Proceedings 4th African Rift Geothermal Conference 2012
Nairobi, Kenya, 21-23 November 2012

Geothermal Exploration and Development After The Passage of the Philippine Renewable Energy Act of 2008

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Keywords: geothermal energy, Philippine National Renewable Energy Program, geothermal administrative rules and regulations, service contracts

ABSTRACT

The Renewable Energy Act of 2008 (RE Act), signed on 15 December 2008, resulted in renewed interest in exploration and development of Philippine geothermal energy resources. The passage of the law and its implementing rules and regulations established the open and competitive selection process for exploration projects. Fiscal incentives were enhanced when the geothermal industry was declared a priority investment sector that will regularly form part of the Philippine investment priority plan.

The market framework in the Philippines is supportive as the government is actively encouraging the development of renewable electricity generation in the country through National Renewable Energy Program (NREP), which outlines the government's goal to increase renewable energy capacity to 15,304 MW by 2030, three times the levels in 2010. This includes an increase in geothermal power capacity by 75%.

Electricity generation from high-temperature conventional resource remains the major use for geothermal energy but the Department of Energy (DOE) seeks to foster initiatives directed to encourage opportunities for direct use. The DOE also aims to develop new technologies like enhanced geothermal systems and low enthalpy by creating a market-based environment that is conducive to private sector investment and participation. In the meantime, mainstay large and traditional geothermal development companies will focus on upgrading existing resources and full utilization/optimization of existing geothermal projects. The open and competitive selection process, on the other hand, will allow smaller but entrepreneurial geothermal exploration companies to operate in greenfield areas. Regulatory issues remain to be the biggest obstacle as developers face complicated approval and permitting process with respect to environment and social acceptability regulations.

1. INTRODUCTION

The global research department of HSBC, one of the world's largest banking and financial services organizations, prognosticated that by 2050, the Philippines will become the world's 16th largest economy. The country is also included in the list of the eleven countries (the Next Eleven "N-11") identified by Goldman Sachs and economist Jim O'Neill, as having a high potential of becoming the world's largest economies in the 21st century, along with Brazil, Russia, India and China. According to Goldman Sachs, the Philippine economy will become the 14th largest economy by 2050.

Under the Philippine Energy Plan, (2012-2030), the DOE said that demand for electricity will double in the next 20 years but to meet this growing demand, the country must expand the development of its RE resources particularly geothermal.

Launched on 14 June 2011 by President Aquino, the NREP sets indicative interim targets for delivery of RE within 2011-2030 timeframe, which requires periodic review to ensure the program confirms to policy objectives of the RE Act by addressing issues on transmission, grid integration for intermittent RE resources, and social and economic impact.

The National Renewable Energy Board (NREB) mandated under the RE Act to recommend specific actions that facilitate the implementation of the NREP to be executed by the DOE and other appropriate agencies of government, shall ensure that there is no overlapping and redundant functions within the national government departments and agencies concerned. The Renewable Energy Management Bureau of the DOE on the other hand is tasked to develop formulate and implement the NREP, to accelerate the development, transformation, utilization and commercialization of RE resources and technologies.

2. GEOTHERMAL RESOURCES CAPACITY

The Philippine government has initiated major structural reforms in the geothermal industry sector. Under the provisions of the *Electric Power Industry Reform Act of 2001*, the government has undertaken the privatization of National Power Corporation's geothermal generating assets such as: the Makban Geothermal Steamfield and Power Plants in Laguna/Batangas; Tiwi Geothermal Steamfield and Power Plants in Albay; Palipinon I and II Geothermal Power Plant in Negros Oriental; and Tongonan I Geothermal Power Plant in Leyte. The Unified Leyte geothermal plants and the Mt. Apo 1 and 2 plants will likewise be put on the auction block.

The government also divested its interests in PNOC-Energy Development Corporation, the national geothermal development company paving the way for the entry of new players in the geothermal industry. The Energy Development Corp. (EDC), which operates the Leyte, Bacon-Manito, Palinpinon, and Mindanao steam fields and owns power plants in Leyte and Mindanao, was fully privatized in 2007 with the sale thru public bidding of the

60% government interest to Red Vulcan Corp., a consortium controlled by the local company First Gen Corp after the initial public sale of 40% of its stocks in 2006.

