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Policy Reforms in Geothermal Energy Resource Development and Utilization in the Philippines

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ABSTRACT

This paper describes the policy reforms the Philippines has undertaken in order to hasten the development and utilization of the country's geothermal energy resource and pursue its goal of energy self-reliance. With vast resources of geothermal energy, the Philippines is one of the leaders in geothermal energy development and utilization particularly in electricity generation. Major policy reforms in 1987 and 1990 set the national policy of allowing private sector participation to construct and operate electric generating plants and sell its power to the grid. Likewise authorizing the financing, construction, operation and maintenance of infrastructure projects by the private sector, brought about a dramatic increase in geothermal plant capacity addition of about 734.39 MW. On the other hand, enactment of the Electric Power Industry Reform Act (EPIRA) in 2001 resulted to the construction of the first merchant power plant in the Philippines. Under this scheme, this plant will sell directly its electricity to large scale consumers and cooperatives. However, in the case of geothermal field development, there is still a need to reform the policy to attract investments. It is expected that once the Renewable Energy Bill is passed into law, it will provide a positive climate for private investment in geothermal field development.

On March 11, 2004 and August 31, 2005, the First Geothermal Contracting Round (GEOTHERMAL 1) and the Philippine Energy Contracting Round (PECR) were launched, respectively. This is a new approach on granting new Geothermal Service Contracts through a more transparent and competitive approach. These events are aimed at promoting investment opportunities in the Philippine geothermal industry. The first contracting round resulted to three bids submitted by Marubeni, Mitsui and CPI while the PECR bid submission deadline was set November 2005.

Introduction

The Philippines is endowed with vast potential for geothermal energy resources because it is situated in Circum Pacific Belt of Fire. Currently, the Philippines is ranked second in the world in terms of geothermal installed capacity (Table 1, overleaf). Since its first commercial operation in 1977, installed capacity grew from 3 MW to its present capacity of 1930.89 MW although there are only two geothermal field developers in the Philippines. There are nine (9) geothermal service contracts, six (6) of these are operating and producing geothermal fields while the remaining three (3) are under advanced exploration stage. PNOC-Energy Development Corporation (PNOC-EDC), a government-owned and -controlled corporation operates seven of the contracts (Table 2). These are Leyte Geothermal Field, Southern Negros Geothermal Field, Bac-Man Geothermal Field, Mt. Apo Geothermal Field, Northern Negros Geothermal Field, Cabalian Geothermal Field and Mt. Labo Geothermal Field. The remaining two fields, Mak-Ban Geothermal Field and Tiwi Geothermal Field are under Unocal Philippines Inc., a wholly owned subsidiary of Chevron Texaco.

On the other hand, geothermal power plants are operated either by National Power Corporation (NPC), a government

Table 2. Geothermal Service Contract Area.

Contract Area	Date Awarded	Status	Contracting Parties
Tiwi, Albay	Sep. 10, 1971	Producing	NPC-PGI
Mak-Ban, Laguna	Feb. 21, 1973	Producing	NPC-PGI
Tongonan, Leyte	May 14, 1981	Producing	DOE-PNOC-EDC
Palinpinon, Negros Oriental	Oct. 16, 1981	Producing	DOE-PNOC-EDC
Bac-Man, Sorsogon/Albay	Oct. 16, 1981	Producing	DOE-PNOC-EDC
Mt. Apo, North Cotabato	March 24, 1992	Producing	DOE-PNOC-EDC
Mt. Labo, Camarines Norte/Sur	March 14, 1994	Advanced Explo.	DOE-PNOC-EDC
Northern Negros, Negros Occidental	March 24, 1994	Under dev.	DOE-PNOC-EDC
Mt. Cabalian, Southern Leyte	Jan. 13, 1997	Advanced Explo.	DOE-PNOC-EDC

Table 1. World Installed Plant Capacities.

