

Introduction
<p>The Philippines is one of the largest producers of geothermal energy in the world (second only to the United States in terms of installed capacity). The country is targeting the installation of an additional 1,200 MW of geothermal capacity within the next ten years. Several areas are waiting for upstream geothermal activities which include exploration involving drilling programs while many are now ready to be harnessed for steam. Investors may develop the steam field and/or own the power plants as well. The government has enhanced fiscal incentives to make putting up Greenfield projects more attractive.</p>
Market Opportunities
<p>Increase in consumption</p> <ul style="list-style-type: none"> • total additional capacity needed (from renewable and non-renewable energy sources): 4,000-4,350 MW • Visayas and Mindanao islands are starting to experience power shortages • target expansion/additional geothermal power generation capacity of 80 MW in Visayas and 120 MW in Mindanao by 2014 • consumption of geothermal energy increased from 1,154MW in 1995 to 1,958 MW in 2008
Philippine Advantage
<p>Natural resources</p> <ul style="list-style-type: none"> • being in the “Ring of Fire”, the Philippine archipelago hosts several volcanic areas where geothermal resources are remarkable • geothermal reservoirs of hot fluids are found in many parts of the Philippines • geoscientists believe that a potential of about 4,339 MW can be tapped from these resources • these reservoirs remain active for many years • Makban and Tiwi geothermal fields had been in commercial operation since 1979 or for more than 27 years <p>Technology that supports the industry</p> <ul style="list-style-type: none"> • being one of the leading producers of geothermal energy in the world for the last three decades, the industry has developed expertise and provided practical solutions and innovations in geothermal technology: <ul style="list-style-type: none"> – Silica Inhibition Technology – On-line Steam Purity Monitoring (SPM) – Calcite Inhibition Technology – Acid Well Utilization – Downhole Sampling using the Kuster-Klyen-Aguila (KKA) Tool – Enhanced Thermowell – Vertical Discharge Diffuser – Well Enhancement Technology • large producers of geothermal energy in the world operate in the Philippines • their innovations have helped make the Philippines the second-largest geothermal energy-producing country in the world • industry leaders present technical papers, share experiences and ideas on geothermal science and engineering to both local and foreign geothermists <p>Support industries/infrastructure</p> <ul style="list-style-type: none"> • high voltage backbone system of interconnected transmission lines, sub-stations and related facilities exist in Luzon, Visayas, and Mindanao <ul style="list-style-type: none"> Luzon Grid – 19,271 MVA, Visayas Grid – 3,269 MVA, Mindanao Grid – 2,103 MVA • National Grid Corporation of the Philippines (NGCP) is responsible for the planning, construction, and centralized operation and maintenance of high-voltage transmission facilities, including grid interconnection and ancillary services

Ideal locations

- the Department of Energy is knowledgeable of the configurations of many geothermic natural resources
- active exploration of geothermal prospects was evident in the conduct of magnetotelluric surveys in the following potential sites identified by the DOE for new capacities:

Luzon (380 MW)

- Kalinga – 60 MW
- Ifugao – 60 MW
- Benguet – 20 MW
- Cagayan – 20 MW
- Bataan – 40 MW
- Albay and Sorsogon – 120 MW
- Batangas – 20 MW
- Mindoro Oriental – 40 MW

Visayas (80 MW)

- Negros Oriental – 60 MW
- Southern Leyte – 20 MW

Mindanao (120 MW)

- Zamboanga del Sur – 40 MW
- North Cotabato – 20 MW
- Davao del Sur – 40 MW
- Davao del Norte – 20 MW

Geothermal power plants for privatization:

Plant	Rated Capacity	Location
Bac-Man	150 MW	Manito, Albay and Bacon, Sorsogon
Palinpinon	192 MW	Puhagan, Valencia, Negros Oriental
Tongonan/Leyte	112.5 MW	Lim-ao, Kananga, Leyte

Human resources

- Manpower Requirement
 - Engineers
 - Chemists
 - Plant Operators
 - Maintenance personnel
 - Administrative staff
- Availability
 - 517,427 total graduates in 2009
 - 63,919 graduates of various Engineering courses
- Quality
 - competitive labor force
 - world-class English language proficiency with capability with some Asian languages
 - fast learning curve (needs only 6-8 weeks to learn technical skills)
 - long tradition of excellence in the professions
 - strong work ethics and customer orientation
 - universal cultural adaptation

Costs advantage

- since it is rich in geothermal resource, the Philippines offers cost advantage to a geothermal energy developer in terms of fuel cost
- extraction of steam from geothermal resource is fairly cheap compared with generating steam using natural gas and coal or other fossil fuels to run steam turbines that generate electricity

- electricity produced by geothermal plants is therefore cheaper even with that produced by hydro power stations

