GOVERNMENT REGULATIONS ON GEOTHERMAL DEVELOPMENT AND ENVIRONMENTAL PROTECTION IN INDONESIA

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ABSTRACT

Since the world energy crisis in 1973, the Government of Indonesia is still trying to decrease dependency of oil for domestic energy use. In line with this effort, program activity to explore and to exploit new and renewable energy resources were increased as an alternative energy. To achieve the goal and to manage of this program, the government of Indonesia in 1978, formulated National Energy Policy which consist of three main principle guide-lines, such as intensification, conservation and diversification energy, and established a National Energy Coordinator Body (BAKOREN) which consist of several ministers who have work related to energy. This National Energy Policy stated that utilization of geothermal energy is one of alternative energy that has a priority to be developed. According to regulate of geothermal development, several laws and regulations were issued by the Government of Indonesia since 1981. The earliest geothermal power generating projects in Indonesia were built at Kamojang Geothermal Fields, West Java in 1983. Now, 309,5 Mwe of power plant capacity has been installed. Currently 21 (twenty one) of the geothermal contracts have been signed. In order to accelerate of geothermal resource development to generate of electric power, some deregulation has been issued, such as PERTAMINA is the state owned oil and natural gas enterprise may sell electricity and tax reduction. In the future, the Government of the Republic of Indonesia is committed to utilize of geothermal energy for electric power by the end of the Sixth Years National Development Plan (in the year of 1999) will be achieved of approximately 1,000 Mwe and at the end of the Second Long-Term Development Plan (in the year of 2019) will be utilized of around 4,000 Mwe.

I. INTRODUCTION

After the world energy crisis in 1973, energy demand steadily grows in line with the growth of development and population. The supply of energy for domestic energy need is generally still dominated by oil and gas. The imbalance between energy supply and demand of energy still occurs, while commercial sources of energy were still utilized not for productive uses. To deal with these problems since 1978, the Government of Indonesia implements the National Energy Policy through three policy elements: intensification, conservation and diversification. The intensification policy is aimed at expanding resources which economically can be utilized. The conservation policy is objected guaranteeing the preservation of energy resources by using it more efficiently and wisely for balancing both development and preservation of environment. The diversification policy is carried out for the purpose of reducing oil share in domestic consumption and replacing it with new, renewable and other less tradable indigenous energy resources. To reduce the dependence on oil in this energy mix, a National Energy Policy was formulated, with the objectives: to assure a gradual shift from a mono energy to a poly energy economy, to assure the availability of energy for domestic market at reasonable price, to ensure a continuous and positive contribution to the balance of payment and public revenues,

to improve national resilience and national endurance, and to protect environment. It is important to note here that in instituting our National Development Program minimizing impact on the environment are equally concerned. At the same time, to improve the living standards of the people of Indonesia through economic progress and rural electrification have been working with responsible of environment protecting. At the same year, the Government of Indonesia established the National Energy Coordinator Body (BAKOREN) which consist of members from several ministers who have regulated work to the energy. The function of this Body is to manage and governing supply and demand of energy.

As mandated by Guide Lines of State Policy 1993 (GBHN), economic development of natural resources will mean that the present and future use of these resources will be the main concern of its activities. The renewable natural resources should be managed in such a way so as to maintain its everlasting benefit, therefore its ability to renew should always be sustained, while the non-renewable sources should be utilized economically and preserved as long as possible. Accordingly, development in the energy sub-sector in PJP-II will be directed to achieve self-reliance and to secure the realization of economic development. The greater part of the energy sources which the Second Long-Term Development Plan (PJP-II) will rely on consist of non-renewable energy sources such as oil, natural gas, coal, peat and other renewable energy sources such as hydro, geothermal, wind biomes and solar.