Country	1990	1995	2000
USA	2774.60	2816.70	2228.00
Philippines	891.00	1191.00	1930.89*
Italy	545.00	631.70	785.00
Mexico	700.00	753.00	755.00
Indonesia	144.75	309.75	589.50
Japan	214.60	413.70	546.90
New Zealand	283.20	286.00	437.00
Iceland	44.60	50.00	170.00
El Salvador	95.00	105.00	161.00
Costa Rica	0.00	55.00	142.50
Nicaragua	35.00	70.00	70.00
Kenya	45.00	45.00	45.00
Guatemala	0.00	33.40	33.40
China	19.20	28.78	29.17
Russia (Kamchatka)	11.00	11.00	23.00
Turkey	20.60	20.40	20.40
Portugal (Azores)	3.00	5.00	16.00
Ethiopia	0.00	0.00	8.52
France (Guadeloupe)	4.20	4.20	4.20
Greece	2.00	2.00	2.00
Thailand	0.30	0.30	0.30
Austria	0.00	0.17	0.17
Argentina	0.67	0.67	0.00
Total	5833.72	6832.77	7997.95

*As of Dec. 2003
Source IGA Internet edition, 2003

owned and controlled corporation, or private entity (IPPs) under the Build-Operate-Transfer (BOT) scheme.

The geothermal sector has continuously contributed about 18.40% of the country's total electricity requirement in year 2004 (Geothermal and Coal Division 2004 Year End Report). With a total gross generation of 10,280.81 gigawatt-hour (GWh) of electricity, it has helped the economy by saving some US$MM625 or about 17.73 million barrels of fuel oil equivalent (MMBFOE) based on a yearly average price of US$35.26 per barrel of oil (Table 3).

Geothermal Development in the Philippines

Philippine geothermal resources are developed through service contracts (production sharing agreements) with the government under Presidential Decree 1442. A Geothermal Service Contract (GSC) is awarded through public bidding or through negotiation with a domestic or foreign company. Foreign ownership is limited to 40% foreign participation. The company must be technically and financially capable of operating the resource. Under this scheme, the government retains ownership of the resource and the operator is awarded the contract to explore, develop, exploit, process and market the resource. As mentioned earlier, the company must be financially and technically capable because the company will provide all the financial, technical and managerial resources. In return, the operator is allowed reimbursement of its costs and the net proceeds are then shared between the government and operator on the basis of a negotiated contract. The contract period is 25 years extendible for another 15 years. The exploration period is negotiable. The contractor markets the steam, the final product, to the power plant operator.

The power plant operator enters into either a steam sales agreement or conversion of steam to electricity agreement with the steam field developers. Under the steam sales agreement, the power plant operator buys the steam from the field developer at an agreed price. On the other hand, under the conversion of steam to electricity agreement, the field developer enters into a contract with the power plant operator to construct the plant, convert the steam to electricity and operate the plant at a certain period of time.

Table 3. Philippines Geothermal Energy Performance (2004 Year End Report – Geothermal and Coal Resources Development Division).

YEAR	GEOTHERMAL POWER PLANTS INSTALLED CAP. (MWe)	GENERATION (GWh)	FUEL OIL DISPLACED (MMBFOE)	AVE. OIL PRICE IN US$/BARREL	FOREIGN SAVINGS (MM US$)
1977	1	0.00	11.33	0.02	
1978	3	0.01	12.32	0.06	
1979	278	636.94	1.10	18.19	19.98
1980	446	2044.85	3.53	29.79	105.03
1981	501	3569.19	6.15	33.86	208.37
1982	509	3563.86	6.14	32.80	201.54
1983	784	4081.98	7.04	28.63	201.49
1984	894	4531.46	7.81	27.89	217.90
1985	894	4952.18	8.54	26.61	227.20
1986	894	4577.30	7.89	13.06	103.07
1987	894	4521.97	7.80	16.97	132.31
1988	888	4845.91	8.36	13.53	113.04
1989	888	5308.66	9.15	16.15	147.82
1990	888	5464.76	9.42	25.00	235.55
1991	888	5759.98	9.93	18.04	179.16
1992	888	5696.80	9.82	18.08	177.58
1993	1018	5667.25	9.77	16.00	156.34
1994	1074	6319.69	10.90	15.82	172.37
1995	1194	6134.52	10.58	16.60	175.57
1996	1448	6538.73	11.27	18.65	210.25
1997	1819	7430.88	12.81	18.27	234.07
1998	1861	8951.61	15.43	12.24	188.91
1999	1909	10367.95	17.88	17.45	311.93
2000	1909	11317.19	19.51	27.36	533.86
2001	1931	10381.03	17.90	23.48	420.25
2002	1931	10248.04	17.67	25.00	441.73
2003	1931	9419.02	16.24	28.00	454.71
2004	1931	10280.81	17.73	35.26	625.00
TOTAL		**162,616.48**	**280.37**		**6,195.12**

