THE STATE OF PHILIPPINE LAW ON GEOTHERMAL POWER: POLICIES, PROJECTS, IMPLICATIONS*

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ABSTRACT

This article traces the development of the Philippine legal framework on geothermal energy. It analyzes pertinent laws that govern the exploration, development, and utilization of geothermal energy and considers the economic, social, and environmental effects thereof. After explaining the abundance of geothermal energy resources in the country, this article also studies the future of geothermal energy, taking into account policies that should be adhered to in the further development of this resource.

I. INTRODUCTION

The world as we know it today is driven by power. Power that is primarily provided by fossil fuels, namely coal and petroleum. As of 2010, petroleum accounted for 34.6% of the world's primary energy production amounting to 176.568 quadrillion British Thermal Units ("Btu").[1] On the other hand, coal ranked second as a primary energy source in 2010, accounting for 28.75% of the world's primary energy production.[2]

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** Editor, PHILIPPINE LAW JOURNAL Vol. 86 (2011). Consultant, Office of Rep. Arthur R. Defensor, Jr., House of Representatives. J.D., University of the Philippines (2013). B.S. Chemistry, Ateneo de Manila University (2007).

[1] *See* U.S. Energy Information Administration, *International Energy Statistics* (2011), *available at* http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=44&pid=44&aid=2 (last visited Mar. 14, 2011). 1 British thermal unit (Btu) = 0.252 kcal = 1.055 kJ.

[2] *Id.*

These resources, due to their ever-increasing demand, are rapidly dwindling with each passing day. Total world oil reserves, as of 2008, were estimated to be at 1,258 billion barrels or 170.8 billion tonnes.[3] Coal reserves were estimated at 826 billion tonnes by the end of 2008.[4] The utilization of these resources by power industries, commerce, and everyday life is steadily increasing. Oil production rose by 16.9% or from 69.5 to 81.3 million barrels per day (11.7 million barrels per day increase) within a decade from 1996 to 2006.[5] World coal production totalled 6.8 billion short tons or 128 quadrillion Btu in 2006, and it increased by 32.7% from the 1996 level of 5.1 billion short tons.[6]

As far as consumption is concerned, oil consumption amounted to 3.928 billion tonnes and accounted for 34.77% of the world's total energy needs. A close second was coal consumption with around 3,304 million tonnes of oil equivalent ("Mtoe")[7] and accounted for 29.24% of energy for the modern world.[8] At this rate, it is estimated that the production from known oil and gas reserves will fall by around 40-60% by 2030.[9]

Another problem concerning fossil fuels concerns the supply of oil, which is concentrated within the territories of several nations, most of which are from the Middle East and form part of the influential Organization of the Petroleum Exporting Countries ("OPEC"). Founded in Baghdad, Iraq in 1960, the OPEC is currently composed of 12 countries[10] consisting of the top producers and exporters of crude petroleum in the world.

The concentration of oil reserves within the territorial jurisdictions of certain states has long been recognized as a source of power and influence in

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[3] British Petroleum, *BP Statistical Review of World Energy: June 2009*, *available at* http://tonto.eia.doe.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=1&cid=regions&syid=1980&eyid=2008&unit=QBTU (last visited Mar. 14, 2011).

[4] *Id.*

[5] *Id.*

[6] *Id.*

[7] One tonne of oil equivalent is equal to 1.5 tones of hard coal or 3.0 tonnes of lignite.

[8] British Petroleum, *supra* note 3.

[9] Stephan Singer et al., *The Energy Report: 100% Renewable Energy by 2050*, WWF INTERNATIONAL, *available at* http://assets.panda.org/downloads/the_energy_report_lowres_111110.pdf (last viewed May 11, 2013).

[10] The current members of the OPEC are: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

both economic and political arenas.[11] The struggle for control over oil-rich territories and the supply of crude oil itself are among the primary causes of armed conflict since World War II. The Persian Gulf War was a result of conflict between Iraq and the Allied Coalition following the former's invasion of its oil-rich neighbour Kuwait on August 2, 1990. Around that time, oil prices were collapsing and a virtually bankrupt Iraq accused Kuwait of exceeding OPEC quotas.[12] At stake in that conflict were the rich oil fields and reserves within Kuwait. Saudi Arabia was also threatened with invasion by Iraq soon after the latter's conquest of Kuwait and was sought to be protected by an Allied Coalition that incidentally had colossal interests with respect to oil in the region.[13] The war in Iraq initiated by the United States against the dictatorial regime of Saddam Hussein was, to an extent, influenced by U.S. interests in oil within that territory.[14]

Since the end of the 20th century, oil prices have been steadily on the rise. In 1999, the price of a barrel of crude oil was at $17.97 per barrel. This figure rose to $28.50 per barrel at the end of 2000. By the end of 2008, a barrel of oil costed $97.26.[15] As of March 23, 2011, the price of crude oil per barrel rested at $110.10 and is still expected to rise.[16]

The consumption of fossil fuels for energy requirements has long been the cause for increasing carbon emissions which are directly responsible for climate change. Carbon dioxide emissions lead to increased greenhouse effect, resulting in global warming. In 1965, the annual world carbon dioxide

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[11] *See* DANIEL YERGIN, THE PRIZE: THE EPIC QUEST FOR OIL, MONEY, AND POWER (1992).

[12] WILLIAM CLEVELAND, A HISTORY OF THE MODERN MIDDLE EAST 464 (2000).

[13] *See* THE PERSIAN GULF AT THE MILLENIUM (Gary Sick and Lawrence Potter, eds., St. Martin's Press 1997); Wikipedia, Gulf War, *at* http://en.wikipedia.org/wiki/Gulf_War (last visited Mar. 14, 2011).

[14] *See* MICHAEL KLARE, BLOOD AND OIL: THE DANGERS AND CONSEQUENCES OF AMERICA'S GROWING DEPENDENCY ON IMPORTED PETROLEUM (2004); Michael Schwartz, *Why Did We Invade Iraq Anyway? Putting a Country in Your Tank* (last modified Oct. 30, 2007), *at* http://www.truth-out.org/article/michael-schwartz-why-did-we-invade-iraq-anyway (last visited Mar. 14, 2011); James Paul, *Iraq: the Struggle for Oil*, Global Policy Forum (last modified Dec. 2002) *available at* http://www.globalpolicy.org/component/content/article/185/40471.html (last visited Mar. 14, 2011); Bernard Cloutier, *The Struggle for Oil* (last modified Oct. 2002), *at* http://www.berclo.net/page02/02en-chessgame-2.html (last visited Mar. 14, 2011).

[15] British Petroleum, *supra* note 3.

[16] OPEC, Basket price of crude oil, *at* http://www.opec.org/opec_web/en/(last visited Mar. 23, 2011).

emissions amounted to 11,970.9 million tonnes of carbon dioxide.[17] This figure has been steadily increasing for over 30 years. As of 2008, the annual carbon dioxide emissions of the world amounted to 31,577.8 million tonnes of carbon dioxide.[18] Of the 2008 figure, 46% is attributable to OECD nations.[19] China and the United States together account for more than 41% of the world total carbon dioxide emissions today.[20]

Furthermore, the combustion of fossil fuels produces numerous air pollutants as by-products, such as nitrous oxide, sulphur dioxide, other volatile organic compounds, and heavy metals. The release of nitrous oxide and sulphur dioxide into the atmosphere is the primary cause of acid rain which has adverse effects on agricultural and forest areas.[21]

The aggregate concerns arising from political, economic, environmental, and social impacts of the world reliance on fossil fuels have fuelled the search for alternative sources of energy. Considering further that the world's energy requirement is expected to increase by 49% from 2010 until 2030, [22] heavy emphasis is being made on research, development, and utilization of renewable energy resources. The concerted efforts of the world have borne fruit to technologies allowing mankind to draw power from sunlight, wind, water, geothermal, ocean current, and nuclear power resources.

This paper will focus on geothermal energy. It will trace the evolution of the Philippine legal framework on geothermal energy, focusing on state policies on geothermal development and maximization to ensure the steady supply of energy. This paper shows where the law stands today and the direction it is headed towards. Also, in considering the overarching implications from geothermal exploration, development, and utilization

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[17] British Petroleum, *supra* note 3.

[18] *Id.*

[19] *Id.* OECD stands for The Organisation for Economic Co-operation and Development.

[20] *Id.*

[21] *See* WILL STEGER & JON BOWERMASTER, SAVING THE EARTH (1990); R.M. Adams, et al., *An Economic Assessment of Air Pollution Damages to Selected Annual Crops in Southern California,* 9 J. ENVIRON. ECON. MGMT. 42 (1979).

[22] U.S. Energy Information Administration, *International Energy Outlook 2010: World Energy Demand and Economic Outlook*, *available at* http://www.eia.doe.gov/oiaf/ieo/world.html (last visited Mar. 23, 2011).

projects, this paper will likewise look into the social and environmental effects that ought to be considered in policy formulation and implementation.

II. GEOTHERMAL ENERGY: HOW IT WORKS

The word geothermal comes from the Greek words *geo*, meaning earth and *thermos*, meaning heat. Literally, geothermal energy is the thermal energy generated from within the Earth's interior. It originates from the residual heat from planetary accretion, radioactive decay of minerals, volcanic activity, and solar energy absorbed at the surface.[23] This radiogenic heat accounts for around half of the Earth's internal heat. It is derived from the decay of long-lived radioactive isotopes of uranium, thorium, and potassium, which are present in the Earth.[24] While it has not been fully determined as to how the Earth generates geothermal energy, it is settled that such energy is of immense magnitude. It has been noticed that the Earth's mantle has been constantly cooling with its temperature having decreased by no more than 300 to 350 °C in three billion years; however, such temperature still remains at around 4000 °C at its base.[25] It has been estimated that the total heat content of the Earth, reckoned above an assumed average surface temperature of 15 °C, is of the order of 12.6×10^{24} megajoules, and that of the crust is of the order of 5.4×10^{21} megajoules.[26]

The heat continuously flowing from the Earth's interior is estimated to be equivalent to 42 million megawatts ("MW") of power.[27] Heat is transferred from the interior towards the surface, mostly by conduction, at an average of 65 milliWatts per square meter ("mW/m2") on continents and 101 65 mW/m2 through the ocean floor. The result is a global terrestrial heat flow rate of around 1,400 exajoules per year.[28] However as the technology stands,

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[23] Mary Dickson & Mario Fanelli, *What is Geothermal Energy?*, ISTITUTO DI GEOSCIENZE E GEORISORSE, Feb. 2004, at 1, 2, *available at* http://www.geothermal-energy.org/geothermal_energy/what_is_geothermal_energy.html#the_top (last visited May 11, 2013).

[24] *Id.* at 2.

[25] *Id.*

[26] *Id.*

[27] Alyssa Kagel et al., *A Guide to Geothermal Energy and the Environment*, GEOTHERMAL AGENCY ASSOC., Apr. 2007, at 2.

[28] Barry Goldstein, et al., *Geothermal Energy in* O. ENDENHOFER, ET AL. IPCC SPECIAL REPORT ON RENEWABLE ENERGY SOURCES AND CLIMATE CHANGE MITIGATION 408 (2011).

the proper utilization of geothermal energy requires the use of a suitable carrier fluid which can absorb energy from the Earth's interior and channel the same back to the surface.[29]

Geothermal energy has various uses, the most common of which is direct heating. This, in turn, dates back to Paleolithic times when man began using hot springs for bathing.[30] Other modern uses of geothermal energy range from open-field agriculture, greenhouse heating, indoor heating systems, aquaculture, and as a source of industrial process heat.[31] However, the most important form of utilization of geothermal energy resources, by far, is for electricity generation.[32]

Geothermal energy resources are only present in areas with a normal or slightly normal geothermal gradient.[33] Gradient refers to the rate at which the Earth's temperature increases with depth, indicating heat flowing from the Earth's warm interior to its cooler surface.[34] A geothermal system starts with the convection of water in the upper crust of the Earth, which transfers heat from a heat source to a free surface.[35] Usually, geothermal energy resources are found in volcanic regions, in the margins of tectonic plates, as it is in these areas that hot magma is produced, closest to the Earth's surface.[36]

A geothermal system is primarily composed of five elements: (i) a heat source, (ii) a reservoir rock, (iii) an impermeable cap rock, (iv) fluid, and (v) a mechanism for fluid recharge and discharge.[37]

The heat source is a node of the Earth's mantle filled with hot magma with a temperature exceeding 600 °C, around five to ten kilometers from the

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[29] Dickson & Fanelli, *supra* note 23 at 3.

[30] Raffaele Cataldi, *Review of historiographic aspects of geothermal energy in the Mediterranean and Mesoamerican areas prior to the Modern Age*, GEO-HEAT CENTRE Q. BULL., Aug. 1993, at 13-16, *available at* http://geoheat.oit.edu/pdf/bulletin/bi046.pdf (last visited Apr. 10, 2011).

[31] Dickson & Fanelli, *supra* note 23 at 37-48.

[32] *Id.* at 31.

[33] A measure of the increase in temperature with increasing depth within the Earth's interior. *Id.* at 10.

[34] *Id.* at 10-12.

[35] *Id.* at 15.

[36] *Id.*

[37] Raul Sabularse, Geothermal Energy in the Philippines (Dec. 2008) (presentation at the Workshop on Geothermal Energy: Resources and Technology for a Sustainable Development at Trieste, Italy) (on file with the Philippine Law Journal).

