

## Electricity Business under Restricted Monopoly: Opportunity or Challenge for Geothermal Development in Indonesia

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### ABSTRACT

PLN as an electricity business authority holder (PKUK) turned into business permit holder (PIUPTL) that engage business in supplying electricity as public utility which includes generation, transmission, distribution, and retail of electricity. This electricity supply business has to be done in an integrated way by one business entities within one business area (Law 30/2009). PLN performs electricity supply business to the public at the price that is determined by the Government while on the upstream side, PLN has primary energy supply in accordance with the market price. There are possibilities that can be done beside scheme of independent power producer, namely: ownership of business area and power wheeling scheme. These schemes emphasize cooperation among PIUPTL as well as between industry and PIUPTL. In electricity supply industry, the investment decision made today will give impact to the economics of electricity systems for many years to come. This paper discusses how strategic management by PLN in order to improve its competitive advantage with long-term planning of the primary energy sources including geothermal energy as a clean, environmentally friendly, and sustainable energy.

### 1. INTRODUCTION

Energy plays an important role for improving the economy, welfare and security of a nation. Security in the energy sector serves as a pillar of the national economic security. Therefore, energy management that covers supply, use and exploitation should be conducted in a fair, sustainable, optimal, and integrated manner as explained in Article 19 of Law Number 30 Year 2007 on Energy which mentions that people have right to get energy as they need (Rajasa, 2010).

Yusgiantoro (2010) stated that energy security refers to a state's abilities responding the changing dynamics of the global energy and to ensure the availability of energy at reasonable prices that closely linked to energy independence. Energy security can be realized through energy independence, and vice versa. Energy security or energy independence of a nation can be measured based on: (1) its ability to provide assurance of supply, (2) its ability to gain access to energy, and (3) its ability to reach the economic price of energy.

Energy is used in the form of fuel and electricity used for the sectors of households, transport, industries and commercial sectors (Sumiarso, 2010). This study will discuss the management of primary energy sources for electricity supply. Electricity is controlled by the state (Article 33 clause (2) of the 1945 Constitution). Then in clause (3) stated that the earth and water and natural resources contained therein are used as much as possible for prosperity of the people. Therefore, for the purpose of the long-term national electricity supply, the state should manage the available natural resources as a form utilization for welfare of the people themselves.

The Ministry of Energy and Mineral Resources released the electrification ratio of Indonesia in 2013 in the amount of 80.5%. It was done without considering the adequacy of electricity supply to meet the needs of the population. In advance, Mochtar (2010) in his book on Challenges in Developing Electricity in Archipelago Countries stated that building infrastructure for electricity in Indonesia is not as easy as building infrastructure for electricity in countries that consist only of land. This condition eventually requires the integrated systems of generation, transmission and distribution of electricity.

The total installed capacity of power plants in Indonesia in 2013 amounted to 42,328 MW with the proportion of energy supply as follows: hydropower 7.7%, fuel oil 12.5%, natural gas 23.6%, coal 51.6%, and geothermal energy 4.4% (MEMR, 2014). Meanwhile, electricity demands will increase in line with population growth and economic growth. To support the economic growth by 6%, it is necessary to increase electricity supply by 9.2 percent per year or approximately 5,500 MW per year (PLN, 2012).

Lately, there has been a shortage of electricity power supply in some areas such as Medan and Aceh. Even the President Director of PLN as the State Electricity Company has already warned the public concerning the risk of electricity crisis in Java Island by 2018 when the construction of Coal Power Plant in Batang does not start in 2014.

Conditions of electricity supply in Indonesia seem to be ironic, in the sense that there has been a shortage of electricity supply amid abundant natural wealth that stores a variety of energy sources in large amount. According to data retrieved from the Ministry of Energy and Mineral Resources, the potentials of energy in 2013 were generated from fossil energy sources, namely petroleum 7.4 billions of barrels, natural gas 150 TSCF, coal 161 billions of tons, coal bed methane 453 TSCF, and shale gas 574 TSCF. Meanwhile, for the potential of renewable energy, it consists of hydropower 75 GW, geothermal energy 29 GW, biomass 50 GW, solar energy 4.80 kWh/m<sup>2</sup>/day, wind energy 3-6 m/s, wave energy 49 GW, and uranium potential 3 GW as presented in Table 1.