Indonesia's regional tectonics is one of the greatest volcanic regions in the world which assures excellent geothermal prospects and thought to have one of the world's largest geothermal energy potential with estimates approximately of 19,600 MW. These geothermal resources could be obtained from 217 identified prospects which are spread widely throughout the Indonesian archipelago. Indonesia's geothermal energy power generation commenced in the Kamojang Field near Bandung in 1983. Now, the geothermal power plant installed capacity of 309.5 Mwe was constructed which made Indonesia is the world's sixth largest producer/user of geothermal energy. During the Sixth Five Year Development Plan, Indonesia plans to increase their installed capacity to 1025 megawatt of geothermal energy capacity. By the year 2019, Indonesia expects to have 4000 megawatts of geothermal energy capacity on-line which may make Indonesia the world's largest geothermal energy producer.

II. LAW AND REGULATIONS ON GOVERNING GEOTHERMAL AND POWER DEVELOPMENT AND ENVIRONMENTAL PROTECTION

The government plays a key role in the development of Indonesia's geothermal resource, especially through PERTAMINA (Oil and Gas State Enterprise) and PT. PLN (Persero) (Electricity State Enterprise). Development of energy sub sector as part of the National development is directed towards the realization of the national development objectives in its totality as stated in the Preamble of the 1945 Constitution (UUD 1945) to establish a just and prosperous society and will be implemented to support other sectors and to meet energy needs in the future by developing and managing energy sources and its utilization.

Laws and regulations on Geothermal Development;

In order to develop of geothermal resources in Indonesia, government has issued several regulations, as follows, although reforming and refining of some of those regulations are still required:

1. Law No. 44/1960
   This law is the basic law covering mining rights, it stipulates that oil and natural gas undertakings shall only be carried out by state and execution of same shall only be carried out by state enterprise. This is to ensure that development of every resources, in this case oil and gas is carried out to full benefit of Indonesia as stipulated in article 33 of the Constitution year of 1945.

2. Law No. 8/1971
   This law regarding establishment of state oil and natural gas mining enterprise under name of "Perusahaan Pertambangan Minyak dan Gas Bumi Negara (PERTAMINA)" as the single state owned enterprise for oil and natural gas. The objective of the enterprise is to develop and carry out oil and natural gas undertakings for the benefit of Indonesia.

3. Presidential Decree No. 22/1981
   The decree governing exploration and exploitation of geothermal resources for giving a priority to power development within the framework of saving on the internal use of oil and gas. The decree also recognized that PERTAMINA had the necessary expertise for geothermal development and, therefore, granted PERTAMINA the sole rights for geothermal exploration and exploitation within boundaries defined by the Minister of Mines and Energy. This law required PERTAMINA to sell geothermal steam for energy, and allowed the State Electricity Corporation of Indonesia (PLN) or the National Electric Power Limited Inc. (PT. PLN (Persero)) since June, 1994 to construct power plants.

4. Presidential Decree No. 23 of year 1981
   The decree required PERTAMINA and its contractors to pay as taxes 46% of its net operating income originating from exploration and exploitation activities of geothermal energy projects (in addition, the contractor must pay a corporation tax of 40% on taxable profits and a tax on interest, dividend and royalty of 10% of taxable profit after deduction of the corporation tax).

5. Regulation of the Minister of Mines and Energy No. 10/P/M/Pertamben/1981
   The regulation concerning guidelines on the terms of the joint operational contract.

6. Presidential Decree No. 45 of year 1991
   The new presidential decree improved and simplified geothermal undertakings and introduced a total project pass through system by PERTAMINA. PERTAMINA and its contractors are now allowed not only to undertake exploration and exploitation activities but also to construct power plant and sell electricity to PLN and to other consumer. This decree outlines two alternative paths for geothermal energy development in Indonesia. First, PERTAMINA or its contractors develop and operate the steamfield, selling the steam to PLN or other parties for electricity generation. The second alternative allows PERTAMINA or its contractors to develop and operate the steam field and generate electricity, which is then sold to either PLN or other consumers. The Indonesian Government also permits other agencies and private developers to undertake geothermal development on a small scale basis with total project system without a partnership with PERTAMINA. On this matter, supervising and monitoring will directly come from the Directorate General of Oil and Gas and the Directorate General of Electricity and Energy Development.