Earth's surface.[38] In these areas, geothermal gradient is high, thereby giving access to a portion of the Earth's crust with very high temperatures from which geothermal energy may be drawn.[39]

The reservoir is an area containing hot permeable rocks which stores fluid (usually water) that, in turn, absorbs heat from the Earth's interior by thermal conduction.[40] It is separated from the heat source by a layer of impermeable rocks which prevent the fluid stored inside from leaking into the heat source.[41]

The cap rock is a layer of impermeable rocks which separates the reservoir from the Earth's surface through steam vents or boreholes drilled into the ground. Its impermeability ensures that the fluid stored in the reservoir is prevented from dissipating away while causing the same to be heated within the reservoir.[42]

It is essential that the reservoir is connected to a mechanism for fluid recharge and discharge.[43] The discharge mechanism, usually boreholes drilled into the ground, steam vents, or natural springs, allows the steam to rise to the Earth's surface where it can be gathered and utilized. [44] The recharge mechanism provides for means by which the water contained by the reservoir can be replenished.[45] There are two ways by which the recharge mechanism is done: naturally or artificially. In recharge by natural means, a recharge area, usually a vast watershed, serves as a catch-basin for rainwater. The rainwater collected seeps into the ground through a permeable layer of rocks which is connected to the reservoir thus replenishing the supply of fluid therein. Recharge by artificial means can be done by drilling of another borehole through the cap rock which leads directly to a cooler part of the reservoir where water may be directly injected. This recharge mechanism utilizes the

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[38] Dickson & Fanelli, *supra* note 23 at 15.

[39] *Id.*

[40] The flow of thermal energy through a substance from a higher- to a lower-temperature region. Heat conduction occurs by atomic or molecular interactions. Conduction is one of the three basic methods of heat transfer, the other two being convection and radiation. *See* JOSEPH ROSEN, ENCYCLOPEDIA OF PHYSICS 51-52 (2004).

[41] Dickson & Fanelli, *supra* note 23 at 16.

[42] Sabularse, *supra* note 37.

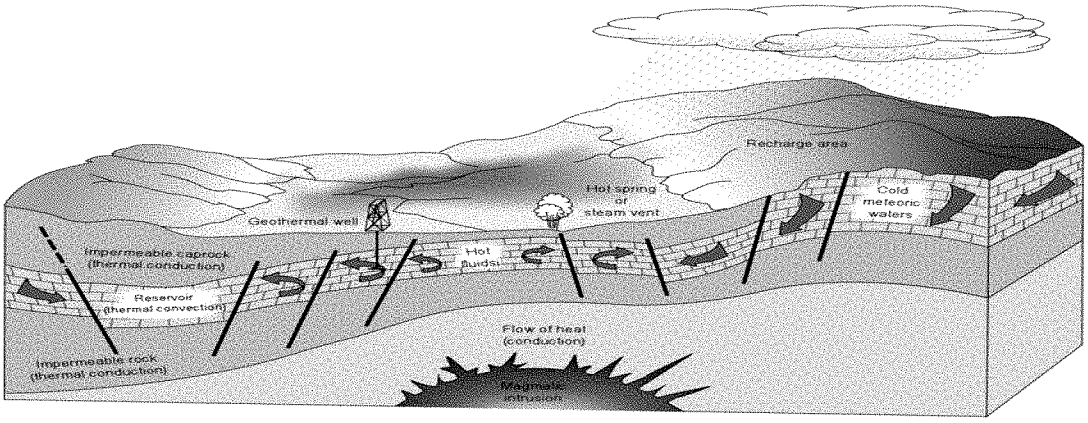
[43] *Id.*

[44] Dickson & Fanelli, *supra* note 23 at 16.

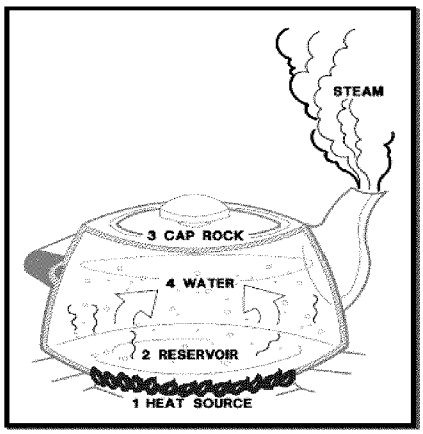
[45] Sabularse, *supra* note 37.

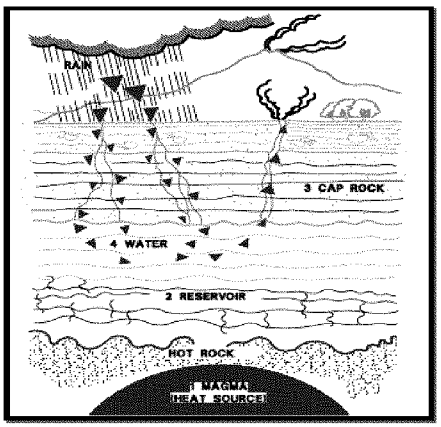
water condensed from the steam utilized to power the turbine thereby allowing the re-utilization of water.[46]

A sample geothermal system is illustrated by the diagram below:[47]



Geothermal energy is harnessed through the utilization of the "kettle concept." The concept is illustrated by Raul C. Sabularse of the Department of Science and Technology, as illustrated by the following diagram:[48]





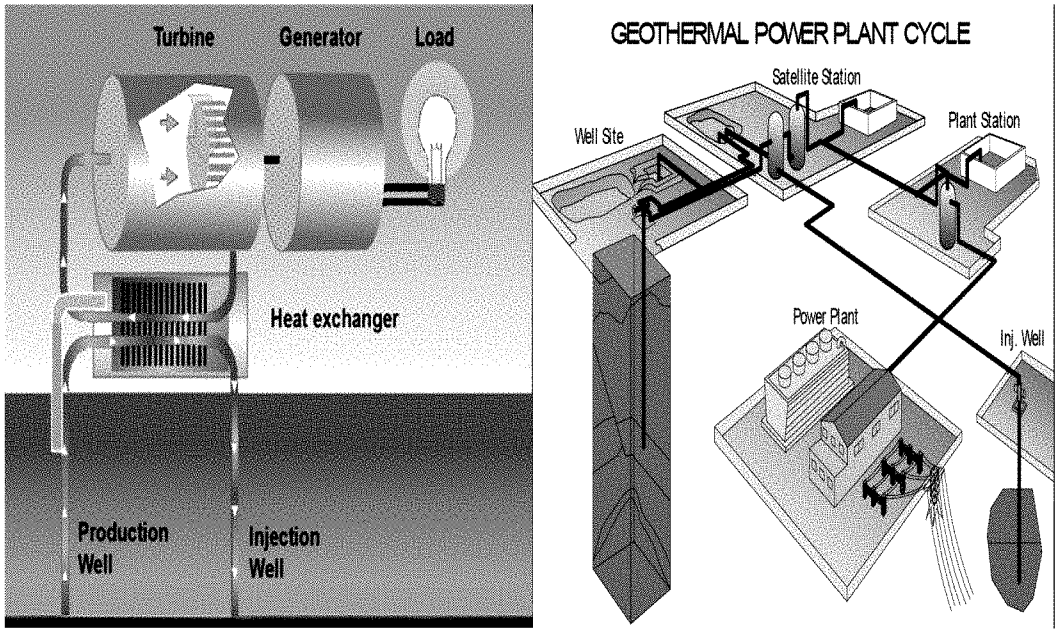
[46] *Id.*

[47] Dickson & Fanelli, *supra*, note 23 at 16.

[48] Sabularse, *supra* note 37.

As can be seen, water stored within the reservoir absorbs heat energy from the Earth's interior and evaporates into steam. Due to the impermeable cap rock which separates the reservoir from the Earth's surface, the steam generated travels through the Earth's surface where it manifests in the form of hot springs or geysers. In geothermal power plants, the concept is employed on a much larger scale. Steam as a form of gas rises to the surface where it is collected and channelled to power a turbine which in turn powers a generator, creating electricity. Wells are drilled in order to allow the replenishment of fluid stored in the reservoir through the recycling of water condensed from the geothermal fluids used to drive the turbine in a geothermal power-plant. Such water can be injected back into the reservoir through injection wells. This way, the natural recharge of the reservoir, through natural rainfall, is complemented by an artificial recharge. For many years now re-injection has also been adopted in various parts of the world as a means to drastically reduce the harmful impact on the environment.[49]

An example of a geothermal power plant schematic is shown below:[50]



[49] Dickson & Fanelli, *supra* note 23 at 18.

[50] Sabularse, *supra* note 37.

While the concept of geothermal energy seems fairly simple, it is the concurrence of the five aforementioned elements of a geothermal energy system that renders a magmatic intrusion as a potential source of energy. The absence of an element renders the development doubtful for sustainable or renewable energy utilization. Thus, a substantial effort is placed on geothermal exploration which seeks the identification of a useful geothermal field, taking into account its size, productive zones, heat content of fluids, as well as any characteristics which may cause problems during development. [51] The exploration phase provides background information for constructing a realistic model of the geothermal system and for assessing the potential of the resource which can then be used in the planning of boreholes.[52]

A geothermal power facility consists of geothermal wells, pipelines that carry geothermal fluids, the utilization plant, and a re-injection well for recharge. The presence of these requirements makes geothermal energy development an extremely capital-intensive business venture.[53] The drilling of wells is quite expensive and pipelines need to be maintained. These pipelines stretch through tens of kilometers and require pumps and valves to ensure the proper pressure and flow of the geothermal fluid. The Makiling-Banahaw Geothermal Field is an example of the vastness of a geothermal energy system. It is one of the largest geothermal energy producers in the Philippines and is found in the Southern Tagalog Region, covering an area of no more than 162,000 hectares. Currently, it has a total installed capacity of 458.53 MW.[54] All this shows that the capital cost of a geothermal plant is usually higher than that of a similar plant run on a conventional fuel.[55]

Nonetheless, geothermal energy, as a form of renewable energy, is seen with great favor due to its greater reliability as compared against other renewable energy sources such as solar and wind energy.[56] Owing to the very nature of geothermal power, power plants utilizing this resource are generally

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[51] Dickson & Fanelli, *supra* note 23 at 26.

[52] *Id.* at 27.

[53] *Id.* at 49.

[54] Ariel Fronda, *Geothermal Energy in the Philippines: Developments and Challenges*, GEOTHERMAL ENERGY MANAGEMENT DIVISION, RENEWABLE ENERGY MGMT. BUREAU, *available at* http://www.c-cred.org/re2010/userfiles/files/Ariel%20Fronda.pdf (last visited May 11, 2013). Presented at the Renewable Energy Conference and Exhibition 2010.

[55] *Id.*

[56] Kagel, et al., *supra* note 27 at 7.

available for generation 95% of any given time in a year, based on decades of observations by plant operators.[57] Geothermal power plants likewise possess a better capacity factor, which is dictated by the reliability of the power source as measured by the amount of real time during which the facility is actually tapped to power the grid. Accordingly, geothermal power plants are usually kept running at a nearly constant output for a full 24 hours a day.[58]

Geothermal energy has the potential to provide reliable sources of electricity, comparable to coal or nuclear power sources, while providing significantly lower emission levels than fossil fuel sources. Also, geothermal energy does away with problems of radioactive waste disposal posed by nuclear sources.[59]

III. THE PHILIPPINE LAW ON GEOTHERMAL ENERGY

A. The Legal Definition of Geothermal Energy

Under Philippine law, it is indubitable that geothermal energy is treated as a natural resource and is therefore owned by the State under the Regalian doctrine. Article XII, Section 2 of the 1987 Constitution explicitly provides that "minerals, coal, petroleum, and other mineral oils, and all forces of potential energy . . . [shall be] owned by the State." Similar provisions are likewise provided under the 1935 and 1973 Constitutions.[60]

It bears stressing that the Constitution, in the previously cited provision, treats geothermal energy as a separate and distinct natural resource from mineral, coal, and petroleum resources as it falls within the category of "all forces of potential energy." This is a significant deviation from the law of the United States, the leading nation in the utilization of geothermal energy, which treats geothermal energy systems as mineral resources.[61]

In American jurisprudence, geothermal energy has been defined as "the natural heat of the earth which can be extracted in the form of hot water

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[57] *Id.* at 8.

[58] *Id.*

[59] *Id.* at 9.

[60] CONST. (1935), art. XII, § 1; CONST. (1973), art. XIV, § 8.

[61] *See* Rosette Inc. v. United States, 277 F.3d. 1222 (10th Cir. 2002); United States v. Union Oil Co. of California, 549 F.2d 1271 (9th Cir. 1977).

and/or water vapor."[62] Geothermal energy consists of heat and pressure used to produce energy, and "must be exploited, if it is to be exploited at all, on the lands from which it is to be removed."[63]

Philippine statutory definitions of geothermal energy have varied as its technology developed. Under the first geothermal law, "geothermal energy" was defined as:

> [E]nergy derived or derivable from and produced within the earth by natural heat phenomenon: and includes all steam, and water vapor, and every mixture of all or any of them that has been heated by natural underground energy, and every kind of matter derived from a bore and for the time being with or in any such stead, water, water vapor, or mixture.[64]

Section 4(q) of the Renewable Energy Act of 2008[65] provides a more modern definition of geothermal energy, consistent with the existing schematics of geothermal power plants:

> (q) "Geothermal energy" as used herein and in the context of this Act, shall be considered renewable and the provisions of this Act is therefore applicable thereto if geothermal energy, as a mineral resource, is produced through: (1) natural recharge, where the water is replenished by rainfall and the heat is continuously produced inside the earth; and/or (2) enhanced recharge, where hot water used in the geothermal process is re-injected into the ground to produce more steam as well as to provide additional recharge to the convection system

A careful perusal of the Philippine legal framework on geothermal energy reveals that through the course of discovery of geothermal energy resources and the emergence and development of the technology allowing its proper utilization and exploitation, the state policy has always been for the promotion of the development and utilization of geothermal energy resources with minimal regulation or interference by the government. This policy is

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[62] *Id. citing* United States v. Union Oil Co. of California, 549 F.2d at 1273-74. Alba v. Peoples Energy Resources Corp., 136 N.M. 79, 94 P.3d 822 (NMCA 2004) *citing* R & R Energies v. Mother Earth Indus., Inc., 936 P.2d 1068, 1073 (Utah 1997).

[63] Rosette Inc. v. United States, *supra* note 61 at 1233.

[64] Rep. Act No. 5092, § 2(c) (1967) (hereinafter "RA 5092").

[65] Rep. Act No. 9513 (2008) (hereinafter "RA 9513").

grounded on the idea that rural electrification is a major factor in accomplishing development. Electricity is used not only for lighting and household purposes, but it also allows for mechanization of many farming and fishery operations, ultimately allowing for greater productivity and efficiency at a reduced cost. The other main state policy in support of geothermal energy development is the goal of energy security, particularly the emancipation from reliance on imported energy supplies considering the perennial problem of the ever-increasing and volatile price of crude oil in the world market.