The DOE aims to make the Philippines the world's largest producer of geothermal energy by increasing the installed capacity from 1,972 MWe to 3,467 MWe by year 2030 for an increase of almost 1500 MW. (**Figure 1**)

Sector	Installed Capacity, MW as of 2010	Target Capacity Addition by				Total Capacity Addition, MW 2011-2030	Total Installed Capacity by 2030
		2015	2020	2025	2030		
Geothermal	1,972.0	220.0	1,100.0	95.0	80.0	1,495.0	3,467.0
Hydro	3,333.0	343.3	3,161.0	1,891.8	0.0	5,396.1	8,729.1
Biomass	30.0	276.7	0.0	0.0	0.0	2767	306.7
Wind	33.0	1,048.0	855.0	442.0	0.0	2,345.0	2,378.0
Solar	1.0	269.0	5.0	5.0	5.0	284.0[9]	285.0
Ocean	0.0	0.0	35.5	35.0	0.0	705.0	70.5
Total	5,369.0	2,157.0	5,156.5	2,468	85.0	9,855.4	15,236.3

Figure 1: RE-based On-Grid Capacity Installation Targets (Source:DOE)

In 2011, the installed (operating) geothermal capacity of the Philippines stood at 1,902.69 MWe, from a total of six operating geothermal concessions scattered throughout the country (**Figure 2**). This figure is slightly lower than the capacity reported in 2010 because steam production had regressed significantly at the underperforming 49 MW Northern Negros Geothermal Power Plant (NNGP) placed on-stream in 2007, forcing EDC to shut down the facility on July 2011. EDC subjected NNGP's steam resource assessment and strategy to third party peer reviews by two teams of international experts but their conclusions validated earlier study made that the steam field will be incapable of delivering 49MW and is likely to deliver closer to 10MW. The NNGP plant was then moved south to the Palinpinon steam field, which EDC expects will be made operational by 2014. Nevertheless, the company plans to install a smaller power plant unit in NNGP. (EDC 2011 Integrated Report)

	2009	2010	2011
Installed Capacity	1,972 MW	1,972 MW	1,902.69 MW
Generation	10,296 GWh	10,279 GWh	10,494 GWh
Fuel Oil Displaced (MMBFOE)	17.16	17.13	17.49
Foreign Savings in MM US$	1,518.73	1,349.31	1,377.51

Figure 2: Installed Capacity, 2009-2011 (Source: DOE)

Following the passage of RE Act, its implementing rules and regulations and the promulgation of the open and competitive selection process for geothermal exploration projects, the geothermal industry has significantly changed particularly in the area of greenfield exploration, steamfield operation and power plant ownership as these were geared towards the government's thrust of maximum privatization. Recently, Maibara Geothermal, Inc., a joint venture corporation owned by PetroGreen Energy Corporation – 65%, Trans-Asia – 25%, and PNOC-Renewables Corporation – 10%, began the development of its Maibara Geothermal Power Project that is expected to bring 20MW of geothermal electricity to the Luzon grid by 2013. EDC is also rehabilitating its Bacon-Manito, Palinpinon, and Tongonan geothermal power plants in the Philippines to ensure on-going geothermal generation. Additional 20MW and 50MW from Palinpinon and Mt. Apo respectively are also expected to come on-stream. (**Figure 3**)

Name	Installed Capacity (MW)	Commissioning Year	Location
Maibarara Geothermal Power Project	20	2013	Laguna/Batangas
Nasulo Geothermal Power Project	20	2013	Palinpinon, Negros Oriental
Mindanao III	50	2014	Mt. Apo, North Cotabato
Total	90		

Figure 3: Committed Projects (Source: DOE)

A total of 32 Geothermal RE Service/Operating Contracts were awarded under the RE Act. There were seven (7) conversions of existing Geothermal Service Contracts under *Presidential Decree (PD) No. 1442*, the former geothermal law, into Geothermal RE Service Contracts (GRESC) under the RE Act (**Figure 4**). In addition, two (2) Geothermal RE Operating Contracts and eight (8) GRESCs under the Open and Competitive Selection Process were awarded (**Figure 5**). As at June 2012, there are fifteen (15) GRESCs under direct negotiation.