7. Presidential Decree No. 49 of year 1991
   The decree reduced taxes imposed on producing geothermal energy, which stipulates that the Government will collect a 34% of its net operating income originating from geothermal energy projects. Amounts for deadrent, regional development tax, Land and Building tax shall be paid by the Government. This move has encouraged geothermal development.

8. Minister of Finance Decree No. 766/KMK.04/1992
   This regulation interprets President Decree No.49/1991 and further clarifies it. It sets out the procedure for the calculation, payment and reporting of levies due to the government from the exploitation of geothermal resources for the production of energy/electricity.

Laws and Regulations governing environmental protection;

It is widely accepted that global environmental problems are direct consequences of the growing demand of energy, especially fossil-fuels, namely oil, coal and natural gas. Since Indonesia will have to maintain its economic growth to enable it to alleviate the poverty level, its energy consumption is expected to continue grow at the rate 8.6% annually. This sharp rise of energy consumption and population implies immense problems for the future that is particularly due to growing environmental impact largely caused by the production and combustion of fossil fuel. Due to the environmental impact, the utilization of fuels have to be stricter. It may cause the encouraging of utilization of renewable energy resources which has a lower impact to the environment. Environmental standards are used extensively in Indonesia as a basis for establishing environmental controls on development projects. These standards cover aspects such as water quality, air quality and noise emissions. Geothermal developers need to be aware that these environmental standards operate at two level, National Environmental Standards set by the central government which apply to the whole of Indonesia, and Regional Environmental Standards which only apply to the particular region the project is located in. Some of the environmental standards employed in Indonesia are strict, while others such as the noise standards are currently quite loosely defined.

Today laws and regulations governing environmental protection, are as follows:

1. Law No.4/1982 on the Basic Guidelines for Environmental Management.
2. Law No.5/1990 on the Conservation of Natural Resources and it's Ecosystem.
3. Government Regulations No.2/1985 on Forest Protection.
4. Government Regulations No.20/1990 on Water Pollution Control.
5. Government Regulation No.15/1993 on Environmental Impact Assessment (AMDAL).
6. President Decree No.64/1986 on Noise Intensity Control.
3. Minister of State for the Environment Decree No. Kep-14/MENLH/1994 on general guidelines for the preparation of Environmental Impact Analysis (ANDAL)
4. Minister of State for the Environment Decree No. Kep-39/MENLH/8/1996 according type of efforts which should be furnished by AMDAL

The implementation of the above laws and regulations should be conducted by geothermal developers, are as follows:

1. Exploration phase:
   a. Environmental Baseline Study covering a wide range of physical, chemical, biological, environmental and sosio-economic parameters.

b. Environmental Management Effort (UKL) and Environmental Monitoring Effort (UPL).

2. Exploitation phase:
   Environmental Impact Assessment (AMDAL) compressing Environmental Impact Analysis (ANDAL), Environmental Management Plan (RKL), and Environmental Monitoring Plan (RPL) for the main geothermal station and steamfield development.

Law and Regulations governing the Private Power Participation;

The laws and regulations governing private power participation are already in place, as follows, although reforming and refining of some of those regulations are still required:

1. Law No.15/1985 on Electric Power.
2. Government Regulation No.10/1989 on the Supply and Use of Electric Power.
3. Government Regulation No.20/1994 on Share Ownership in Foreign Investment Companies.
4. Presidential Decree No.37/1992 on Private Sector Enterprise for Electric Power Supply.
5. Minister of Mines and Energy Regulation No.02.P/03/M.PE/1993 vide No.04.P/03/M.PE/1995 on Guidelines for Implementing Private Sector and Cooperative to Supply Electric Power for Public Use.
6. Minister of Finance Decision N.128/KMK.00/1993.