B. The First Geothermal Law: Republic Act No. 5092

The first law to govern geothermal energy in the Philippines is Republic Act No. 5092 ("R.A. No. 5092") enacted by the Philippine Congress on June 17, 1967. The said law, known as the *Geothermal Energy, Natural Gas and Methane Gas Law*, provided for a system by which the exploration, development, and exploitation of geothermal energy resources could be realized. One of the primary concepts enunciated in R.A. No. 5092 is the application of the Regalian doctrine, then provided by the 1935 Constitution, with respect to geothermal energy resources. Thus, Section 3 of the said law aptly provides, as follows:

> SEC. 3. State ownership. — All geothermal sources or occurrences of geothermal energy, natural gas and methane gas in public and/or private lands in the Philippines, whether found in, on or under the surface of dry lands, creeks, rivers, lakes, or other submerged lands within the territorial waters of the Philippines belong to the State, inalienable and imprescriptible and their exploration for, tapping and utilization shall be governed by the provisions of this Act.

Under such provision, the ownership over all geothermal energy resources in the Philippines is vested in the State. This provision is further strengthened by Section 4 thereof which provides for a limitation on the right of ownership of private individuals where geothermal energy resources are found, as follows:

> SEC. 4. Title to land. — The ownership or the right to the use of lands for agricultural, industrial, commercial, residential, mining, petroleum, or for any other purposes other than for the exploration, tapping or use of geothermal energy, natural gas and methane gas, does not include ownership of, nor the right to explore for, tap, or

> utilize the geothermal energy, natural gas and methane gas in, on or under the surface of such land.

Under R.A. No. 5092, the right to explore for, tap, or utilize geothermal energy, natural gas, and methane gas may be obtained and exercised only by means of permits and leases granted by the government.[66] However, no such permit shall be required if the exploration is undertaken by the owner of the land, his agent, or if such geothermal energy is already being used for any domestic purpose at the time of effectivity of R.A. No. 5092.[67] In any other case, it is the government that has the right to undertake the exploration for, tapping, or utilization of geothermal energy by itself or through its instrumentalities, or through independent contractors.[68]

Applicants for permits or leases under R.A. No. 5092 may be natural or juridical persons: individual applicants must be Filipino citizens of legal age,[69] whereas a partnership or corporation must be duly organized under the laws of the Philippines with at least 60% of the capital held by Filipinos.[70] "Applicants must show that they possess sufficient finance, organization, resources, technical competence, skills, and experience necessary to conduct the operations . . . in a manner which is in accordance with the best method known to the industry . . . ."[71] Applications for leases and permits are made with the Director of Mines.[72] Permits shall remain effective for not more than three years from the date of its issuance and may be extended for up to four years.[73] The issuance of a permit grants to the holder thereof the following rights:

> [T]he exclusive right to explore the block covered, to do geological and physical work, to conduct drilling operations, and to do such other work related to explorations or that has for its object the discovery of geothermal energy.[74] A lease granted under R.A. No. 5092 grants upon the holder thereof the exclusive right, under the term of the lease, to drill within the boundaries projected vertically

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[66] RA 5092, § 5(1).
[67] § 5(1).
[68] § 5(2).
[69] § 6(2).
[70] § 6(3).
[71] § 6(4).
[72] §§ 12, 17.
[73] § 16.
[74] § 14.

> downward of the area covered by his lease to tap and utilize the geothermal energy, natural gas and methane gas existing therein and/or to extract therefrom any kind of matter derived from a bore and for the time being with or any steam, water, water vapor or mixture and to process and market the same subject to regulation by Government for the conservation and prevention of waste, prevention of water and air pollution, safety and health, and any other relevant matter.[75]

R.A. No. 5092 likewise recognizes easement rights over private and public land in favor of holders of permits or leases duly issued by the government under the same law. Section 10 provides for the establishment of easements of temporary or permanent occupancy over private property in favor of a permittee or lessee for the purpose of exploring, developing, and exploiting geothermal energy resources. Such easement shall be created by means of an agreement between the permittee or lessee and the landowner.

> If no agreement can be reached, or if the owner or legal occupant refuses to grant such easement, or in general, when any obstacle of whatever nature exists to the immediate and certain acquisition of the necessary surface area or of any right indispensable to the permittee or lessee for the purpose of concession, the municipal court of the municipality where the land is situated shall, upon application of the permittee or lessee and posting of the necessary bond, grant to the said, permittee or lessee authority to use and occupy the land needed by him in his operations, pending final determination of the case which shall include among others the reasonable value or rental of the land to be occupied and the compensation for any resulting damage that the land-owner or legal occupant may suffer as a result of such occupation.[76]

If such occupation is made necessary for the construction of infrastructure or other processes[77] necessary for the exploration, development, and exploitation of geothermal energy resources, such occupation by the permittee or lessee shall be considered the exercise of the power of eminent domain by the State.[78] Such holders of permits and leases likewise have the

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[75] § 19.

[76] § 10(1).

[77] Bores, tanks, reservoirs, waterways, pipelines, roads, railroads, tramlines, telephone and telegraph lines; airfields, radio stations, powerhouses, transmission lines, pumping stations, wharves, piers and terminals.

[78] RA 5092, § 10(2).

right to enter and re-enter private land upon notice sent to the owner on the land at least 10 days in advance so long as such entry or re-entry is for the purpose of conducting geological or geophysical studies or the making of any bore or drillings therein, subject to the right of indemnity of the landowner for any damages suffered.[79]

C. Presidential Issuances for the Reservation and Exploration of Geothermal Energy Resource Areas

In the 1970s, then President Ferdinand E. Marcos, recognizing the potential of geothermal energy, promulgated a slew of Presidential Proclamations ("P.P.") directing the reservation and exploration of potential geothermal energy resources.

On August 14, 1970, he promulgated P.P. No. 739 which reserved under the administration of the National Power Corporation a 17,661 hectare land covering the municipalities of Mindanao and Tiwi, Albay.

Barely a year later, on February 21, 1973, President Marcos caused the issuance of P.P. Nos. 1111 and 1112. Under P.P. No. 1111, a tract of land with an area of 162 hectares covering the municipalities of (i) Cavinti and Canlubang, Laguna, (ii) Sariaya, Quezon, and (iii) Cuenca, Batangas was reserved for geothermal energy exploration. P.P. No. 1112 likewise established such a reservation in Tongonan, Leyte.

On April 8, 1975, President Marcos issued P.P. Nos. 1412 and 1413. P.P. No. 1412 amended P.P. No. 1112 further increasing the geothermal reservation created thereby. P.P. No. 1413 on the other hand, created the Palinpinon geothermal reservation in the province of Negros Oriental.

To facilitate the development of the geothermal areas established by the aforementioned Presidential Proclamations, President Marcos promulgated P.P. No. 2036-A on November 11, 1980. This created the Philippine National Oil Corporation-Energy Development Corporation as well as the Bacon-Manito geothermal reservation in the provinces of Albay and Sorsogon. Currently, the PNOC-EDC is the largest government -owned and -controlled

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[79] § 9.

corporation ("GOCC") engaged in the management and administration of majority of the operational geothermal power plants in the Philippines.

D. The Second Geothermal Law: Presidential Decree No. 1442

To accelerate the development of Philippine geothermal energy resources with the goal of reducing dependence on imported energy supplies,[80] President Marcos promulgated Presidential Decree No. 1442[81] ("P.D. No. 1442") on June 11, 1978 which effectively repealed most provisions of R.A. No. 5092. P.D. No. 1442 provided for a simplified procedure by which the development and utilization of geothermal energy resources may be undertaken. While the exploration and development of geothermal energy resources still remained with the primary prerogative of the State, P.D. No. 1442 allowed the indirect participation of the State through geothermal service contracts with a domestic or foreign contractor who must be technically and financially capable of undertaking the operations required in the service contract.[82] Such service contracts may be awarded through public bidding or through negotiation as duly approved by the Secretary of Energy.[83] However, the execution of the activities and operations subject of the service contract, including the implementation of the work program and accounting procedures agreed upon, shall at all times be subject to direct supervision of the government.[84] P.D. No. 1442 likewise provided an option for holders of valid and subsisting exploration permits and geothermal leases to convert the same into service contracts; otherwise, the same shall be revoked automatically.[85]

The right to easement over private lands granted under R.A. No. 5092 is likewise recognized in Section 2 of P.D. No. 1442. Be it noted, however, that P.D. No. 1442 does not provide for a specific delineation of the right to easement over private lands in which geothermal energy resources may be found as compared with the detailed provisions of R.A. No. 5092. Considering that there is no inconsistency between R.A. No. 5092, P.D. No. 1442, and Republic Act No. 9513 ("R.A. No. 9513"), the most recent legislation on

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[80] Pres. Dec. No. 1442, Preamble (1978) (hereinafter "PD 1442").

[81] Entitled "An Act to Promote the Exploration and Development of Geothermal Resources."

[82] PD 1442, § 1(1).

[83] § 1.

[84] § 1(1).

[85] § 3.

geothermal energy, insofar as easement rights of service contract holders is concerned, it can be reasonably argued that the right to physical possession and easement vested upon the grantee by the State to explore, develop, and exploit geothermal energy resources recognized under Sections 9 and 10 of R.A. No. 5092 remains good law.

Under P.D. No. 1442, the rights and obligations of a service contractor, in addition to any granted or imposed by law, are largely governed by the service contract. Thus, Section 4 thereof provides:

> SEC. 4. *Privileges of Service Contractors.* The provisions of any law to the contrary notwithstanding, a service contract executed under this Act may provide that the contractor shall have the following privileges:
>
> (a) Exemption from payment of tariff duties and compensating tax on the importation of machinery and equipment and spare parts and all materials required for geothermal operations subject to such conditions as may be imposed by the Director of Energy Development; Provided, that should the contractor or its sub-contractor sell, transfer, or dispose of these machinery, equipment, spare parts or materials without the prior consent of the Bureau of Energy Development, it shall pay twice the amount of the taxes and duties not paid because of the exemption granted;
>
> (b) Entry, upon the sole approval of the Bureau of Energy Development which shall not be unreasonably withheld, and subject to such conditions as it may impose of alien technical and specialized personnel (including the immediate members of their families), who may exercise their professions solely for the operations of the contractor as prescribed in its contract with the Government under this Act;
>
> (c) Subject to the regulations of the Central Bank, repatriation of capital investment and remittance of earnings derived from its service contract operations, as well as such sums as may be necessary to cover principal and interest of foreign obligations incurred for the geothermal operations.
>
> (d) Other privileges provided in Section 12 of Presidential Decree No. 87 as may be applied to the geothermal operations.

Section 12 of Presidential Decree No. 87, also known as *The Oil Exploration and Development Act of 1972*, provides for the privileges that may be stipulated in a service contract for the development and exploitation of petroleum resources. Such privileges may likewise be enjoyed by a service contractor provided that it is stipulated in its service contract with the State. These privileges are as follows:

> (a) Exemption from all taxes except income tax;
>
> (b) Exemption from payment of tariff duties and compensating tax on the importation of machinery and equipment, and spare parts and all materials required for petroleum operations subject to the conditions that said machinery, equipment, spare parts and materials of comparable price and quality are not manufactured domestically; and directly and actually needed and will be used exclusively by the contractor in its operations or in operations for it by a subcontractor are covered by shipping documents in the name of the contractor to whom the shipment will be delivered direct by the customs authorities; and prior approval by the Department of Energy (DOE);
>
> (c) Exemption upon approval by the DOE from laws, regulations and/or ordinances restricting the exportation of machinery and equipment which were imported solely for its operation when no longer needed therefor;
>
> (d) Rights and obligations in any contract concluded shall be deemed as essential considerations for the conclusion thereof and shall not be unilaterally changed or impaired; and
>
> (e) The privileges and benefits granted to a contractor under the provisions of this Act together with any applicable obligations shall likewise be made available to concessionaires and their authorized contractors and/or service operators, whether local or foreign, if they so elect.

P.D. No. 1442 likewise recognizes an alternative mode of developing geothermal energy resources by way of exploitation permits which shall be granted by the State in cases where discovered geothermal resources are deemed inappropriate for service contract arrangements in view of economic or technical reasons.[86]

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[86] § 5.

E. The Renewable Energy Act, Republic Act No. 9513

Currently, the primary law governing geothermal energy resources is R.A. No. 9513, otherwise known as the *Renewable Energy Act of 2008*, signed into law by President Gloria Macapagal-Arroyo on December 10, 2008. With its passage, the harnessing and utilization of renewable energy ("RE") was given recognition as a critical component of the government's strategy to provide a clean and steady energy supply for the country. R.A. No. 9513 defines renewable energy resources as "energy resources that do not have an upper limit on the total quantity to be used. Such resources are renewable on a regular basis, and whose renewal rate is relatively rapid to consider availability over an indefinite period of time."[87] Apart from geothermal energy, RE resources are primarily classified in Section 4 as follows:

> (b) "Biomass resources" refer to non-fossilized, biodegradable organic material originating from naturally occurring or cultured plants, animals and micro-organisms, including agricultural products, by-products and residues . . . ;[88]
>
> . . . .
>
> (z) "Hydroelectric Power Resources" or "Hydropower Resources" refer to water resources found technically feasible for development of hydropower projects which include rivers, lakes, waterfalls, irrigation canals, springs, ponds, and other water bodies;[89]
>
> . . . .
>
> (ii) "Ocean energy systems" refer to energy systems which convert ocean or tidal current, ocean thermal gradient or wave energy into electrical or mechanical energy;[90]
>
> . . . .
>
> (xx) "Solar energy" refers to energy derived from solar radiation that can be converted into useful thermal or electrical energy;[91] [and]
>
> . . . .
>
> (ccc) "Wind energy" refers to energy that can be derived from wind that is converted into useful electrical or mechanical energy . . . .[92]

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[87] RA 9513, § 4(uu).
[88] § 4(b).
[89] § 4(z).
[90] § 4(ii).
[91] § 4(xx).
[92] § 4(ccc).