Figure 4: Production Contract Areas (Source: DOE)

Figure 5: Exploration Contract Areas (Source: DOE)

3. GEOTHERMAL RESOURCES LEGAL FRAMEWORK

The principal legal concept to control the utilization and management of natural resources including geothermal, is the Regalian doctrine, which declares that all natural resources in the territory belong to the State and therefore private ownership or title must emanate from it. While the State is accorded the primary responsibility for development and utilization of natural resources, participation by the private sector is not prohibited under the Philippine Constitution. Private sector participation is allowed through three types of agreements: co-production, joint venture, and production sharing. The common element among these agreements is the intent to give the State greater participation in decision-making and in the sharing of profits.

Under *PD 1442*, otherwise known as "*An Act Promoting the Exploration and Development of Geothermal Resources*", the Government may directly explore for exploit and develop geothermal resources. It may also indirectly undertake the same under service contracts awarded through public bidding or concluded through negotiation, with a domestic or foreign contractor who must be technically and financially capable of undertaking the operations required in the service contract

The RE Act is a landmark legislation, which aims to spur growth in exploration and development through the entry of foreign capital and the institutionalization of a system of incentives. The law established the open and competitive selection process for geothermal exploration projects. It also seeks to promote equitable sharing of the benefits with the host communities and indigenous peoples. Among the important features of the RE Act in relation to geothermal resources are:

- the definition of geothermal as mineral resource paving the way for the entry of 100% foreign-owned corporation in geothermal resource exploration, development and utilization;

- setting up a system that will allow consumers to choose green sources of energy and providing for the establishment of a Renewable Portfolio Standard system, requiring electricity suppliers to source a certain amount of their energy supply from RE resources;

- declaration of the RE sector as a priority investment sector that will regularly form part of the Philippine investment priority plan;

- provision in the law allowing the environmental compliance certificate for RE projects to be issued from the appropriate regional office of the Department of Environment and Natural Resources; and

- institutionalizing government share on existing and new RE development projects equal to one percent (1%) of the gross income of RE resource developers resulting from the sale of RE produced and such other income incidental to and arising from the RE generation, transmission, and sale of electric power except for geothermal energy, which shall be at one and a half percent (1.5%) of gross income.

The RE Act introduced a new contractual system for the award of geothermal exploration and production contracts denominated as Renewable Energy Service (Operating) Contracts which refers to service agreements between the Government, through the DOE, and RE developer who is given the exclusive right to explore and develop a particular area over a period of time. *Department Circular No. DC2009-07-0011*, otherwise known as the "*Guidelines Governing a Transparent and Competitive System of Awarding Renewable Energy Service/Operating Contracts and Providing for the Registration Process of Renewable Energy Developers*", was promulgated by the DOE on 12 July 2009. The circular specifies the minimum legal, technical and financial requirements for a proponent applying under the Geothermal RE Service Contract System and outlines the documentation in the open and competitive selection process.

3.1 Local Government Code of 1991

The *Local Government Code of 1991* (LGC) requires prior and periodic consultations with the local government units (LGUs) before any RE exploration activity is conducted within their respective jurisdictions. Specifically, Section 17 of the LGC, grants LGUs the responsibility to manage environment and natural resources within their jurisdiction including implementation of local development planning and environmental protection programs, along with law and regulatory enforcement.

The government share on existing and new RE development projects shall be equal to one percent (1%) of the gross income of RE resource developers resulting from the sale of renewable energy produced and such other income incidental to and arising from the renewable energy generation, transmission, and sale of electric power except for indigenous geothermal energy, which shall be at one and a half percent (1.5%) of gross income.

The RE Act has basically amended the provisions of *Energy Regulations (ER) No. 1-94, and its Attendant Rules and Procedures*, which previously prescribed the provisions of direct benefits to LGUs hosting geothermal energy resource development projects and/or energy generating facilities within their territorial jurisdiction. For purposes of determining the government share, gross income shall include proceeds resulting from the sale of RE produced and such other income incidental to and arising from the renewable energy generation, transmission and sale of electric power.

