the year. Studies indicate that many of these storms are potential sources of energy which can provide 76,600 MW (theoretically) and 7404 MW (technically). The Philippines generates 1.18 MW of electricity from its wind sources (boi.gov, 2010). Indonesia also has a high potential for generating energy from wind sources (with a speed of 3 m/s to 6 m/s) because of its geographical location. However, electricity generated from wind sources in Indonesia is only 0.5 MW (Ing Hasrul et al., 2012).

Like other tropical countries, Indonesia and the Philippines are both rich in running water sources. Their respective governments both give special attention to generating electricity by using hydropower. Hydroelectric generation in the Philippines and Indonesia is 1448 and 1048 MW, respectively. Technically, the Philippines can produce 11,223 MW of electricity in small and large scales. It also has the potential to generate 1847 MW in microscales. Microscales (as small as 27 MW) can also be produced by hydropower electricity (DOE, 2012). Indonesia is capable of generating 75,000 MW in large scales. Moreover, microscales amounting to 459 MW can also be produced (Lidula et al., 2007). At present, 10% of the total energy in Indonesia is produced by hydropower (Kuncoro and Arief, 2011).

Table 1
Generation of renewable energy and hydroelectricity (MW).

	Solar	Biomass	Biogas	Geothermal	Wind	Hydro	Thermal
Indonesia	13.5	1618	–	1200	0.5	1048	6608
Philippines	1	20	–	1900	1.18	1448	6275

Biogas and biomass are other potential sources of energy in tropical nations that are rich in farmlands and that generate large amounts of animal husbandry waste products. The Philippines produces about 20 MW of electricity from biomass. Also, 653 biogas systems generate electricity from farm and livestock waste products. Studies show that Indonesia has the potential to generate 50,000 MW of electricity from biomass because of palm gardens and many other natural resources. However, it can only actually produce 1618 MW of biomass energy (Kuncoro and Arief, 2011).

The Philippines and Indonesia are very rich in geothermal resources because of the presence of active volcanoes. The capacity to generate energy from volcanoes in the Philippines is one of the highest in the world. The country ranks second in the world, after the United States (U.S.), in producing energy from geothermal sources, generating 1900 MW of geothermal energy (SB, 2012) Table 1.

Studies show that Indonesia's potential for geothermal energy is more than that of the Philippines. At present, the country is commercializing around 1200 MW of geothermal energy (BG, 2010). After the U.S. and the Philippines, Indonesia ranks third in the world in geothermal energy generation.

3. Total energy generation

Surprisingly, the total rate of energy production is significantly different as presented by various sources. The World Bank report published in 2010 claims that total energy production of the Philippines was only 23.5 million tons of oil equivalents (Mtoe)