1. Policies on Renewable Energy

R.A. No. 9513 is guided by four principles which characterize the Philippine long-term energy program. Section 2 thereof provides:

> SEC. 2. *Declaration of Policies.* - It is hereby declared the policy of the State to:
>
> (a) Accelerate the exploration and development of renewable energy resources such as, but not limited to, biomass, solar, wind, hydro, geothermal and ocean energy sources, including hybrid systems, to achieve energy self-reliance, through the adoption of sustainable energy development strategies to reduce the country's dependence on fossil fuels and thereby minimize the country's exposure to price fluctuations in the international markets, the effects of which spiral down to almost all sectors of the economy;
>
> (b) Increase the utilization of renewable energy by institutionalizing the development of national and local capabilities in the use of renewable energy systems, and promoting its efficient and cost-effective commercial application by providing fiscal and nonfiscal incentives;
>
> (c) Encourage the development and utilization of renewable energy resources as tools to effectively prevent or reduce harmful emissions and thereby balance the goals of economic growth and development with the protection of health and the environment; and
>
> (d) Establish the necessary infrastructure and mechanism to carry out the mandates specified in this Act and other existing laws.

The afore-quoted policies indicate a significant departure from the previous approach of the government in geothermal energy development and utilization. As abovementioned, R.A. No. 5092 and P.D. No. 1442 both emphasize the development by the State of geothermal energy resources. This may be done directly by the State, any of its instrumentalities, GOCCs, or indirectly through a private service contractor which is technically and financially capable of undertaking the operations for such development. Under R.A. No. 9513, however, the State still retains the prerogative of developing such resources directly yet emphasis is made on promoting and increasing the involvement of the private sector. Thus, two of the main thrusts of the

Department of Energy ("DOE") with respect to RE are (i) the creation of a market-based environment that is conducive to private sector investment and participation; and (ii) the encouragement of RE technology transfer and research and development.[93]

It is foreseen that with regard to RE development and use, the DOE will (i) increase RE-based capacity by 100% by 2013; and (ii) increase non-power contribution of RE to the energy mix by 10 million barrels of fuel oil equivalent ("MMBFOE") in the next 10 years. In support of these general goals, the government aims to (i) be the number one geothermal energy producer in the world; (ii) be the number one wind energy producer in Southeast Asia; (iii) double hydro capacity by 2013; and (iv) expand contribution of biomass, solar and ocean by about 131 MW.[94]

In order to encourage private sector participation and investment in RE technologies, R.A. No. 9513 imposes policy mechanisms and provides fiscal incentives to power distributors, prospective investors and developers, and consumers. The policy mechanisms granted by the Act are as follows:

a. Renewable Energy Portfolio Standard ("RPS");
b. Renewable Energy Market ("REM");
c. Green Energy Option Program;
d. Net-metering for Renewable Energy;
e. Transmission and Distribution System Development; and
f. Off-grid development of RE resources.

a. Renewable Energy Portfolio Standard ("RPS")

Section 6 of R.A. No. 9513 explicitly enjoins all stakeholders in the electric power industry to contribute to the growth of the renewable energy industry of the country. Towards this end, all power producers in the Philippines are mandated to maintain a minimum percentage of generation from eligible renewable energy resources to be determined by the National Renewable Energy Board ("NREB") on a per grid basis. It is a policy which places an obligation on the electric power industry participants to source or

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[93] Department of Energy (hereinafter "DOE"), *Renewable Energy, at* http://www.doe.gov.ph/ER/Renenergy.htm (last visited Mar. 4, 2011).

[94] *Id.*

produce a specified fraction of their electricity from eligible RE resources under the Renewable Energy Market ("REM") system likewise created by R.A. No. 9513. This policy seeks to contribute to the growth of the RE industry by diversifying energy supply and to help environmental concerns by reducing greenhouse emissions.[95] In effect, it provides a captive market for renewable energy projects.

b. Renewable Energy Market ("REM")

The REM is a sub-market on the Wholesale Electricity Spot Market ("WESM") created under R.A. No. 9136[96] where trading of RE Certificates may be facilitated.[97] A RE Certificate evidences the energy sourced, produced, and sold or used by electric power industry participants. A RE Certificate may be traded in the REM for purposes of determining compliance with the RPS,[98] i.e., by selling or trading. The owner of the RE Certificate can claim to have purchased renewable energy to meet the minimum percentage required for renewable energy generation under the RPS.

The WESM was institutionalized by Section 30 and is conceptualized as a market-based approach to the production, distribution, and regulation of the power industry. It is primarily composed of the wholesale electricity spot market participants and provides the mechanism for identifying and setting the price of actual variations from the quantities transacted under contracts between sellers and purchasers of electricity.[99] Essentially, it encourages the unification and participation of all stakeholders in the energy industry in the regulation of the sale of electricity under the supervision of the DOE under the Energy Regulatory Commission ("ERC"). The WESM is primarily implemented by the Philippine Electricity Market Corporation ("PEMC"), an autonomous corporation constituted by DOE, with equitable representation from electric power industry participants.[100]

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[95] Dep't of Energy Dep't. Circ. No. DC2009-05-0008, § 4 (2009) (hereinafter "DOE DC2009-05-0008"). These are the Implementing Rules and Regulations of Rep. Act No. 9513.

[96] Also known as the "Electric Power Industry Reform Act of 2001" or "EPIRA."

[97] DOE DC2009-05-0008, § 10(1) (2009).

[98] RA 9513, § 8; DOE DC2009-05-0008, § 3(tt).

[99] Rep. Act No. 9136, § 30(1)-(2) (2001) (hereinafter "RA 9136").

[100] § 30(3).

Under the REM, a Renewable Energy Registrar is created under the PEMC which shall issue, keep, and verify RE Certificates corresponding to energy generated from eligible RE facilities.[101]

c. Green Energy Option Program

The Green Energy Option program provides end-users the option to choose RE resources as their sources of energy.[102] Its formulation and implementation is in consonance with the market-based approach adopted by the government with respect to RE development. Under the Implementing Rules and Regulations ("IRR") of R.A. No. 9513, the DOE shall lay down the necessary rules and regulations to govern its implementation while the ERC shall issue the necessary regulatory framework therefor. To date however, there is still no IRR or regulatory framework in place for the Green Energy Option program.

d. Net-metering for Renewable Energy

Net-metering is a consumer-based RE incentive scheme wherein electric power generated by an end-user from an eligible RE generating facility and delivered to the local distribution grid may be used to offset electric energy provided by the distribution utility[103] to the end-user during the applicable period.[104] This encourages end-users to participate in RE generation.

e. Transmission and Distribution System Development

Section 11 of R.A. No. 9513 explicitly mandates the National Transmission Corporation ("TRANSCO"), its successors-in-interest, buyers, concessionaires, and all distribution utilities to "include the required connection facilities for RE-based power facilities in their respective Transmission and Distribution Development Plans," subject to the approval of the DOE. Furthermore, such entities must effect connection of RE-based

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[101] RA 9513, § 8.

[102] § 9.

[103] Any electric cooperative, private corporation, government-owned utility or existing local government unit which has an exclusive franchise.

[104] DOE DC2009-05-0008, § 7.

power facilities with the transmission and distribution system upon receipt of a formal notice of approval by the DOE.[105]

f. Off-grid Development

The aforementioned policy mechanisms involve the on-grid development of RE resources. However, the government is cognizant of the role of electrification in sustaining effective rural development, thus, R.A. No. 9513 likewise exhorts off-grid RE development through missionary electrification. Such thrust shall be undertaken by the National Power Corporation-Small Power Utilities Group, its successors-in-interest, or qualified third parties who shall acquire a minimum percentage of their total annual generation from missionary electrification, upon recommendation of the NREB, from available RE resources in the area concerned, as may be determined by the DOE.[106] Eligible RE generation in off-grid and missionary areas shall be eligible for the provision of RE Certificates for purposes of RPS. In the event that there is no viable RE resource in the off-grid and missionary areas, the relevant electricity supplier in the off-grid and missionary areas shall still be obligated to comply with the RPS as provided by the NREB.[107]

2. Fiscal Incentives for Renewable Energy

In line with the overall policy under R.A. No. 9513 to provide the most favorableable business climate for the RE industry, thereby attracting the interest and participation of the private sector as well as foreign investors, the said law provides for numerous incentives for prospective RE developers and investors. Among these incentives are as follows:

a. Tax incentives;
b. Feed-in Tariff ("FIT") System;
c. Cash Incentive of Renewable Energy Developers for Missionary Electrification;
d. Entitlement to the issuance of an Environmental Compliance Certificate ("ECC");

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[105] § 8(b).
[106] RA 9513, § 12(1).
[107] § 12(3).

e. Exemption from Universal Charge;
f. Option in payment of transmission charges; and
g. Preferential financial assistance from government financial institutions.

a. Tax Incentives

Among the most important incentives provided for under R.A. No. 9513 are the tax incentives granted to RE developers for RE projects and activities. As provided by Section 15 thereof, these incentives are as follows:

i. Income Tax Holiday;
ii. Duty-free Importation of RE Machinery, Equipment, and Materials;
iii. Special Realty Tax Rates on Equipment and Machinery;
iv. Net Operating Loss Carry-Over ("NOLCO");
v. Corporate Tax Rate;
vi. Accelerated Depreciation;
vii. Zero Percent Value-Added Tax Rate;
viii. Tax Exemption of Carbon Credits; and
ix. Tax Credit on Domestic Capital Equipment and Services.

The tax incentives so provided above may be availed of by RE developers of hybrid or cogeneration systems but such availment shall apply only to the equipment, machinery, or devices utilizing RE resources.[108]

i. Income Tax Holiday

RE developers are entitled to an income tax holiday which exempts such person or entity from income taxes levied by the national government.[109] New or additional investments made on existing RE ventures by RE developers and investors likewise entitle them to an income tax holiday on said investment for at most seven years from the start of commercial operations.[110] However, the maximum period for enjoyment of such income tax holiday by a

[108] § 19.
[109] § 15(a).
[110] DOE DC2009-05-0008, § 13(A)(1)(b).

RE developer shall be 21 years inclusive of the initial seven-year income tax holiday and additional investments on such RE facility.[111]

ii. Duty-free Importation of RE Machinery, Equipment, and Materials

Within the first 10 years upon the issuance of a certification of a RE developer, any importation of machinery, equipment, and parts made by it shall not be subject to tariff duties so long as they are: (1) directly and actually needed and will be exclusively used in RE facilities for transformation into energy and delivery of energy to the point of use; (2) such equipment are covered by shipping documents in the name of the RE developer; and (3)prior endorsement by the DOE is obtained.[112] Furthermore, the endorsement of the DOE is essential for any sale, disposition, or transfer of any equipment imported pursuant to the aforementioned procedure and subject to other regulations imposed by the DOE.[113]

iii. Special Realty Tax Rates on Equipment and Machinery

Notwithstanding any provision of law to the contrary, realty and other taxes on civil works, equipment, machinery, and other improvements of a Registered RE developer actually and exclusively used for RE facilities shall not exceed 1.5% of their original cost less accumulated normal depreciation or net book value.[114] Original cost as contemplated by law refers to "(1) the tangible cost of construction of the power plant component, or any improvement thereon; or (2) the assessed value prevailing at the time [R.A. No. 9513] came into effect or at the time of the completion of the power plant project after effectivity of the Act . . . assessed at a maximum level of 80%, whichever is lower."[115]

iv. Net Operating Loss Carry-Over ("NOLCO")

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[111] § 13(A)(1)(c).
[112] RA 9513, § 15(b)(1); DOE DC2009-05-0008, § 13(B)(1).
[113] RA. 9513, , § 15(b)(2); DOE DC2009-05-0008, § 13(B)(2).
[114] RA 9513, § 15(c); DOE DC2009-05-0008, § 13(C).
[115] DOE DC2009-05-0008, § 13(C)(2).

The NOLCO of the RE developer during the first three years from the start of commercial operation which had not been previously offset as deduction from gross income shall be carried over as a deduction from gross income for the next seven consecutive taxable years immediately following the year of such loss.[116] However, this grant is subject to the following conditions: "(i) that the NOLCO had not been previously offset as a deduction from gross income; and (ii) [that] the loss should be a result from the operation and not from the availment of the incentives provided [by R.A. No. 9513]."[117]

v. Corporate Tax Rate

After availment of the income tax holiday for seven years, RE developers shall pay a corporate tax of 10% on its net taxable income as provided by National Internal Revenue Code ("NIRC"), however, the RE developer shall pass on the savings to the end-users in the form of lower power rates.[118] All RE developers that acquire, operate, or administer existing RE facilities that were or have been in commercial operation for more than seven years from the effectivity of R.A. No. 9513 shall likewise pay a corporate tax rate of 10% on its net taxable income.[119]

vi. Accelerated Depreciation

In the event that a RE project fails to receive the benefit of an income tax holiday before full operation, the RE developer may apply for Accelerated Depreciation in its tax books and be taxed based on such. However, if such RE developer applies for Accelerated Depreciation, the project or its expansions shall no longer be eligible to avail of the income tax holiday incentive.[120]

vii. Zero Percent Value-Added Tax Rate

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116 RA 9513, § 15(d).
117 DOE DC2009-05-0008, § 13(D).
118 RA 9513, § 15 (e).
119 DOE DC2009-05-0008, § 13(E)(2).
120 RA. 9513, § 15(f); DOE DC2009-05-0008, § 13(F).

The following transactions shall be subject to 0% value-added tax ("VAT"):

> (a) Sale of fuel from RE sources or power generated from renewable sources of energy such as, but not limited to, biomass, solar, wind, hydropower, geothermal, ocean energy, and other emerging energy sources using technologies such as fuel cells and hydrogen fuels;
>
> (b) Purchase of local goods, properties and services needed for the development, construction, and installation of the plant facilities of RE Developers; and
>
> (c) Whole process of exploration and development of RE sources up to its conversion into power, including, but not limited to, the services performed by subcontractors and/or contractors.[121]

viii. Tax Exemption of Carbon Credits

"All proceeds from the sale of carbon emission credits shall be exempt from any and all taxes."[122]

ix. Tax Credit on Domestic Capital Equipment and Services

When a RE operating contract-holder purchases equipment and other materials from a domestic manufacturer, he is entitled to a tax credit equivalent of 100% of the value of the VAT and custom duties that would have been paid on such equipment had it been imported.[123] This tax credit is subject to the following conditions:

> (a) That the said equipment, machinery, and spare parts are reasonably needed and shall be used exclusively by the Registered RE Developer in its registered activity;
>
> (b) That the purchase of such equipment, machinery, and spare parts is made from an accredited or recognized domestic source, in

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[121] RA 9513, § 15(g); DOE DC2009-05-0008, § 13(G).
[122] RA. 9513, § 15(i); DOE DC2009-05-0008, § 13(H).
[123] RA 9513, § 15(j).