To address the issue of the delayed remittance of LGU's share in natural resources projects within their jurisdiction, House Bill (HB) No. 4410 entitled "*An Act Providing for the Direct Remittance to the Host Local Government of its Forty Percent Share (40%) of the Proceeds Derived from the Utilization and Development of National Wealth, amending for the Purpose Section 293 of Republic Act No. 7160 as Amended Otherwise Known as the Local Government Code of 1991*" was passed in the House of Representatives. The bill was approved on 16 May 2011 and transmitted to and received by the Senate on 24 May 2011.

3.2 Indigenous Peoples Rights Act of 1997

The "*Indigenous Peoples Rights of Act of 1997*" ("IPRA") provides that no agreement for the exploitation of natural resources shall be approved unless there is a prior certification from the National Commission on Indigenous Peoples (NCIP) that the area does not overlap any ancestral domain or that the free and prior informed consent (FPIC) of the concerned indigenous cultural communities or indigenous peoples (ICCs/IPs) has been obtained. IPRA grants to ICCs/IPs certain preferential rights to their ancestral domains and all resources found therein.

No geothermal service contract shall be approved unless there is a prior certification from the NCIP that the area does not overlap any ancestral domain or that the FPIC has been obtained from the ICC/IP concerned in accordance with the guidelines set by the NCIP. The NCIP has recently revised the rules on FPIC by implementing the *Revised Guidelines on FPIC and Related Processes of 2012* also known as *NCIP Administrative Order 3, Series of 2012*.

3.3 Environmental Impact Assessment System

Existing environmental laws and regulations as prescribed by the Department of Environment and Natural Resources (DENR), tasked with environmental protection and administration, mandates the RE developer to procure an Environmental Compliance Certificate (ECC) from the appropriate regional office of the DENR.

The DENR's Environmental Management Bureau (EMB) is the lead agency that implements the Environmental Impact Statement (EIS) System and handles the review and evaluation of the environmental impact of development projects. Under the EIS System, a project proponent of environmentally critical projects and projects within environmentally critical areas must obtain an ECC prior to the commencement of the project. Under DENR regulations, resource-extractive industries are considered environmentally critical projects.

An ECC certifies that a proposed project or undertaking will not cause significant negative environmental impact. The ECC also certifies that the proponent has complied with all the requirements of the EIS System and has committed to implement its approved Environmental Management Plan. The ECC contains specific measures and conditions that the project proponent has to undertake before and during the operation of a project, and in some cases, during the project's abandonment phase to mitigate identified environmental impacts.

Currently, the DOE is conducting public consultations on a draft circular on RE Safety, Health and Environment Rules and Regulations covering safety and protection against hazards to health, life and property as well as pollution of air, land and water from RE operations. Section 4 Rule 2 of the draft circular grants the Director of the DOE's Renewable Energy Management Bureau (REMB) or his duly authorized representative to issue suspension orders against erring RE operators. The REMB Director is also given the power to suspend any particular activity or operation when such activity or operation causes or will cause imminent danger until such necessary actions are taken by the RE operator. Clearly, this provision conflicts and overlaps with the rules and regulations imposed by the EMB with respect to violation of the terms and conditions of the ECC and other environmental rules being implemented by the EMB.

3.4 National Integrated Protected Areas System

The *National Integrated Protected Areas System Act of 1992* (NIPAS Act) provides for the establishment and management of protected areas, defining its scope and coverage. Section 14 of the NIPAS Act specifies the survey of energy resources in protected areas solely for data gathering. Any exploitation and utilization of energy resources found within protected areas shall be allowed only through passage of law by Congress. Currently, potential geothermal areas have land use conflicts with key biodiversity areas, proposed protected areas, eco-tourism areas and forestry projects.

Recently, the House of Representatives passed HB 5485, which disallows all extractive activities in protection

forestlands. The bill was approved on 13 December 2011 and transmitted to and received by the Senate on 15 December 2011. Concurrent with this bill is HB 5860 entitled "*An Act Providing for the Delineation of the Specific Forest Limits of the Public Domain and for Other Purposes*" which was approved on 21 March 2012 and transmitted to and received by the Senate on 26 March 2012.