There could be a number of forms of private sector participation as business partner in power supply allowable under the above existing laws and regulations:

1. Own and operate base load power generation with or without transmission and distribution facilities, serving bulk electric power to PT.PLN (Persero)/or Private Utility.
2. Own and operate generation, transmission and distribution facilities serving electric power to consumers, operation within a specific geographical area.
3. Operate industrial and commercial cogeneration technology, producing energy for owned use and available excess power my be to PT. PLN (Persero) or others.
4. Small private power plants supplying electricity to PT. PLN (Persero) under published tariff and standard contract schemes.
5. Serving transmission and distribution facilities to PT. PLN (Persero), Private Utility or others.
6. Joint venture with PT. PLN (Persero).

III. GOVERNMENT INSTITUTION;

In order to assist and supervise the implementation of geothermal development in Indonesia, there are three institutions who have authorization for any matters with connection to geothermal development, such as:

a. Directorate General of Geological and Mineral Resources (through Directorate of Vulcanology) who has a dealing with reconnaissance survey.

b. Directorate General of Oil and Gas (through PERTAMINA) who has an exploration and exploitation authority,

c. Directorate General of Electricity and Energy Development (through PT. PLN (Persero)) who has authority for supply-demand of electricity

The above of those institutions have to coordinate to achieve a national target for geothermal development which should be utilized as electricity approximately of 1,000 Mwe at the end of fiscal year of 1998/99 and raise to around 4,000 Mwe at the end of fiscal year of 2018/19.

IV. CONTRACTS OF GEOTHERMAL PROJECT

As a legal framework in geothermal development contract consists of 2 (two) kind of contracts which is called the Joint Operation Contract or the Steam Sales Contract and the Energy Sales Contract. The Joint Operation Contract (JOC) is a legal agreement between the contractors and PERTAMINA, representing the government. PERTAMINA is responsible for the management of the operation and the contractor is responsible for the production of geothermal energy from contract area, the conversion of energy to electricity and the delivery of geothermal energy or electricity. The Energy Sales Contract (ESC) is an integral part of the JOC. An ESC is an agreement among PERTAMINA as seller, the contractors as deliverer and PLN as purchaser of geothermal energy. Under this agreement, the production period for delivery of geothermal energy from each unit is 30 years commencing from the date of commercial generation for each unit.

At present, there are 21 (twenty one) of geothermal contracts have been signed which could be drawn in 3 (three) generation that:

a. First Generation of geothermal contracts (1982 - 1993), six contracts were signed. One of Joint Operation Contracts between PERTAMINA and Unocal Geothermal Indonesia Ltd and one of Energy Sales Contract among PLN, PERTAMINA and Unocal Geothermal Indonesia Ltd were signed in March, 1984 for Gunung Salak contract area and One of JOC between PERTAMINA and Amoseas Indonesia Inc and one of ESC among PLN, PERTAMINA and Amoseas Indonesia Inc were signed in May, 1984 for Darajat contract area, both of these contract areas is in West Java. One of JOC between PERTAMINA and Unocal Geothermal Indonesia Ltd and one of ESC among PLN, PERTAMINA and Unocal Geothermal Indonesia Ltd for Sarulla contract area in North Sumatera were signed in February, 1993.

b. Second Generation of geothermal contracts, ten contracts were signed for five contract areas on December 4th, 1994, as follows:

   - Gunung Salak contract area, one of the JOC between PERTAMINA and Unocal Geothermal Indonesia Ltd and one of the ESC among PLN, PERTAMINA and Unocal Geothermal Indonesia Ltd were signed as restated and amanded of previous JOC and ESC which were signed in 1984, for six units of a total power capacity of 330 Mwe and to be operated in commercial by 1999. The levelized of electricity price is US cent 7.281 per kwh in 1997.

- Wayang Windu contract area, one of the JOC between PERTAMINA and Mandala Perkasa and one of the ESC among PLN, PERTAMINA and Mandala Perkasa were signed for four units of a total power capacity of 220 Mwe with 55 Mwe to be completed by 1999. Mandala Perkasa is a joint venture between the national company Figears and Asia Power Ltd as contractor. Total investment could be as much as US$ 520 million. The levelized of electricity price is US cent 7.240 per kwh in 1998.