> which case, prior approval by the DOE should be obtained by the local manufacturer, fabricator, or supplier; and
>
> (c) That the acquisition of such machinery, equipment, materials, and parts shall be made within the validity of the RE Service/Operating Contract.[124]

The IRR also requires that any transfer of domestically purchased machinery or equipment within 10 years from acquisition shall require DOE approval.[125]

b. The Feed-In Tariff ("FIT") System

Section 7 of R.A. No. 9513 mandates the constitution of a FIT system for electricity produced from wind, solar, ocean, run-of-river hydropower, and biomass. The FIT system "refers to the renewable energy policy that offers guaranteed payments on a fixed rate per kilowatt-hour for renewable energy generation, excluding any generation for own use . . . ."[126] Its establishment was made by legislative fiat under Section 7 of R.A. No. 9513 in order to accelerate the development of emerging renewable energy resources. Under a FIT system, eligible renewable electricity generators (whether homeowners and businesses) are paid a premium price for any renewable electricity they produce in excess of their own consumption which is coursed into the grid.[127]

The formulation of the rules governing the FIT system was delegated by law to the ERC in consultation with the NREB. Despite the one-year period provided by R.A. No. 9513 for the ERC to promulgate such rules, the FIT rules were only promulgated on July 23, 2010. However, as the rules

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[124] DOE DC2009-05-0008, § 13(I).

[125] § 13(I)(3).

[126] Energy Reg. Comm'n. Resol. No. 16-10, § 1.3 (2010) (hereinafter "ERC Res. 16-10"). This are the Feed-in Tariff Rules, *available at* http://www.erc.gov.ph/pdf/Revised%20FIT%20Rules%20for%20POSTING_final.pdf (last visited Mar. 24, 2011).

[127] A. Klein, et al., *Evaluation of Different Feed-in Tariff Design Options: Best Practice Paper for the International Feed-in Cooperation*, Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (2nd ed. 2008), *available at* http://www.feed-in-cooperation.org/wDefault_7/wDefault_7/download-files/research/best_practice_paper_2nd_edition_final.pdf (last viewed Apr. 7, 2011).

currently stand, only eligible RE producers are able to benefit from the FIT incentive. The Feed-in Tariff rules refer to eligible RE producers as those power facilities utilizing emerging RE resources identified in Section 7 of R.A. No. 9513 or to parts of existing power facilities that have been substantially modified or expanded as described in Section 3 thereof, which entered into commercial operation after effectivity of the FIT system. Thus, energy producers who rely on a hybrid system may avail themselves of the benefit of the FIT system.

The rules impose the collection of a feed-in tariff allowance from consumers as a separate charge on their respective electric bill. This allowance shall be delivered to the National Grid Corporation of the Philippines which shall be applied for the settlement and payment of the FIT incentive to eligible RE producers.[128]

Interestingly, geothermal energy resources are not among the resources enumerated by Section 7 for which the FIT system is to apply following the rule of *casus omisus pro omisso habendus est.*[129]

c. Cash Incentive of Renewable Energy Developers for Missionary Electrification

R.A. No. 9513, Section 15 (h) states that:

> A renewable energy developer, established after the effectivity of this Act, shall be entitled to a cash generation-based incentive per kilowatt hour rate generated, equivalent to fifty percent (50%) of the universal charge for power needed to service missionary areas where it operates the same, to be chargeable against the universal charge for missionary electrification . . . ."

d. Entitlement to the issuance of an Environmental Compliance Certificate

By virtue of registration as a RE developer, such person or entity may be issued an Environmental Compliance Certificate ("ECC") from the

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[128] ERC Res. 16-10, §§ 2.4, 2.5, 2.6.

[129] "A case omitted is to be held as intentionally omitted." BLACK'S LAW DICTIONARY 219 (6th ed., 1991).

corresponding regional office of the Department of Environment and Natural Resources ("DENR") notwithstanding Section 17(b)(3)(iii) of Republic Act No. 7160 ("R.A. No. 7160"), which mandates the province's role as primary enforcer of environmental laws.[130]

e. Exemption from Universal Charge

"Power and electricity generated through the [RE System] for the generator's own consumption or for free distribution in the off-grid areas shall be exempted from the payment of the Universal Charge . . . ."[131] A Universal Charge is the amount imposed for the recovery of the stranded cost, as provided by Section 34 of R.A. No. 9136. All consumers shall be exempted from the payment of Universal Charge if: "(1) the power or electricity generated through the RE System is consumed by the generators themselves; and/or (2) the power or electricity through the RE System is distributed free of charge in the off-grid areas."[132]

f. Option in payment of transmission charges

R.A. No. 9513 provides that:

> [A] registered RE Developer producing power and electricity from an intermittent RE resource may opt to pay the transmission and wheeling charges of TRANSCO or its successors-in-interest on a per kilowatt-hour basis at a cost equivalent to the average per kilowatt-hour rate of all other electricity transmitted through the grid.[133]

This provision serves to mitigate any possible loss on the part of the RE developer due to the intermittency of a RE resource. This is particularly

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[130] § 16; § 17: "*Basic Services and Facilities.* (b) Such basic services and facilities include, but are not limited to, the following: (3) For a Province: (iii) Pursuant to national policies and subject to supervision, control and review of the DENR, enforcement of forestry laws limited to community-based forestry projects, pollution control law, small-scale mining law, and other laws on the protection of the environment; and mini-hydroelectric projects for local purposes."

[131] RA 9513, § 17.

[132] DOE DC2009-05-0008, § 17(C).

[133] RA 9513, § 18.

relevant as some geothermal energy resources are active intermittently. For this purpose, Section 20 of R.A. No. 9513 explicitly states that:

> TRANSCO or its successors-in-interest, in consultation with stakeholders, shall determine the maximum penetration limit of the Intermittent RE-based power plants to the Grid, through technical and economic analysis. Qualified and registered RE generating units with intermittent RE resources shall be considered 'must dispatch' based on available energy and shall enjoy the benefit of priority dispatch.

g. Incentives for Domestic RE Component Manufacturers

In conformity with the overall policy of the government as aforestated, Section 21 of R.A. No. 9513 explicitly declares that the RE Sector is a "priority investment sector that will regularly form part of the country's Investment Priority Plan." Thus, all manufacturers, fabricators, and suppliers of locally-produced RE equipment and components duly recognized and accredited by the DOE shall be entitled to the following privileges:

i. Tax and Duty-free Importation of Components, Parts, and Materials

Section 21(a) of R.A. No. 9513 provides that "[a]ll shipments necessary for the manufacture and/or fabrication of RE equipment and components shall be exempted from importation tariff and duties and value added tax" as long as the said components, parts and materials are:

> (i) Not manufactured domestically in reasonable quantity and quality at competitive prices;
>
> (ii) Directly and actually needed and shall be used exclusively in the manufacture/fabrication of RE equipment; and
>
> (iii) Covered by shipping documents in the name of the duly registered manufacturer/fabricator to whom the shipment will be directly delivered by customs authorities.[134]

Furthermore, prior approval by the DOE is necessary for the importation of such components, parts, and materials.

[134] RA 9513, § 21(a).

ii. Tax Credit on Domestic Capital Components, Parts, and Materials

Section 21(b) of R.A. No. 9513 likewise extends to manufacturers, fabricators, and suppliers of locally-produced RE equipment and components duly recognized and accredited by the DOE the incentive provided by Section 15(j) for 100% tax credit on the value of VAT and custom duties "that would have been paid on the RE machinery, equipment, materials and parts had these items been imported." However, such components, and parts must be "directly needed" and "shall be used exclusively by the RE manufacturer, fabricator and supplier for the manufacture, fabrication and sale of the RE equipment" and that the requisite DOE approval must first be acquired.

iii. Income Tax Holiday and Exemption

Section 21(c) of R.A. No. 9513 likewise extends to manufacturers, fabricators, and suppliers of locally-produced RE equipment and components duly recognized and accredited by the DOE the benefit of the income tax holiday extended to RE developers under Section 15(a).

iv. Zero-rated value added tax transactions

Section 21(d) of R.A. No. 9513 likewise extends to manufacturers, fabricators, and suppliers of locally-produced RE equipment and components duly recognized and accredited by the DOE the benefit of zero-rated VAT transactions enjoyed by RE developers pursuant to Section 15(g) thereof.

h. Preferential financial assistance from government financial institutions

Under Section 29 of R.A. No. 9513, government financial institutions are "explicitly commanded to provide preferential financial packages for the development, utilization and commercialization of RE projects as duly recommended and endorsed by the DOE."

3. Exploration, Development, and Exploitation of Geothermal Energy Resources

R.A. No. 9513 introduces a substantial modification with respect to the mechanism and regulatory framework governing the development of RE resources. Considering that geothermal energy is recognized as a form of RE resource under R.A. No. 9513, the means for exploration, development, and exploitation of geothermal energy resources under P.D. No. 1442 is deemed repealed by the former.

To recall, the 1987 Constitution retained the Regalian Doctrine as part of the fundamental law of the land under Article XII, Section 2. Thus, all RE resources are owned by State and may not be alienated. Furthermore, the same provision likewise prescribes that the exploration, development, and utilization of natural resources shall be under the full control and supervision of the State. It may do so either directly, "or by entering into co-production, joint venture, or production-sharing agreements with Filipino citizens, or corporations or associations at least sixty per centum of whose capital is owned by such citizens."[135] Formerly under P.D. No. 1442, the exploration, development, and exploitation of geothermal energy resources was done through geothermal service contracts executed between the government and qualified persons, whether natural or juridical. Under R.A. No. 9513, a uniform mechanism of developing RE resources was mandated through a Renewable Energy Service (Operating) Contract ("RE Contract"). The amendment streamlines the process of procuring a permit from the State, thereby accelerating the development of RE resources through encouraging the private sector and foreign investors to actively participate in the RE industry.

The law itself defines a RE Contract as:

> [A] service agreement between the Government, through the DOE, and RE Developer over a period of time in which the RE Developer has the exclusive right to a particular RE area for exploration and development. The RE Contract shall be divided into two (2) stages: the pre-development stage and the development/commercial stage. The preliminary assessment and feasibility study up to financial closing shall refer to the pre-

[135] CONST., art. XII, § 2.

> development stage. The construction and installation of facilities up to the operation phase shall refer to the development stage.[136]

From the very statutory definition itself, it is clear that the law seeks the elimination of bureaucratic delays in the application, processing, and approval of RE development projects. A RE Contract embodies both the exploration and service contract thereby eliminating the long-drawn process of negotiating and processing the necessary paperwork for the approval of two separate agreements. Under such contract, a RE developer upon discovery of a feasible and productive RE resource may immediately opt to undertake its development without going through the bureaucratic process in obtaining a separate contract therefor.

R.A. No. 9513, however, does not explicitly provide for the manner by which such contracts may be entered into, nor does it provide the requisite qualifications of a prospective RE developer as it merely mentions the definition of a RE Contract. The prerogative to promulgate the rules, regulations, and guidelines for its implementation was largely vested with the DOE subject to consultation with the Senate and House of Representative Committees on Energy, relevant government agencies, and RE stakeholders.[137]

On July 12, 2009, the DOE promulgated Department Circular No. DC2009-07-0011 ("D.C. No. DC2009-07-0011"),[138] which laid down the regulatory framework governing the grant of RE Contracts. Geothermal RE projects may be classified as either large- or small-scale pursuant to the criteria determined by the DOE.[139] Under Section 6, any person, natural or juridical, local or foreign, may apply for RE Contracts subject to the limitations provided therein. For foreign-owned corporations applying for a RE Contract over geothermal energy resources, such contract must be in the nature of a financial or technical assistance agreement ("FTAA") for large-scale exploration, development, or utilization of geothermal resources.[140] Such requirement, however, is rendered nugatory by Section 23 of D.C. No.

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[136] RA 9513, § 4(tt).

[137] § 33.

[138] Entitled "Guidelines Governing a Transparent and Competitive System of Awarding Renewable Energy Service/Operating Contracts and Providing for the Registration Process of Renewable Energy Producers."

[139] DOE Dep. Circ. No. DC2009-07-0011, § 23(2) (2009) (hereinafter "DOE DC2009-07-0011").

[140] § 6(a)(iii).

DC2009-07-0011 which explicitly provides that RE Contracts over geothermal RE resources with foreign-owned entities are automatically considered to be in the nature of an FTAA.

Considering the all-encompassing scope of RE contracts with respect to RE resource development and exploitation,[141] strict requirements are laid down by the DOE as condition precedents for approval of such contracts. Apart from documentary requirements proving the requisite legal capacity to enter into contracts, D.C. No. DC2009-07-0011 requires that a RE applicant must possess the necessary technical capability to undertake obligations under the RE Contract in terms of (i) a proven track record or experience in the technical and specialized aspects of the project; (ii) a viable work program illustrating the minimum expenditure commitments as well as "environmental protection/conservation and social acceptability plans;" (iii) experience and technical expertise of key personnel; and (iv) sufficient equipment to be used for RE operations either held in ownership by the RE applicant or by way of lease.[142] A RE applicant must furthermore submit to the DOE proof that it possesses adequate financial capacity to sustain the needs of the proposed RE project. Such financial capacity may be proven through audited financial statements, bank certifications attesting to the amount held by the RE applicant in its account, projected cash flow statements, list of company-owned assets, whether real or personal, and other such documents as may be required by the DOE.[143] However, the minimum amount of working capital required by the circular is only such amount "equivalent to 100% of the cost of its work commitment for the first year of the proposed work program."[144]

For RE developers and investors interested in the development and exploitation of geothermal energy resources, Section 23 of the circular requires the following as additional requisites for the grant of such contract:

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[141] The first proviso of Section 4, DOE Dep. Circ. No. DC2009-07-0011 (2009), *supra* note 139, provides that RE Contracts shall govern the exploration, development, and exploitation of all RE resources except biomass resources which shall be governed by a RE Operating Contract as provided for by Section 25 thereof. The second proviso of the aforesaid section provides that biofuel producers are governed by Joint Admin. Order No. 2008-1 (2008) as mandated by Rep. Act No. 9367.