4. STATUS ON GEOTHERMAL ENERGY USE, MARKET DEVELOPMENT AND STIMULATION

Electricity generation from high enthalpy hydrothermal systems from operating fields closely related to and controlled by subduction and subsequent volcanic arc formation remains the major use for geothermal energy. (Ogena et al, 2010)

Nevertheless, the DOE will also conduct inventory to identify low temperature and low enthalpy geothermal potential areas for exploration, development and utilization. (**Figure 6**)

Sector	Target indicative capacity addition achieved by	Others
Geothermal	2027	Low-Enthalpy Geothermal Resource Assessment completed by 2015
Hydro	2023	Construction of Sea Water Pumped Storage Demo Facility by 2030
Biomass	2015	Mandatory E10 blend for all gasoline vehicles by 2012
Wind	2022	Grid parity by 2025
Solar	2030	Smart Grid and Concentrated Solar Thermal Power Demo completed by 2015; Grid parity by 2020
Ocean	2025	1st Ocean Energy Facility operational by 2018

Figure 6: Expected Milestones Over the Period 2011 to 2030 (Source: DOE)

4.1 Electricity Generation

High-temperature conventional geothermal energy resource remains the low-hanging fruit compared to new technologies like enhanced geothermal systems and low enthalpy. Unconventional geothermal technologies have yet to be developed and tested commercially and the DOE seeks public-private partnerships to foster private sector investments in new technologies particularly in the field of research.

Geothermal accounts for fifteen percent (15%) of the power generation mix for 2011. The DOE aims to develop framework and methodology for the pricing of geothermal resource to determine the true cost of steam production, as well as to facilitate formulation of realistic price projections. Most importantly, the DOE seeks to establish social acceptability of geothermal power projects in the countryside through the conduct of consultation and dialogues with IPRA, NIPAS and concerned LGUs.

Steamfield and power plant operations are based on a framework that covers four types of contracts:

- Steam Sales Agreements - delivery and sale of steam to power plants for conversion to electricity with a minimum take or pay provision;
- Power Purchase Agreements - sale of electricity with a minimum energy off-take level provision;
- Energy Conversion Agreements with BOT contractors - delivery of steam to the BOT power plant and payment for the conversion of steam to electricity at a nominated capacity; and
- Energy Sales Agreement with cooperatives and distribution units - sale of electricity from own merchant plant. (Catigtig, 2008)

4.2 Direct Use

While the emphasis is on developing geothermal energy for the generation of electricity, the DOE is looking to develop non-power geothermal applications, as well as formulate guidelines for non-power use. The direct-use applications of geothermal energy are limited to bathing and balneology and to a lesser extent, agriculture-drying plants located in the Southern Negros Geothermal Production Field in Palinpinon, Negros Oriental and in the Bacman Geothermal Field in Manito, Albay. Total installed thermal capacity is 3.30 MWt and thermal energy used is 1.25 MWt. Capacity factor stands at 0.39 while total energy used is 39.58 TJ/year. (Ulgado and Gular 2005; Aligan, 2010)

Due to lack of financial resources, low market price of the main product and deterioration of the plant, the Palinpinon agro-industrial drying plant ceased operation in 2001. The operation of the Manito Livelihood Geothermal Project has also been suspended due to scaling and major turbine problems. (Ulgado and Gular 2005; Aligan, 2010)

The development of crop drying facilities using geothermal heat is still in the early stages although there exists a huge potential but this is hampered by the traditional preference for solar drying. The benefits in terms of time saved in drying, owing to geothermal energy's high temperature and non-seasonality compared to sunlight have yet to be fully disseminated by the DOE. Since there exists geothermal prospects of the intermediate to low-enthalpy types, the DOE needs to include the development of small-scale geothermal resources for direct utilization in its policy program, which will also help address public awareness and enhance social acceptability, as stakeholders will see geothermal energy's tangible use. (Aligan, 2010)