Policy Reforms on Infrastructure and Power Sector

In the past, the National Power Corporation (NPC) had the lone control over the power sector industry in the Philippines. However, major policy reform brought new opportunities in the power sector. The legislative framework of Executive Order No. 215 in 1987 set the national policy of allowing the private sector to finance, construct and operate electric generating plants, which was once the sole mandate of NPC (PD 40). The complementary law, Republic Act 6957 otherwise known as the BOT Law, was put in effect in 1990, also allows the financing, construction, operation and maintenance of infrastructure projects by the private sector. The scheme is a contractual agreement between the Government and private contractor wherein the latter would be responsible in constructing and financing the infrastructure facility. The Contractor operates and maintains the constructed facility for an agreed period of time where it is allowed to charge facility users fee, rents and other charges to recover both his investment and operating expenses plus a reasonable rate of return. It is on the basis of the provisions of this law that PNOC-EDC entered into BOT arrangements with private power companies for the Leyte and Mt. Apo Projects.

Meanwhile, another policy reform was introduced in the power sector. This is Republic Act 9136 otherwise known as the "Electric Power Industry Reform Act of 2001". It provides a framework for the restructuring of the electric power industry. Under the law, NPC's generation assets will be sold to new generating companies in a manner that will effect greater transparency, managerial accountability, market competition and efficiency.

Impacts of PD 1442 and Policy Reforms in the Power Sector on Geothermal Energy Development

Although the Philippines is second in the world in terms of geothermal installed capacity, there are only two field developers in the country. Certain provisions under PD 1442 deter investments in geothermal energy development. The 60-40 production sharing agreement and financial incentives under this contract system is unattractive to investors due to unfavorable return on investment. In contrast, other country's production sharing agreement for geothermal was more attractive than the Philippines' production sharing agreement. Indonesia, in particular, offers better financial incentives, lower government share and bears the risk of exploration failure. Reducing government share increases the contractor's IRR.

However, in the power sector, major policy reforms introduced in 1987 and 1990 have resulted to the addition of more than 700 MW plant capacity installations in Leyte, Mindanao and Makban. Another 53 MW capacity plant to be commissioned in 2007 was also brought about by these policy reforms.

Key Opportunities

A key opportunity for private companies is to participate in the public contracting round for geothermal field development in the Philippines. The Department of Energy (DOE) formally launched GEOTHERMAL 1, in formal ceremonies on March 11, 2004 in Manila, which aims to attract investments in the exploration and the development of the country's most prospective geothermal resources. By introducing a different mechanism in the offering and granting of new Geothermal Service Contracts through a bidding process, GEOTHERMAL 1 anticipates to generate investors' interest, either in the exploration and development of new prospects/areas, or in projects for the expansion or optimization of existing production fields.

GEOTHERMAL 1 offers ten areas or projects that were painstakingly selected based on their technical, environmental and legal merits (Table 4):

GEOTHERMAL 1 resulted to three bids with CPI Energy and Mitsui bidding for the Rangas-Tanawon Project and Marubeni for the Mt. Apo Optimization Project.

In support of the Philippines quest for energy independence, the DOE spearheaded the PECR launching on August 31, 2005, comprising geothermal, petroleum and coal contracting rounds.

Table 4. Areas Offered.

Area	*Capacity*
Tanawon-Rangas sector BacMan Project, Sorsogon	40-80 MW
Mindanao Optimization North Cotabato	20 MW
Manito Kayabon Sector, Bacman Project, Sorsogon	20 – 40 MW
Cabalian, Southern Leyte	60 – 110 MW
Dauin, Negros Oriental	40 – 80 MW
Biliran	20 – 40 MW
Amacan, Compostela Valley	20 – 40 MW
Natib, Bataan	40 MW
Mabini, Batangas	20 MW
Montelago, Mindoro Oriental	20 – 40 MW

For the geothermal sector, development of new geothermal areas is encouraged in the provinces of Benguet, Bataan, Albay, Mindoro Oriental, Palawan, Biliran Negros Occidental, Cebu, Camiguin and Compostela Valley.