[142] DOE DC2009-07-0011, § 6(c).

[143] § 6(d).

[144] § 6(d)(vi).

> (a) **A firm commitment in the form of a sworn statement, of an amount corresponding to the expenditure obligation that will be invested in the contract area as part of the RE Proposal/Application documents:** provided, that such amount shall be subject to changes as may be necessary to cover the costs of inflation and foreign exchange fluctuations;
>
> (b) **Representations and warranties that**, except for payments for dispositions for its equity, foreign investments in local enterprises which are qualified for repatriation, and local suppliers' credits and such generally accepted and permissible financial schemes for raising funds for valid business purposes, **the RE Developer shall not raise any form of financing from domestic sources of funds, whether in Philippine or foreign currency, for conducting its geothermal operations for and in the contract area**; and
>
> (c) A stipulation in the RE Contract that the foreign RE Developers are **obliged to give preference to Filipinos in all types of employment for which they are qualified and that the technology be transferred to the same** . . . . (Emphasis supplied)

The financial requisites are provided to ensure that a foreign investor seeking to embark on a RE development venture in the Philippines shall have, by itself, the capacity to realize such project. As will be elucidated further below, this is in line with the policy of the government not only to accelerate the development of RE resources and increase participation of the private sector and foreign investors in the RE industry, but also to ensure minimal utilization of public funds in the development of the same. In effect, the State has virtually entrusted the development of the power industry in the private sector, only retaining the power to supervise in the exercise of its illimitable police power. It is hoped that the concessions made by the government will result in the full development of the RE industry through the active participation of the private sector, thereby allowing the government to divert public funds to other pressing State concerns. The requirement of preferential Filipino employment is provided to ensure that the development of RE resources will likewise uplift the Filipino people and spur rural development. Furthermore, the proviso for technology transfer is put into place in order to ensure domestic capability to manage and operate the RE industry after the expiration of the RE Contract.

One of the most attractive features of a RE Contract for prospective RE investors is the simplified process by which a contractor or developer may shift from the pre-development stage to the development or commercial stage. The pre-development stage of a RE Contract "involves the preliminary assessment and feasibility study up to financial closing of the RE project."[145] The pre-development stage necessarily includes the exploration stage. On the other hand, the development or commercial stage "involves the development, production, or utilization of RE resources, including the construction and installation of relevant facilities up to the operation phase of the RE facilities."[146]

The concurrence of all elements of a geothermal system requires an extensive explorative study conducted on the prospective geothermal site. Thus, the matter of exploration, as far as geothermal energy is concerned, entails a substantial amount of investment from a prospective investor or developer. In light of the foregoing, the availability of the conversion option from pre-development stage to development or conversion stage, apart from being a mere matter of convenience, serves as a form of security by providing RE investors or contractors with a contractual option to compel the grant of exclusive rights to develop, exploit, and utilize RE resources, thereby protecting any preliminary investment.

Under Section 4(b)(i), a RE developer may apply for the conversion of a RE Contract from the pre-development stage to the development or commercial stage even before its expiration. This is important as it grants the RE developer a considerable extent of flexibility and discretion in determining whether or not to proceed with the development and exploitation of RE resources. Under current DOE rules, holders of valid and subsisting service contracts and agreements involving RE resources are likewise granted an option to convert such service contract or agreement into a RE Contract under R.A. No. 9513. The application shall be subject to approval by the DOE and "shall be carried out on the basis of [the holder's] prior rights over the contract area."[147] Thus, a service contract or agreement granting exclusive rights to exploration shall be converted into a RE Contract in the pre-development stage while a service contract or agreement that grants exclusive rights to

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[145] §4 (a)(i) (2009).
[146] § 4(a)(ii).
[147] § 4(b)(ii).

develop and utilize such RE resources shall be granted a RE Contract in the commercial or development stage.

A RE Contract shall be awarded through an open and competitive process of selection except for RE resources located in frontier areas and where there is a failure to comply with the requirements under the open and competitive process of selection as provided by DOE Rules.[148] For RE Contracts in the nature of an FTAA, the signature of the President is necessary for its approval.[149] Thus, RE Contracts "[governing] large-scale exploration, development, and exploitation of geothermal energy resources by foreign-owned entities" also require presidential approval.[150]

Once a RE Contract is approved by the government through the DOE, it is more in the nature of a contract rather than a franchise and thus, it is to be governed primarily by the law on contracts save in cases where there is overriding public interest necessitating the exercise of the State's police power or eminent domain.[151] A RE developer may withdraw from a RE Contract upon its manifestation in writing, addressed to the President, through the DOE, on the ground that that the project is no longer economically feasible in its judgment. Such withdrawal shall be approved only upon a showing that such RE developer has fully satisfied its legal, technical, and financial obligations under the RE Contract. Furthermore, the performance bond advanced by such RE developer shall be forfeited in favor of the Republic of the Philippines.[152]

4. Other Salient Features of R.A. No. 9513

a. Government Share in RE Operations

Pursuant to the Regalian Doctrine as provided in the 1987 Constitution, all natural resources are owned by the State. As such owner, the State necessarily possesses the *jus fruendi* or right to the fruits of such properties arising from the commercial development and utilization. However, this right

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[148] §§ 8-10.
[149] § 11.
[150] §§ 11, 23.
[151] CONST., art. XII, §§ 6, 11, 17, 18.
[152] DOE DC2009-07-0011, § 23.

was virtually waived by Congress under Section 13 of R.A. No. 9513, which reads as follows:

> **SEC. 13.** ***Government Share.*** - 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.
>
> To further promote the development of RE projects, the government hereby waives its share from the proceeds of micro-scale projects for communal purposes and non-commercial operations, which are not greater than one hundred (100) kilowatts.

It can be surmised from a casual perusal of the afore-quoted provision that the State, in line with its primordial policy of accelerating and guaranteeing the development of RE resources, has made RE operations a totally private venture with almost all profits therefrom accruing to the RE developer. As pointed out earlier, this is in line with the policy which relies on the potentially lucrative commercial climate that the State has prepared for the private sector and foreign investors that will serve as the catalyst for development of the RE industry whose success will inevitably inure to the benefit of the Filipino people by way of increased productivity, utilization of more environment-friendly technologies, and rural development. The second paragraph of Section 13 seeks to promote rural electrification especially in off-grid areas. The benefit waived by the government will inevitably go a long way once electrification is achieved, facilitating rural development.

The government share arising from geothermal energy development and utilization is specifically mandated by R.A. No. 9513 as 1.5% of the gross income of the RE developer in the preceding fiscal year.[153] Gross income derived from business shall be equivalent to gross sales less sales returns, discounts and allowances, and cost of goods sold, consistent with Section 27, paragraph (A)7 of the NIRC. [154] "For purposes of determining the Government share, the gross income of RE developers shall include the

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[153] DOE DC2009-05-0008, § 20(A)(1).

[154] § 20(A)(3).

proceeds resulting from the sale of RE produced and such other income incidental to and arising from RE generation, transmission, and sale of electric power."[155] For integrated geothermal operations, "the Government share of 1.5% shall be based on the gross income from the sale of electricity generated from geothermal energy."[156] Except for government-owned and -controlled corporations, the government share shall be distributed at 60% for the national government and 40% for the local government units ("LGUs") concerned.[157]

The allocation and distribution of local government share shall be governed by Section 292 of R.A. No. 7160.[158] Furthermore, the share of LGUs shall be released directly "to the provincial, city, municipal, or barangay treasurer, as the case may be, without need of further action on the part of the National Government." Such share shall be released "on a quarterly basis within five (5) days after the end of each quarter and shall not be subject to any lien or holdback that may be imposed by the National Government for whatever purpose."[159]

b. Incentives for RE Host Communities or LGUs

Section 13 of R.A. No. 9513 is intimately related with Section 31 thereof which provides that "[e]ighty percent (80%) of the share from royalty and/or government share of RE host communities and/or LGUs from RE projects and activities shall be used directly to subsidize the electricity consumption of end users in the RE host communities/LGUs whose monthly consumption do not exceed one hundred (100) kwh." When LGUs host the energy resource or facility they are entitled to "an equitable share in the proceeds derived from the development and utilization of the RE resource and sale of electric power."[160] For purposes of R.A. No. 9513, the host LGU and its respective share shall be determined by the following guidelines:[161]

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[155] § 20(A)(2).

[156] § 20(B)(1).

[157] § 20(A)(5).

[158] Otherwise known as the "Local Government Code of 1991" (hereinafter "LOC. GOV'T. CODE")

[159] LOCAL GOV.'T. CODE, §§286, 293; DOE DC2009-05-0008, § 20(D).

[160] DOE DC2009-05-0008, § 21(A).

[161] § 21(A).

> (1) With respect to integrated energy generating facilities, the host LGU is where the energy-generating facilities and energy resources are located. The LGU shall be entitled to a share based on the sale of electric power;
>
> (2) With respect to energy resources, the host LGU is where the renewable energy resources are located delineated by geophysical and exploration surveys. The LGU shall be entitled to a share based on the sale of renewable energy produced by the RE Developer; and
>
> (3) With respect to non-integrated generating facilities, the host LGU is where the energy generating facility is located. The LGU shall be entitled to a share based on the sale of electric power by the generating facility.
>
> . . . .
>
> . . . The remaining twenty percent (20%) shall be used to finance local government and livelihood projects which shall be appropriated by their respective Sanggunian pursuant to Section 294 of R.A. No. 7160.[162]

c. Renewable Energy Trust Fund ("RETF")

Section 28 of R.A. No. 9513 mandates the establishment of the RETF which seeks to "enhance the development and greater utilization of renewable energy." The RETF shall be used to:

> (a) Finance the research, development, demonstration, and promotion of the widespread and productive use of RE systems for power and non-power applications, as well as to provide funding for R & D institutions engaged in renewable energy studies undertaken jointly through public-private sector partnership, including provision for scholarship and fellowship for energy studies;
>
> (b) Support the development and operation of new RE resources to improve their competitiveness in the market: *Provided*, That the grant thereof shall be done through a competitive and transparent manner;
>
> (c) Conduct nationwide resource and market assessment studies for the power and non-power applications of renewable energy systems;

[162] DOE DC2009-05-0008, § 21(B)(3).

> (d) Propagate RE knowledge by accrediting, tapping, training, and providing benefits to institutions, entities and organizations which can extend the promotion and dissemination of RE benefits to the national and local levels; and
>
> (e) Fund such other activities necessary or incidental to the attainment of the objectives of this Act.

The same section also states that the fund may be used for grants, loans, or other financial arrangements which shall be awarded in "a competitive and transparent manner."

IV. GEOTHERMAL ENERGY AND THE PHILIPPINES

The significance of the Philippine geothermal power industry cannot be overemphasized. As an archipelago strategically located within the Pacific Ring of Fire, the Philippines is one of the most active volcanic areas in the world which has bestowed it with an array of natural geothermal energy resources. As of 2005, the Philippines possessed a total capacity of 1,977.69 megawatts ("MW") from geothermal energy. This is almost twice than the figure of 1,194 MW in 1995.[163] The Philippines was ranked second in the world in terms of total installed capacity after the United States which possessed a capacity of 2,544 MW.[164]

As of 2008, the total installed capacity for RE resources amounted to 5,489.2 MW of which 1,972 MW or 35.92% is provided by geothermal energy. [165] The reduction of the capacity was brought about by decommissioning of old dilapidated plants but off-set to a certain extent by the operation of newly constructed geothermal projects. The DOE is exerting earnest efforts in repairing decommissioned power plants as well as discovering and developing new geothermal energy resource systems through the assistance of the private sector and foreign investment. By the year 2030, the capacity of RE production in the Philippines is projected to double its

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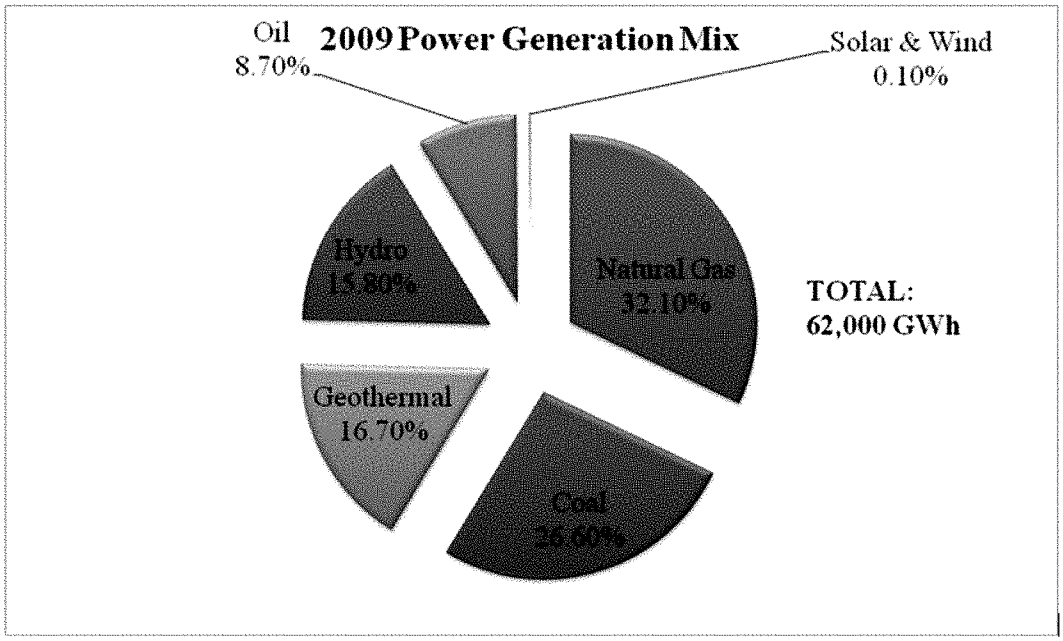
[163] DOE, *Geothermal Statistics: World Installed Geothermal Plant Capacities*, *available at* http://www.doe.gov.ph/ER/GeoStat-world_installed.htm (last visited Mar. 4, 2011).