4.3 Support Initiatives and Market Stimulation

The energy crisis in Luzon experienced in the early 1990s led to the passaging of the *Electricity and Power Industry Reform Act of 2001* (EPIRA) causing the state-owned National Power Corporation (NPC) to relinquish sole control on power generation. The *Build-Operate-Transfer Law* in 1990 allowed private sector development of geothermal and other types of power plant and infrastructure facilities. With the re-organization of the DOE in 1992, the government was able to develop strong

initiatives and implement a country-wide Master Energy Plan in the energy sector. EPIRA provides for significant changes in the power sector, which include among others:

- the functional unbundling of the generation, transmission, distribution and supply sectors;
- the privatization of the generating plants and other disposable assets of NPC, including its contracts with independent power producers;
- the unbundling of electricity rates;
- the creation of a Wholesale Electricity Spot Market (WESM); and
- the implementation of open and non-discriminatory access to transmission and distribution systems.

Pursuant to EPIRA, NPC transferred its transmission and sub-transmission assets to the National Transmission Corporation (TransCo), a government agency spun-off from NPC and created to operate the transmission systems throughout the Philippines. TransCo is also mandated to provide open access to all industry participants and was granted a monopoly over the high-voltage transmission network.

The EPIRA also required the privatization of TransCo. In December 2007, Monte Oro Grid Resources Corp. (Monte Oro) won the concession to manage, operate and maintain the transmission and sub transmission assets of TransCo. On 14 January 2009, the 25-year concession of TransCo was turned over to National Grid Corporation of the Philippines (NGCP), the company formed by Monte Oro. The grant to NGCP of the concession is expected to lead to better efficiency and improved grid inter-connectivity.

The EPIRA mandates the establishment of a wholesale market that provides the mechanism for identifying and setting the price of actual variations from the quantities transacted under contracts between sellers and purchasers of electricity. The Philippine Electricity Market Corporation (PEMC) acts as the market operator that governs the WESM. In accordance with EPIRA, the present structure of PEMC will undergo changes upon implementation of an independent market operator set-up.

The National Renewable Energy Board (NREB) has formally endorsed TransCo to become the administrator of the charges that will be collected from all power consumers for the use of RE including the feed-in-tariff allowance (FIT-All). TransCo was delegated as the FIT-All administrator rather than the NGCP, since the proceeds to be collected from all power consumers are considered public funds, in accordance with the opinion provided to the NREB by the Office of the Government Corporate Counsel.

Other salient features of the RE Act to support initiatives and market stimulations include:

4.3.1 Renewable Portfolio Standard

The RE Act provides for the establishment of a Renewable Portfolio Standard ("RPS") system, which would require electricity suppliers to source a certain amount of their energy supply from eligible RE resources.

The NREB shall set the mandatory minimum percentage of generation from eligible RE resources and determine to which sector RPS shall be imposed on a per grid basis. The NREB is still finalizing the implementing rules and regulations for the RPS, which were initially expected to be released in 2012. The RPS will also be complemented by a feed-in tariff (FIT) system. However, the FIT system under the RE Act has given priority connections to the grid for electricity generated from emerging RE resources to the exclusion of geothermal.

4.3.2 Renewable Energy Purchase Agreement/Wholesale Electricity Spot Market

RE developers must enter into a Renewable Energy Purchase Agreement (REPA) with the NGCP for power generated and pitched to the grid. As an alternative to the REPA there exists the Wholesale Electricity Spot Market (WESM), which was established under EPIRA. In order to secure access to the WESM, generators must enter into a connection agreement with NGCP. Given that the RE generators benefit from priority dispatch under the RE Act, the generator possesses assurance of revenues from the NGCP and WESM. To facilitate compliance with RPS, the DOE shall establish the Renewable Electric Market (REM) and shall direct the Philippine Electric Market Corporation to implement changes to the WESM Rules in order to incorporate the rules specific to the operation of the REM under the WESM.

4.3.3 Certified Emission Reduction Market

RE projects may be registered under the Clean Development Mechanism (CDM) and earn emission reductions, which become Certified Emission Reductions once they have been through the approval processes required by the United Nations Framework Convention on Climate Change. These can then be traded in the global carbon market. Geothermal projects are eligible to register under the CDM by virtue of utilizing RE sources that offsets fossil fuel generated electricity and exporting electricity to the grid. All proceeds from the sale of carbon emission credits shall be exempt from any and all taxes.