Under these schemes, most promising areas are offered for contract and joint venture application. This is a more transparent and competitive approach wherein investors are given access to all available technical data. Contract application will still be under the PD 1442 scheme while the joint venture scheme is an opportunity for private sector to enter into a joint venture with an existing contract holder like PNOC-EDC and Unocal Philippines to expand their existing geothermal

operations and/or to develop new fields in the vicinity of their existing concession/contract areas.

Non-power applications of geothermal energy also offer new opportunities for private companies. The Philippines already included different areas for direct utilization in the recently concluded launching of PECR. It was proven and studies showed that the heat from utilized geothermal steam and low temperature geothermal steam that cannot be used for power generation have wide varieties of applications.

With the projected capacity addition of more than 700 MW in the medium-term Philippine Energy Plan 2004-2013, investors should take a closer look at the country's untapped geothermal resource, which is about 2,600 MW (Phil Geothermal Energy Reserves-DOE).

Future Plans

Seeing the flaws in the existing laws in geothermal energy development and to increase private sector participation, the DOE is supporting the passage of House Bill 5771 (Renewable Energy Bill) pending in congress. The bill, which is a consolidation of all the proposed Renewable Energy Bills, supports the energy sector goals and objectives of achieving energy self-reliance through indigenous energy resource development, pursuing cleaner energy sources and applications and promoting greater private sector participation. The primary aim of this bill is to further promote the exploration, development, and utilization of renewable energy sources in a sustainable manner.

The salient features of this bill include the following:

- Renewable Portfolio Standards (RPS) - Establishes a minimum amount of RE-based energy for all generators of electricity
- Green Energy Option - Provides end-users the option to choose RE, which is a concrete step towards RE promotion
- Off-Grid Areas – Mandates NPC-SPUG and/or New Power Producers to source a minimum % of their generation from available RE sources in the area concerned
- Full Cost Accounting or Social Cost Pricing - Accounts for the environmental, economic, health and other detrimental costs associated with or resulting from the production of electricity. The feature also provides for a collection of fees from fossil-fuel generators per level of emission / detrimental effects
- Net Metering and Distributed Generation - Allows grid users to connect small scale RE to the distribution grid (up to 100kW)
- Reduction in Government Share – Reduces government share to 2% of gross sale for geothermal
- Fiscal Incentives - Incentives include 100% tax credit on capital equipment, six years income tax holiday, exemption from universal charge, VAT zero rated

Another move that could attract private investment in geothermal energy development is the amendments of the current build-operate-transfer law. The changes will make BOT contract time-bound.

By making projects time-bound both proponents and government are mandated follow a strict calendar days timeline within which they complete a certain component of the project. The proponent could stand to lose the contract to the next winning bidder if it fails to deliver the project on time. The government, for its part, needs to strictly follow schedule in its approval processes to facilitate the project and avoid costly delays.

Conclusion

Policy reforms introduced in 1987 and 1990 on infrastructure and power sector have successfully attracted investments in geothermal development. A total of 734.39 MW capacity additions was brought about by these policy reforms. The Northern Negros Geothermal Power Plant to be commissioned by 2007 was also brought about by these reforms.

However, in the case of geothermal field development, there is still a need to reform the policy to attract investments. Investors are not keen on investing in geothermal development projects due to unfavorable return for their investments. The Renewable Energy Bill pending in Congress offers an incentive package that will stimulate the interest of investors to take a second look at this investment area. By providing additional incentives, it is expected that inflow of capital from the private sector will increase not only in geothermal field development but also in the power plant development and energy generation sector.

Recognizing the important role that the private sector plays in the country's development in the attainment of objectives and plans set under the Philippine Energy Plan, the Department of Energy is continually working on the improvement of the climate for private investment. With the various policies and reforms as well as the present investment opportunities, it is hoped that private sector participation in geothermal development will increase.

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