**Table 1: Energy potentials in Indonesia (MEMR, 2013)**

NO	NEW RENEWABLE ENERGY	RESOURCES	INSTALLED CAPACITY	RASIO (%)
1	Hydro	75,000 MW	6,848.46 MW	9.13%
2	Geothermal	28,617 MW	1,343.5 MW	4.6 %
3	Biomass	49,810 MW	1,683.1 MW	3.3%
4	Solar Energy	4.80 kWh/m <sup>2</sup> /day	28.77 MW	-
5	Wind	3 – 6 m/s	1.87 MW	-
6	Tidal Energy	49,000 MW	0.01 MW	0%
7	Uranium	3,000 MW	30 MW	0%

NO	FOSSIL ENERGY	RESOURCES (SD)	PROVEN RESERVES (CT)	RASIO CT/SD	PRODUCTION (PROD)	RASIO CT/PROD (YEAR)
1	Oil (billion barrel)	7.41	3.74	0.505	0.314	12
2	Gas (TSCF)	150.70	103.35	0.685	2.98	35
3	Coal (billion ton)	161.3	28.7	17	0.317	89
4	CBM (TSCF)	453.3	-	-	-	-
5	Shale Gas (TSCF)	574	-	-	-	-

Furthermore, the utilization of renewable energy sources to generate electricity remains very low (Table 1), i.e. hydropower (9.13%), geothermal energy (4.6%), and biomass (3.3%). It indicates a gap between the availability of resources and the supply of electricity needs. On the other hand, regulation has mandated to utilize primary energy sources optimally in accordance with the National Energy Policy to ensure sustainable supply of electricity and then the primary energy source selection should focus on new and renewable energy (Law 30/2009).

## 2. STUDY DESCRIPTION

### 2.1. General overview

In this paper, the focus will be on generating electricity from geothermal energy with carrying out exploration study in institutional conditions of PLN as a single electricity buyer in Indonesia. In order to speed up geothermal development, there are possibilities that can be done beside scheme of independent power producer, namely: ownership of business area and power wheeling scheme.

### 2.2. Objectives of the study

The objectives of this study are:

- To give an overview of electricity supply business in Indonesia; and
- To make an analysis describing of institutional perspective in electricity business while it became an opportunity or challenge for geothermal development.

## 3. MANAGING RESOURCES STRATEGICALLY FOR SUSTAINABLE ELECTRICITY SUPPLY

Resource management is a comprehensive process of structuring the firm's resource portfolio, bundling the resources to build capabilities, and leveraging those capabilities with the purpose of creating and maintaining value for customers and owners. Structuring the resource portfolio involves using processes (i.e., acquiring, accumulating, and divesting) to obtain the resources that the firm will use for bundling and leveraging purposes. Bundling refers to the processes (i.e., stabilizing, enriching, and pioneering) used to integrate resources to form capabilities (Simon, Hitt and Ireland, 2007).

Leveraging involves the set of processes (i.e., mobilizing, coordinating, and deploying) used to exploit capabilities to take advantage of specific markets' opportunities. Thus, through an external orientation, the purpose of leveraging is to use capabilities to create solutions for current and new customers (Kazanjan, Drazin, and Glynn, 2002). From the firm's perspective, value creation begins by providing value to customers. When the firm produces greater utility for customers than competitors do, it enjoys a competitive advantage. In turn, a competitive advantage contributes to increased owner wealth when the firm's long-term profit margin is positive.

Thus, value creation occurs when a firm exceeds its competitors' ability to provide solutions to customers' needs, while maintaining or improving its profit margins. Value creation is optimized when a firm synchronizes the processes in and between each resource management component such that the difference between the firm's costs and the price paid by consumers is optimized. Additionally, the processes involved in managing resources are affected by the environmental context in which the firm operates (Lichtenstein and Brush, 2001).