4.4 Investment Trends

While geothermal was defined under the law as a mineral resource opening the way for the entry of 100% foreign-owned corporation in exploration, development and utilization, the Philippine government has yet to award such contracts to foreign companies.

Most of the steamfields are operated by large and traditional energy companies like EDC and the local unit of Chevron, which have the ability to finance RE investments

funded on a non-recourse finance basis. Smaller but entrepreneurial geothermal developers seeking investors for technology research and development (R&D) and/or project finance hold greenfield exploration service contracts. However, new geothermal developers are required to demonstrate their competence by selecting experienced and well-respected consultants, and using equipment with proven reliability.

Most if not all capital prior to the geothermal project's proven feasibility is done through equity and not debt. Financing of exploration and confirmation drilling usually comes from company equity or risk capital provided by investors. Generally, investment is sourced from seed capital, venture capital, or equity financing. Due to the high risk involved with geothermal exploration, Philippine banks do not provide loans until the later stages in the development process.

Critical collaboration between civil society organizations and the resources industry needs to be pursued further. We cannot discount the role of civil society in the resources industry as in the case of the World Wide Fund (WWF), which has initiated a program called the "Ring of Fire" to unleash the potential of geothermal energy in Southeast Asia particularly in the Philippines and Indonesia. WWF hopes the program will show it is possible to achieve the use of geothermal energy in a sustainable way, conserving biodiversity, while supporting innovation and green economic growth, counter climate change and improve the living conditions of targeted communities.

4.4 What Government Must Do

Philippine government regulators must develop guidelines for the inclusion of non-conventional geothermal technologies like engineered geothermal systems and low enthalpy for inclusion in feed-in tariff rates that will provide guaranteed payment to RE investors through a universal charge.

The DOE should also develop publicly available database protocols and tools for geothermal resource assessments to facilitate access by developers to risk capital. It is noteworthy that the Philippine Stock Exchange is relaxing the rules for RE firms seeking to list on the local bourse to fund the development of their expansion by proposing rules, which were drafted with the DOE. Presently, the exchange does not implement a specific and separate set of listing requirements and reporting standards applicable for RE companies similar to the Philippine Mineral Reporting Code for mining companies.

The DOE in cooperation with the National Geothermal Association of the Philippines, the local industry association, is currently spearheading the implementation of a geothermal resource reporting code and development of a publicly available database. New geothermal exploration companies have heeded the call of government by taking up exploration acreage. In time these companies will be culling investments locally through initial public offerings or private equity placements. For the protection of the investing public, there is thus a need for a standardized reporting by these exploration companies similar to the Philippine Mineral Reporting Code. Protocols and tools for resource assessment will help also in developing technical expertise.

Public-private partnerships (PPPs) must be encouraged in the field of research, development and demonstration for new technologies in resource exploration. With the Filipinos' propensity to easily adapt to new technologies and their good command of the English language, the Philippines with its enormous resources potential can be a hub for geothermal geoscientific research. Private investments are needed in the establishment of research institutions and more data acquisition stimulated by financial incentives by the government and probably grants from development agencies. Current discussions between the governments of the Philippines and New Zealand aim at building more competence for personnel at the DOE through scholarships and development of opportunities not just for investment but also for transfer of technology. As well as development opportunities in both countries, New Zealand Foreign Minister Murray McCully believes that both countries are well placed to develop opportunities around the world, including in Indonesia and South America.

5. DEVELOPMENT CONSTRAINTS

While the DOE vowed to speed up support systems for RE development, progress has been slow as the DOE admitted that implementation of the RE Act policy reforms has been hobbled by delays. Initially, the National Renewable Energy Board (NREB) took a while to organize as the DOE consulted stakeholders rather than unilaterally deciding the membership of the board. The DOE still has to come up with renewable portfolio standards (RPS) which will set the capacity needed from each RE technology, including geothermal, as well as the mechanics to connect the main grid to all operational RE plants. The green-energy option program is also expected to be done thereafter.

The DOE has the mandate over energy resources but most of these projects are located in NIPAS or areas covered by other land use agreements like mining or logging concessions under the jurisdiction of the DENR. The contractor is thus prevented from accessing its contract area because of land use conflict despite having a valid and subsisting contract. The DOE and DENR should review procedures for permitting and consult private industry in setting up timeframes for obtaining licenses and permits.