Industry Potentials

Growth in number of geothermal power plants

- has grown from 4 in 1979 to 29 as of 2008
- 17 new plants are expected to be on-stream by 2014

New investments

- the recently passed Philippines Renewable Energy Act of 2008 is expected to accelerate the exploration and development of geothermal resources in the Philippines

Increasing share in electricity generation

- geothermal energy already accounts for 18% of the country's total electricity generated in power plants
- distribution by Grid: Luzon - 8.25%, Visayas - 71%, Mindanao - 11%
- current installed capacity of 1,958 MW represents 12.5 % of total power generation capacity
- will be roughly around 2,173 MW in 2014

Rural employment opportunities

- the industry provides opportunities for direct labor sourced particularly from rural areas

Increasing contribution to the economy

- will continue to contribute to foreign exchange savings as it substitutes imported fuel oil
- the 25 million barrel fuel oil equivalent (MMBFOE) of the sourced indigenous geothermal energy translates to an estimated annual savings of US\$588.4 million
- will be a substantial earner of foreign exchange through carbon credits under the Clean Development Mechanism

Government Support

Enabling laws/policies

- Renewable Energy Act of 2008 (R.A. 9513) - establishes the necessary infrastructure and mechanisms to carry out the government's thrust to promote the development, utilization and commercialization of renewable energy sources which includes geothermal energy
 - promotes the purchase, grid connection and transmission of electricity generated from renewable energy sources to ensure its market
 - provides incentives such as exemption from various taxes and duties to renewable energy developers to make investments more attractive

Development plans and programs

- intensify development and utilization of renewable energy sources and technology
- accelerate exploration and development of geothermal resources
 - intensify search of geothermal sources through continued public bid rounds and improved service contracting schemes
 - promote and implement Philippine Energy Contracting Rounds (PECR) and award service contracts

Market support

- A Presidential Order directs local government units in certain areas near or adjacent to geothermal power plants to develop Economic Zones that will draw power from these plants.
- To contribute to the growth of the renewable energy industry by diversifying energy supply, the Renewable Portfolio Standards (RPS) policy requires electricity suppliers to source a certain portion of their energy supply from eligible geothermal energy sources.

Technical/R & D support

- Government identifies potential sites of geothermal energy resources where investors may undertake pre-development or exploration activities
- Assists private entities who have identified frontier areas by providing technical assistance in further determining if these areas warrant the establishment of a power plant

Financial Support

- Project Preparation Fund (PPF) managed by the Land Bank of the Philippines
- Loan Guarantee Fund (LGF) - LGU Guarantee Corporation, and Banco de Oro – Universal Bank will act as the Program Manager and Escrow Agent, respectively
- New and Renewable Energy Financing Programme (NREFP) managed by the Development Bank of the Philippines

Incentives

Fiscal Incentives:

- Income Tax Holiday (ITH) for 7 years
- Duty-Free Importation of RE machinery, Equipment and Materials
- Special Realty Tax Rates on Equipment and Machinery.
- Net Operating Loss Carry-Over (NOLCO)
- Corporate Tax Rate. of 10% on net taxable income after 7 years of ITH
- Accelerated Depreciation
- Zero Percent Value-Added Tax Rate
- Tax Exemption on Carbon Credits
- Tax Credit on Domestic Capital Equipment and Services - value-added tax and custom duties

Non-fiscal Incentives:

- Renewable Portfolio Standard
- Priority connection to the grid
- Priority purchase and transmission by grid system operators

Costs of Doing Business

Investment Cost

- Capital Costs
 - covers power plant, steam field wells, fluid recycling system and transmission line
 - capital cost for geothermal system ranges from \$4-5 million per installed MW
 - plant lifetimes are typically 30 years
- Operating and Maintenance Costs
 - operating and maintenance costs range from \$0.03 to \$0.05/kWh
- Tariff
 - mainly contracted on Php/kWh
 - base rate usually escalated by inflation and foreign exchange indices
- Volume
 - geothermal plants are baseload with 90% capacity factor but will depend on the contracted kilowatt hours

Salaries and wages

Monthly Salary Range (in US dollars @ \$1 = P48)

- Engineers – 833 to 854
- Chemists – 688 to 750
- Plant Operators – 458 to 479
- Maintenance Personnel – 438 to 458
- Administrative Staff – 583 to 625

Taxes and royalties

- geothermal energy is considered a mineral resource
 - government share is at 1.5% of gross income

Industry Players

Companies with existing stakes in the industry

- Geysir Green Energy (Biliran Geothermal Inc.)
- Chevron Geothermal Philippines Holdings Inc.
- Aboitiz Power Renewables Inc.
- Ayala Corp.
- First Gen Corp
- Energy Development Corp.
- National Power Corp.

Contacts

Board of Investments (BOI)

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