[164] *Id.*

[165] Fronda, *supra* note 54.

current value with a target of 1,165 MW in capacity to be drawn from geothermal energy resources.[166]

The contribution of geothermal energy in supplying Philippine electrification needs is very significant as it ranks third in the power generation mix as of 2009, as shown by the chart below:[167]



166 DOE, *Philippine Energy Plan 2012-2030*, *available at* http://www.doe.gov.ph/doe_files/pdf/01_Energy_Situationer/2012-2030-PEP.pdf (last visited Jun. 13, 2013). Presented on the 2nd Meeting of the Energy Committee, Philippine Chamber of Commerce and Industry on Apr. 28, 2010. *See also* DOE, Indicative Geothermal Capacity Additions, *available at* http://www.doe.gov.ph/doe_files/pdf/04_Energy_Resources/Stat-GeoAddition.pdf (last visited Jun. 13, 2013).

167 Fronda, *supra* note 54.

The following are the current existing geothermal plants in the Philippines according to recent data from the DOE:[168]

Plant	Installed Capacity (MW)	Dependable Capacity (MW)	Location	Area of Geothermal Field (hectares)	Owner
MakBan (1-10) MakBan Ormat	442.80 15.73	274.74 0.00	Calauan, Laguna Bitin, Bay Laguna	162,000 (Mt. Makiling and Mt. Banahaw)	AP Renewable Inc. Ormat, Inc. USA
Bac Man	151.50	0.00	Bacon, Sorsogon	31,300 (Pocdol Volcanic Range)	Bac-Man Geothermal Inc.
Tiwi (1-6)	275.69	75.59	Tiwi, Albay	17,661 (Mt. Malinao)	AP Renewable Inc.
Palinpinon	192.50	152.27	Valencia, Negros Oriental	133,000 (Cuernos de Negros Volcano)	Green Core Energy
Northern Negros	49.37	6.50	Bago City, Northern Negros	4,310 (Mt. Kanlaon)	PNOC-EDC
Leyte	112.50	74.06	Tongonan, Leyte	107,625 (Tongonan and Mahanagdong)	Green Core Energy
Tongonan II & III	609.92	558.83	Tongonan, Leyte	107,625 (Tongonan and Mahanagdong)	PNOC-EDC
Mindanao I & II	103.23	98.25	Kidapawan, North Cotabato	701 (Mt. Apo)	Marubeni Energy Services Corp.
TOTAL	1,953	1,321			

An examination of the foregoing figures reveals that the actual production of some geothermal power facilities is not at par with their projected capacities. Such inability may be attributed to several factors, primarily the age of certain power plants such as MakBan Units 1-5 and Tiwi

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[168] *Id.;* For a more detailed list of data *see* http://www.doe.gov.ph/EP/ExistingPlants.htm (last visited Apr. 10, 2011).

Units 1-5, which have been in operation for over 30 years and are prime for decommissioning.

In line with the government's thrust to aggressively accelerate the development of geothermal energy resources, numerous geothermal fields are currently undergoing the process of exploration or pre-development in order to supplement or replace our ageing geothermal power infrastructure. The prospective projects are as follows:[169]

Plant	**Location**	**Potential Capacity (MW)**	**Year Available**
Batong Buhay	Kalinga	60	2011
Buguias Tinoc	Ifugao	60	2012
Daklan	Benguet	20	2012
Baua	Cagayan	20	2012
Natib	Bataan	40	2010
Mabini	Batangas	20	2010
Montelago	Oriental Mindoro	40	2010
Tanawon	Albay and Sorsogon	40	2010
Rangas	Albay and Sorsogon	40	2009
Manito Kayabon	Albay	40	2011
Mandalagan	Negros Occidental	20	2014
Dauin	Negros Oriental	40	2011
Cabalian	Southern Leyte	100	2011
Biliran	Biliran	20	2009
Lakewood	Zamboanga del Sur	40	2012
SE Apo	Davao del Sur	40	2014
Amacan	North Davao	20	2013
NW Apo	North Cotabato	20	2011
Mindanao	North Cotabato	50	2011

[169] DOE, *Indicative Geothermal Capacity Additions*, *at* http://www.doe.gov.ph/ER/GeoStat-geocapacity_additions.htm (last visited Mar. 4, 2011).

Greenfield			
	TOTAL	**730**	

V. POLICIES AND IMPACTS: A COMMENTARY

A. A Weak Approach to Sustainable Development

At the outset in this paper, due emphasis was made regarding the ever-dwindling sources of energy in the world despite its constantly increasing hunger for power. Geothermal energy presents itself as a viable candidate in the quest for the Holy Grail of renewable energy: a source of potentially unlimited and clean energy. It has been proposed that geothermal energy can provide up to 10 times the current global energy production.[170]

However, while the mad rush towards energy sustainability appears to have taken hold of nations in a global scale, we must re-examine and ponder on our approach because our nation is navigating through uncharted waters. While decisive action is imperative, the dire implications of misguided action demand the utmost circumspection.

Sustainable development is the goal of our RE laws. In fact, Section 2(a) of R.A. No. 9513 provides that the goal of the acceleration of the exploration and development of renewable energy resources is the "achievement of energy self-reliance, through the adoption of sustainable energy development strategies." But what really is this concept of sustainable development that we are so eager to achieve? Indeed, "the very concept of sustainability and sustainable development are confounding concepts because they have come to mean almost anything, which in turn implies that they are in danger of having no meaning other than as slogans."[171]

The term sustainable development is used by the World Commission on Environment and Development to indicate development that "*meets the needs of the present generation without compromising the needs of future generations.*"[172] This

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[170] Singer et al., *supra* note 9 at 76.

[171] Roderick Eggert, *Mining and Economic Sustainability: National Economies and Local Communities*, INT'L. INST. FOR ENV'T. & DEV'T. and WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT, Oct. 2001, at 3.

[172] Dante Gatmaytan, *Implementing the Sustainable Development Directive of the Constitution*, 80 PHIL. L.J. 1, note 4 (2005), *citing* Ian Coxhead & Sisira Jayasuriya, *Environment and*

principle is likewise embodied in Principle 3 of the Rio Declaration on Environment and Development which provides: "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations."

The principle of sustainable development is a rapidly developing concept in international environmental law and is common in contemporary conventions and treaty provisions.[173] There are currently two dominant views regarding sustainable development: the weak and strong sustainability approach. Weak sustainability, also called "constrained growth," emphasizes economic models that do not differentiate between natural and human-made resources.[174] Proponents of this view assume that scientific and technological advancement will address natural resource depletion and emphasize the importance of economic and social gains in the face of environmental degradation.[175] Weak sustainability allows for the depletion or degradation of natural resources, so long as such depletion is offset by increases in the stocks of other forms of capital (for example, by investing royalties from depleting mineral reserves in factories).[176] The model can be illustrated, as follows:[177]

Natural Resources, in THE PHILIPPINE ECONOMY: DEVELOPMENT, POLICIES, AND CHALLENGES 271 (Arsenio Balisacan & Hall Hill eds., 2003), emphasis supplied.

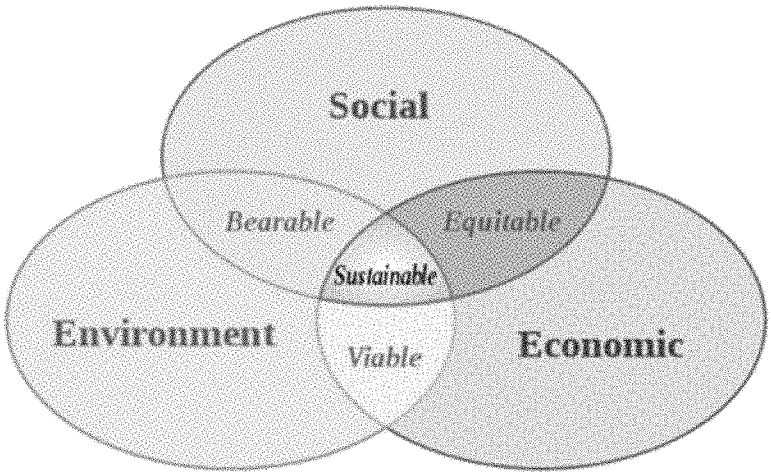
[173] *See* Preamble of the Agreement establishing the World Trade Organization; International Tropical Timber Agreement which was adopted on Jan. 26, 1994; Convention on Biological Diversity which came into force on Dec. 29, 1993; Kyoto Protocol, dated Dec. 11, 1997; UN Framework Convention on Climate Change which came into force on Mar. 21, 1994.

[174] JUAN LUCENA, ET AL., ENGINEERING AND SUSTAINABLE COMMUNITY DEVELOPMENT 34 (2010).

[175] *Id.* at 35.

[176] Organisation for Economic Co-operation and Development (hereinafter "OECD"), *Glossary of Statistical Terms: Weak Sustainability*, *at* http://stats.oecd.org/glossary/detail.asp?ID=6611 (last visited Apr. 10, 2011).

[177] Image *available at* http://lh4.ggpht.com/_6ai5mauc2j4/Sa6qiek8LLI/AAAAAAAACEQ/oHBNmcq_D0A/s400/sustainability%20-%20venn%20diagram%20-%20economic%20-%20social%20-%20environment.jpg (last visited Apr. 10, 2011).



The second view, known as strong sustainability, sees sustainability as non-diminishing life opportunities.[178] This should be achieved by conserving the stock of human capital, technological capability, natural resources, and environmental quality.[179] Under the strong sustainability criteria, minimum amounts of a number of different types of capital (economic, ecological, social) should be independently maintained in real physical or biological terms. The major motivation for this insistence is derived from the recognition that natural resources are essential inputs in economic production, consumption, or welfare that cannot be substituted by physical or human capital. It is understood that some environmental components are unique and that some environmental processes may be irreversible.[180] All forms of capital must be

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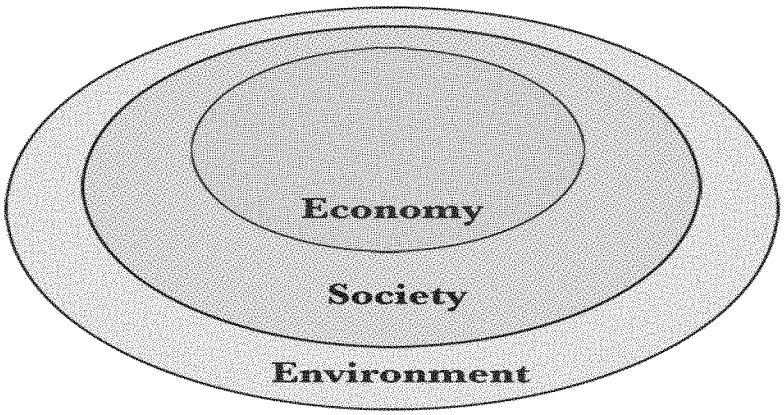
[178] K.A. BREKKE, ECONOMIC GROWTH AND THE ENVIRONMENT: ON THE MEASUREMENT OF INCOME AND WELFARE 1983 (1997).

[179] *Id.* at 91.

[180] ROBERT AYRES ET AL., VIEWPOINT: WEAK VERSUS STRONG SUSTAINABILITY 6, *available at* http://dare.ubvu.vu.nl/bitstream/1871/9295/1/98103.pdf (last visited Apr. 10, 2011).

maintained intact and independent of one another. The implicit assumption is that different forms of capital are mainly complementary; that is, all forms are generally necessary for any form to be of value.[181] Strong sustainability can be illustrated by the following model:[182]



It can be readily concluded from a cursory perusal of our laws on geothermal energy and renewable energy resources that the Philippines espouses the weak sustainability approach. Since the enactment of R.A. No. 5092, the thrust of the government was to accelerate the development of geothermal energy resources to enjoy the economic and social benefits of electrification. Such approach was likewise carried over with the enactment of P.D. No. 1442. Our new law, R.A. No. 9153, on the other hand, veers away from its predecessors in the sense that it aggressively seeks the development of such resources, and ultimately the economy, but at the expense of the environment and society.

While R.A. No. 9513 seeks to employ a sustainable development approach in accelerating and promoting the development of RE resources, the

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[181] OECD, *Glossary of Statistical Terms: Strong Sustainability, at* http://stats.oecd.org/glossary/detail.asp?ID=6577 (last visited Apr. 10, 2011).

[182] Image *available at* http://images-mediawiki-sites.thefullwiki.org/06/1/8/6/59304183291068774.gif (last visited Apr. 10, 2011).

manner by which it is implemented by the very law tends to relegate other concerns such as environmental and social impacts for economic development.

The law makes sweeping pronouncements calculated to entice the undertaking of geothermal energy development projects without taking into consideration the adverse effects of such projects to the immediate community. R.A. No. 9513 merely provides RE host communities and LGUs an 80% part of the government share which will trickle to the individual person by way of a rebate on his or her electric bill. However, such measure alone cannot fully compensate for all possible ramifications or consequences arising from geothermal development and operation.

B. Environmental and Social Impacts of Geothermal Energy

Geothermal energy is more environment-friendly than other energy technologies. In general, negative environmental impact associated with geothermal energy utilization is minor.[183] Geothermal power plants release significantly lesser air pollutants because they do not burn fossil fuels like conventional fuel plants. Moreover, considering that geothermal energy operations merely utilize steam, its operations are not a significant source of greenhouse gases. However, environmental problems also arise during geothermal plant operation which must not be overlooked. These concerns require proper attention by project proponents during the exploration, development, and exploitation of geothermal energy resources.