Certain provisions introduced in the new free and prior informed consent (FPIC) guidelines are tantamount to exercise by the indigenous peoples (IPs) of ownership over natural resources within ancestral domains, which the Supreme Court declared in *Cruz v Secretary of Environment and Natural Resources, et al.* [2000], the

Indigenous Peoples Rights Act ("IPRA") does not confer or recognize. The Supreme Court further held in *Cruz* that the rights given to the IPs regarding the exploitation of natural resources under IPRA only amplified what has been granted to them under existing laws but the State retains full control over the exploration, development and utilization of natural resources. Any provision in the proposed FPIC guidelines that will give veto powers to IPs infringes upon the State's ownership over natural resources within the ancestral domains.

The DOE is currently lobbying that the Philippine legislature promulgate a new law that will set the parameters for "energy project of national significance". Energy projects are unduly delayed because of "non-aligned and non-harmonized laws" and legal roadblocks from local government units, indigenous people and some interest groups whose opposition to these projects are often based on misinformation or lack of awareness. The DOE's initiative in pushing for a law that will recognize projects of national significance announced by Secretary Jose Rene Almendras during the recent Philippine Energy Investment Forum held in December 2011 is a welcome development as a number of exploration projects including the setting up of transmission lines cannot move forward because of problems with local government units.

In the radar of resource developers currently is how the national government will address the implementation of a ban on open-pit mining by a provincial legislative council that highlighted a policy conflict between the national and local governments. The ban stalled the development of the mineral resource and deprived the government of much-needed revenue. For this reason, the national government implemented an executive order that addresses issues of regulatory conflict at the national and local levels. Devolving the mandate of environmental protection to LGUs including the power to impose local taxes is now being brought to the limelight with the inter-related issues of resource development, environment and revenue generation. In the meantime, resource developers are keenly observing the outcome. (Saligumba, 2012)

On the fiscal aspects, there are provisions in the RE Act and its IRR pertaining to tax incentives that still need clarification and necessitate the issuance of pertinent internal revenue rules and the necessary technical studies. Under Section 15 (e) of the RE Act, an RE developer will pay a 10% corporate income tax instead of the normal 30% rate. Rules must be issued to ascertain whether the RE developers who are using the current 30% income tax rate, but are subsequently found to be entitled to the 10% tax rate can claim a refund of the excess income tax paid in prior years. (Mendoza, 2012)

There should also be clarification on the kind of income that is attributable to additional investments in an existing RE facility or project that is entitled to Income Tax Holiday (ITH). Should the ITH only cover the increase in income from sale of energy occasioned by additional investments resulting in an increase in capacity of an existing RE facility? Or should the ITH also apply when the additional investment does not result in increased capacity but has the effect of reducing production/operational costs, increasing efficiency and better product quality? (Mendoza, 2012)

The RE Act provides that the government's share in existing and new RE development projects will be equal to 1% of the gross income of RE developers. This includes not just income from the sale of RE produced, but also incidental income arising from the generation, transmission and sale of electric power. Will requiring the RE developers to pay the 1% government share based on gross income, in addition to national and local taxes, effectively increase government share? (Mendoza 2012) The national government should also develop a transparent system of accounting for and allocation of sharing of revenues and taxes with LGUs. It must expedite and streamline the release of LGU shares through a simplified process with timeframe requirements. It should also enhance the correctness and accuracy of tax collections for purposes of ensuring that full benefits from tax collections will be received by the concerned LGUs. The expedited release of host communities' share in the national wealth will lessen local opposition to geothermal projects.

6. CONCLUSION

The Philippine government aims to ensure energy security by optimizing the use of geothermal energy through investment promotions as well as identification and implementation of sector reforms. Through the RE Act, the DOE will continue to promote the use of geothermal resources for power utilizing the open and competitive selection process, and develop non-power geothermal applications as well. While the fiscal terms and policy mechanisms under the RE Act are being slowly put into place, there is the pressing need to address environmental and social acceptability issues by harmonizing the permitting process and intensifying efforts to increase the level of awareness for geothermal energy.

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