- Patuha contract area, one of the JOC between PERTAMINA and Patuha Power Ltd and one of the ESC among PLN, PERTAMINA and Patuha Power Ltd were signed for four units of a total power capacity of 220 Mwe with 55 Mwe to be completed by 1999. Patuha Power Ltd is a joint venture between the national company PT. Esarindo Supra Abadi and California Energy Ltd as contractor. Total investment could be as much as US$ 650 million. The levelized of electricity price is US cent 7.252 per kwh in 1998.

- Karaha contract area, one of the JOC between PERTAMINA and Karaha Bodas Company and one of the ESC among PLN, PERTAMINA and Karaha Bodas Company were signed for four units of a total power capacity of 220 Mwe with 55 Mwe to be completed by 1999. Karaha Bodas Company is a joint venture between the national company PT. Sumarah Daya Sakti and Caithness Resources Inc as contractor. The levelized of electricity price is US cent 7.251 per kwh in 1998.

- Dieng contract area, one of the JOC between PERTAMINA and Himpurna California Energy Ltd and one of the ESC among PLN, PERTAMINA and Himpurna California Energy Ltd were signed for four units of a total power capacity of 220 Mwe with 95 Mwe to be completed by 1999. Himpurna California Energy Ltd is a joint venture between the national company PT. Himpurna and California Energy Ltd as contractor. The levelized of electricity price is US cent 7.50 per kwh in 1998.

c. Third Generation of geothermal contracts, ten contracts were signed for five contract areas on November 17th, 1995 and January 7th, 1996, as follows:

- Kamojang extension contract area, one of the SSC between PERTAMINA and PT. Latoka Trimas Bina Energi and one of the ESC among PLN, PERTAMINA and PT. Latoka Trimas Bina Energi were signed for two units of a total power capacity of 60 Mwe to be completed by 1999. The electricity flat price is US cent 6.95 per kwh.

- Cibuni contract area as a first of small scale geothermal development, one of the ESC among PLN, PERTAMINA and PT. Yala Geothermal Indonesia were signed for four units of a total power capacity of 40 Mwe with 10 Mwe to be completed by 1997. The electricity flat price is US cent 6,97 per kwh.

- Bedugul contract area, one of the JOC between PERTAMINA and Bali Energy Ltd and one of the ESC among PLN, PERTAMINA and Bali Energy Ltd were signed for two units of a total power capacity of 110 Mwe to be completed by

1999. Bali Energy Ltd is a joint venture between the national company PT. Pandanwangi Sekartaji and California Energy Ltd as contractor. The electricity flat price is US cent 7.15 per kwh.

- Sibayak contract area, one of the SSC between PERTAMINA and PT. Dizamatra Powerindo and one of the ESC among PLN, PERTAMINA and PT. Dizamatra Powerindo were signed for two units of a total power capacity of 40 Mwe to be completed by 1999. The electricity flat price is US cent 7.0 per kwh.

- Darajat contract area, one of the JOC between PERTAMINA and Amoseas Indonesia Inc. and one of the ESC among PLN, PERTAMINA and Amoseas Indonesia Inc. were signed as restated and amended of previous JOC and ESC which were signed in 1984, for four units of a total power capacity of 275 Mwe, with 55 Mwe to be operated in commercial by 1999. The electricity flat price is US cent 6.95 per kwh.

At present, 32 (thirty two) of private companies is trying to get the Ministry Permit of geothermal resource development for electric power. These private companies interested to the 25 (twenty five) of geothermal prospects that consist of 10 prospects in Sumatera Island, 14 prospects in Java Island, and 1 prospect in Sulawesi Island.

VI. CONCLUSION

To achieve the goal of geothermal development for electric power utilization at the end of the second 25 years of national development plan, the Government of Indonesia is always concerning of the following matters:

a. The Government of Indonesia commits to accelerate the geothermal energy development for electricity generation to accomplish the target. The target of geothermal for power utilization is approximately 1.000 Mwe at the end of 1998/99 and around 4.000 Mwe at the of 2019/20.

b. The Government of Indonesia always try to make the geothermal energy becomes more attractive and competitive to other energy sources by deregulating laws and regulations.