1. Drilling

The first perceptible effect on the environment is that of drilling, whether the boreholes are shallow ones for measuring the geothermal gradient in the study phase or deeper exploratory or producing wells. These operations will modify the surface morphology of the area and could damage local plants and wildlife. [184] During drilling or flow-tests, undesirable gases may be discharged into the atmosphere. Fortunately, the impact on the environment caused by drilling mostly ends once the process is completed.[185]

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[183] Goldstein, et al., *supra* note 28 at 418.
[184] Dickson & Fanelli, *supra* note 23 at 54.
[185] *Id.*

2. Air Emissions

Geothermal fluids (steam or hot water) usually contain gases such as carbon dioxide, hydrogen sulfide, ammonia, methane, and trace amounts of other gases, concentrations of which usually increase with temperature.[186] Gas emissions from geothermal power plants are 90% carbon dioxide at an average rate of 122 grams carbon dioxide per kWh.[187] Hydrogen sulfide is a naturally occurring compound found in volcanic gases, petroleum deposits, natural gas, geothermal fluids, hot springs, and fumaroles.[188] It is a serious health hazard as it is highly-toxic even at small doses.[189] It is also a potent air pollutant and is among the chemicals responsible for the formation of acid rain.[190] Emissions by geothermal plants are managed through the process design of the power plant itself depending on the specific methodology employed in extracting geothermal energy.[191] Geothermal power plants may be designed to re-inject the geofluid stream without releasing the potentially harmful gaseous emissions into the atmosphere.[192] For other plants, the vent stream may be chemically treated or scrubbed to remove hydrogen sulfide and other obnoxious fumes.[193] Nonetheless, in comparison with its fossil fuel counterparts, the amount of harmful emissions generated by geothermal energy resources is almost negligible.[194]

3. Solid and Liquid Wastes

Mercury, arsenic, and boron may be present in geothermal fluids which, when present at significant concentrations, may pose local

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[186] *Id.* at 55.

[187] Goldstein, et al., *supra* note 28 at 418.

[188] Kagel, et al., *supra* note 27 at 27.

[189] U. S. DEP'T. OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATED HAZARDOUS SUBSTANCES: HEALTH ,TOXICITY, ECONOMIC AND TECHNOLOGICAL DATA 1067 (1990).

[190] CRAIG FREUDENRICH, ET AL., KAPLAN AP ENVIRONMENTAL SCIENCE 123 (2009).

[191] Jefferson Tester, et al., *Impact of Enhanced Geothermal Systems on U.S. Energy Supply in the 21st Century*, MASS. INST. OF TECH (2007).

[192] *Id. See also* Goldstein, et al., *supra* note 28 at 418.

[193] *Id.*

[194] Tester, et al., *supra* note 191; Kagel, et al., *supra* note 27 at 23-24; Goldstein, et al., *supra* note 28 at 419.

environmental and health risks.[195] These substances are naturally found in minute or trace amounts in volcanic systems.[196] Surface disposal, if significantly in excess of natural hot spring flow rates and if not strongly diluted, can have adverse effects on the ecology of rivers, lakes, or marine environments.[197] The amount of surface disposal depends on the geological, hydrological, and thermodynamic conditions of the geothermal field, the type of fluid collection or injection system, as well as the kind of power plant utilized.[198] Be that as it may, adverse impact from mercury, arsenic, and boron may be avoided with the proper use of technology and methodology in geothermal energy extraction.[199] The United States has had success in local government measures mandating mercury abatement for geothermal power plants.[200] Such measures involve the use of shallow groundwater aquifers and impermeable linings which provide protection from any spillover or sludge arising from geothermal energy operations.[201]

4. Waste Water

Discharge of waste waters is also a potential source of chemical pollution. Spent geothermal fluids with high concentrations of chemicals such as boron, fluoride, or arsenic should be either treated, re-injected into the reservoir, or both.[202] The waste waters from geothermal plants also have a higher temperature than the environment and therefore constitute a potential thermal pollutant.[203] Excess heat emitted in the form of steam may affect cloud formation and change the weather locally.[204]

Utmost care must be exercised in re-injecting geothermal effluent back into the reservoir, which is commonly done in the abatement of obnoxious compounds present in the geothermal fluid.[205] The reservoir is connected to

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[195] Goldstein, et al., *supra* note 28 at 419; Kagel, et al., *supra* note 27 at 34-38, 40.

[196] Kagel, et al., *supra* note 27 at 34-38, 40.

[197] Goldstein, et al., *supra* note 28 at 419.

[198] *Id.*

[199] Kagel, et al., *supra* note 27 at 38.

[200] *Id.* at 35.

[201] Goldstein, et al., *supra* note 28 at 419.

[202] Dickson & Fanelli, *supra* note 23 at 55.

[203] *Id.*

[204] HARSH GUPTA & SUKANTA ROY, GEOTHERMAL ENERGY: AN ALTERNATIVE RESOURCE FOR THE 21ST CENTURY 162 (2007).

[205] Tester, et al., *supra* note 191.

the underground water system, including watersheds or aquifers, which serve as the source of groundwater used for both domestic and agricultural use. If waste water is to be re-injected, its proper treatment must be institutionalized to prevent or minimize any damage to the local environment or community.

5. Noise Pollution

Noise pollution from geothermal plants is typically considered during three phases: the well-drilling and testing phase, the construction phase, and the plant operation phase.[206] During the construction phase, noise may be generated from construction of the well pads, transmission towers, and the power plant. During the operation phase, the majority of noise is generated from the cooling tower, the transformer, and the turbine-generator building.[207] During the production phase there is a higher pitched noise of steam travelling through pipelines and the occasional vent discharge. These are normally acceptable. At the power plant, the main noise pollution comes from the cooling tower fans, the steam ejector, and the turbine "hum."[208] The decibel levels of geothermal drilling and plant construction have been measured to range from 90 to 120 decibels.[209] During normal operations of a geothermal power plant, noise levels are in the 71 to 83 decibel range at a distance of 900 m.[210] Nonetheless, noise levels drop rapidly with distance from the source. If necessary, noise levels could be reduced further by the addition of mufflers or other soundproofing means but at added cost.[211]

6. Subsidence

Geothermal operations, which involve the drawing of large amounts of water or steam from the reservoir may give rise to the phenomenon of subsidence, or the slow, downward sinking of the land surface.[212] Subsidence occurs as a direct result of physical removal of fluid from the reservoir at rates

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[206] Kagel, et al., *supra* note 27 at 42.
[207] *Id.*
[208] Dickson & Fanelli, *supra* note 23 at 56.
[209] GUPTA & ROY, *supra* note 204 at 164.
[210] Tester, et al. *supra* note 191.
[211] *Id.*
[212] Kagel, et al., *supra* note 27 at 52.

higher than that of recharge, either by natural or artificial means.[213] This is an irreversible phenomenon, but by no means catastrophic, as it is a slow process distributed over vast areas. Over a number of years the lowering of the land surface could reach detectable levels, in some cases by a few tens of centimeters and even meters, and should be monitored systematically, as it could damage the stability of the geothermal buildings as well as any private home in the neighbourhood. [214] A documented incident of subsidence attributable to geothermal energy generation took place in the utilization of the Wairakei field in New Zealand, where reinjection of geothermal fluid was not used. Subsidence rates in one part of the field were as high as 0.45 m per year.[215] Proper reinjection of geothermal fluids can properly mitigate and reduce the potential for subsidence by maintaining proper reservoir pressures.[216]

7. Induced Seismicity and Landslides

There is sufficient evidence to establish a link between geothermal energy production and the increased incidence of seismic activity in the geothermal resource area. Pressure or temperature changes induced by stimulation, production, or injection of fluids can lead to geo-mechanical stress that can affect the subsequent rate of earthquake occurrences.[217] Induced seismic activities are manifested in minor events such as microseismic noise[218] to natural fractures that occur in the geothermal energy system which vary in length from one to ten meters.[219] Micro earthquakes with magnitudes ranging from two to three on the Richter scale have been known to occur in geothermal areas.[220] Landslides have been known to occur in geothermal areas although it remains unclear if such incidents are directly attributable to geothermal energy activities.[221]

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[213] GUPTA & ROY, *supra* note 204 at 162.

[214] Dickson & Fanelli, *supra* note 23 at 56.

[215] Tester, et al., *supra* note 191.

[216] Kagel, et al., *supra* note 27 at 52.

[217] Goldstein, et al., *supra* note 28 at 420.

[218] Microseismic noise arises from the opening fractures caused by geothermal drilling and power plant operation. Tester, et al. *supra* note 191.

[219] Tester, et al., *supra* note 191.

[220] Kagel, et al., *supra* note 27 at 54.

[221] Tester, et al., *supra* note 191.

8. Disturbance of Natural Hydrothermal Manifestations

The utilization of geothermal energy resources has been cited as the cause for the total destruction and compromise of natural hydrothermal manifestations such as geysers, hot springs, and mud pots.[222] An example would be the compromise of the once famous Tiwi Hot Springs in Tiwi, Albay, following the recommissioning of the Tiwi Geothermal Power Plants in the area.

9. Conflicts in the Law

Another problematic area is the conflict in implementing R.A. No. 9153 in relation with Republic Act. No. 7586 ("R.A. No. 7586") otherwise known as the National Integrated Protected Areas System Act. Some geothermal energy resource sites fall within protected areas under R.A. No. 7586. Thus, a balance must be struck between the interest of electrification, rural development, and energy security on the one hand against the right to maintain a balanced and healthful ecology on the other.

R.A. No. 8371 or the Indigenous Peoples Rights Act also gives rise to another conflict of implementation of laws. Mountain areas are prime locations for geothermal energy resources due to the likelihood of a magmatic intrusion in the vicinity. Again, a balance must be struck between energy security and the rights of indigenous peoples as guaranteed under the Constitution.[223]

C. Environmental Impact Systems and Geothermal Energy

In recognition of the environmental impact involved in energy infrastructure projects, the government has adopted the environmental impact statement ("EIS") system as the means to ensure a "rational balance between socio-economic development and environmental protection for the benefit of present and future generations."[224] The EIS system mandates all agencies and instrumentalities of the national government, including GOCCs, as well as

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[222] *Id.*

[223] CONST., art. XIII, § 6.

[224] Dep't. of Env't and Nat. Resources Adm. Order No. 2003-30, art. I, § 1 (2003) (hereinafter "DENR AO 2003-30").

private corporations, firms, and entities to submit an EIS and secure the issuance of an ECC as both a pre-requisite and a continuing requirement for project planning, construction, and operation of Environmentally Critical Projects ("ECPs") or projects involving Environmentally Critical Areas.[225] Even geothermal energy projects are not exempted from this policy.

The EIS system requires the conduct of an Environmental Impact Assessment ("EIA") which has been defined as:

> [A] process that involves evaluating and predicting the likely impacts of a project (including cumulative impacts) on the environment during construction, commissioning, operation and abandonment. It also includes designing appropriate preventive, mitigating and enhancement measures addressing these consequences to protect the environment and the community's welfare.[226]

Under the EIS system, the project proponent is required to submit an EIS which shows "a comprehensive study of the significant impacts of a project on the environment and includes an Environmental Management Plan/Program that the proponent will fund and implement to protect the environment."[227] The EIS is then reviewed by the EIA Review Committee and by the appropriate approving authority, which may be the Regional Director of the Environmental Management Bureau ("EMB") under the DENR Secretary.[228] A party aggrieved by the decision of the approving authority may seek recourse by exhausting administrative appeals all the way to the Office of the President.[229]

If the EIS is found to be satisfactory, an ECC may be issued in favor of the project proponent. "No person, partnership or corporation shall undertake or operate any such declared environmentally critical project or area without first securing an ECC issued by the President or his duly authorized representative."[230] An ECC certifies to the following representations and undertakings of the project proponent: (i) "[That] the proposed project or undertaking will not cause significant negative environmental impact;" (ii)

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[225] Pres. Dec. No. 1151, § 4 (1979); Pres. Dec. No. 1586, § 2 (1978).
[226] DENR AO 2003-30, art. I, § 3(h).
[227] Art. I, § 3(k).
[228] Art. II, § 5.
[229] Art. II, § 6.
[230] Pres. Dec. No. 1586, § 4 (1978).

"[That the proponent] has complied with all the requirements of the EIS System and has committed to implement its approved Environmental Management Plan;" and "[that the project proponent will] undertake [specific measures and conditions] before and during the operation of a project, and in some cases, during the project's abandonment phase to mitigate identified environmental impacts."[231]

Geothermal energy operations are not exempt from the requirements of the EIS system. Moreover, geothermal infrastructure projects are identified as ECPs for purposes of the EIS system.[232] The thrust of the EIS system was further strengthened by virtue of a Memorandum of Agreement between the DENR and the DOE for the streamlining of the EIS Process for Energy Projects which regulates geothermal energy resource development.[233]

However, recent policy issuances on EIS have become less stringent in regulating infrastructure development. Significantly, the present administrative issuance on EIS systems has done away with the enumeration of ECPs and instead relies largely on the discretion of the EMB in determining the characteristics of the project or undertaking, location, and potential impact.[234] Moreover, most contemporary efforts with respect to EIS pertain largely to streamlining the process rather than calibrating the standards used in determining the environmental impact of projects. The clear intent of such developments is to simplify and ease the difficulty in securing an ECC reducing the same to nearly a *pro forma* requirement.

VI. CONCLUSION

This paper has shown that after decades of experience, the country has taken strides in the development of a legal framework for geothermal energy. Considering the abundance of geothermal energy resources in the Philippines, the government should continue to emphasize on geothermal energy development.

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[231] DENR AO 2003-30, art. 1, § 3(d).

[232] Pres. Proc. No. 2146 (1981); DENR Adm. Order No. 1996-37, art. II, § 1(a)(iii)(2) (1996).

[233] DENR and DOE, *Memorandum of Agreement on Streamlining of EIS Process for Energy Projects*, *available at* www.doe.gov.ph/ER/pdf/MoA_EIS.pdf.

[234] DENR AO 2003-30, art. II, § 4.

However, the current legal framework, while couched in the language of sustainable development, merely ensures energy sustainability. This framework poses a solution that fails to achieve a rational balance between socio-economic development and environmental protection. It secures the welfare of the present by gambling the future, furthering the old mindset that led to our current crisis in energy.

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