Because of high environmental uncertainty and varying degrees of environmental munificence, sustaining a competitive advantage over time is unlikely, with the result that a firm instead will seek to develop a series of temporary competitive advantages. Creating a series of temporary advantages allows the firm to create new value while maintaining the value created in previous periods. Thus, effectively and efficiently managing resources within a firm's given environmental context ultimately determines the amount of value the firm generates and maintains over time (Ireland and Webb, 2006).

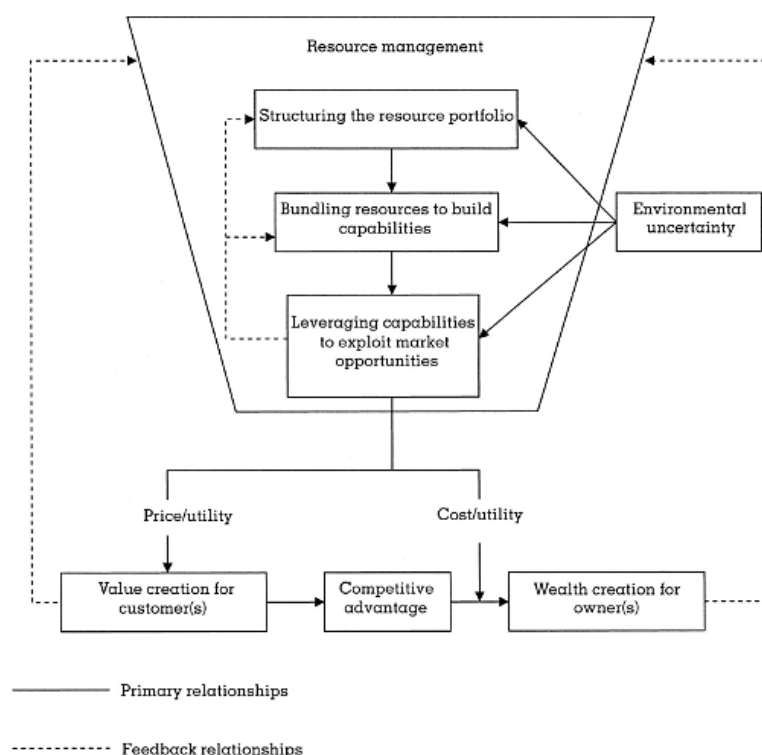
The Resource-Based View (RBV) of the firm provides the theoretical underpinnings for understanding how resources can be managed strategically. RBV is used by strategic management scholars and increasingly by entrepreneurship scholars to identify and explain performance differences among firms (Alvarez and Barney, 2002). From a strategic perspective, RBV suggests that competitive advantages are a function of the resources the firm develops or acquires to implement its product market strategy (Wernerfelt, 1984). As a complement to Porter's (1985) theory of competitive advantage based on the firm's product market position, RBV suggests that competition among product market positions held by firms can also be understood as competition among resource positions held by firms.

The development of electricity generation using renewable sources is also in accordance with the view of Hart (1995) on the Natural Resource-Based View that takes into account the natural environment in creating sustainable competitive advantage and relates with pollution prevention, product stewardship and sustainable development. Miller and Shamsie (1996) discovered that different types of resources explained performance in separate types of environments. Hitt, Bierman, Shimizu and Kochhar (2001) found that human capital has direct and indirect (through interactions with strategy) effects on firm performance. Their results indicate that increasing value of human capital exceeds its cost. In addition, there is growing evidence that the firm ability to effectively manage its resource portfolio affects firm performance (Henderson & Cockburn, 1994; Teece et al., 1997; Zott, 2003).

Currently though, the process of managing the firm's resources to create wealth is implicitly assumed in RBV. The actions necessary to manage resources strategically are not evident, suggesting that resources alone are unlikely to predict firm performance differentials (Amit, Lucier, Hitt and Nixon, 2002). Indeed, the firm's distinctive resources are likely to produce sustainable competitive advantages only when they are managed strategically (Gove et al., 2003).

Herein we argue that resources are managed strategically when their deployment facilitates the simultaneous and integrated use of opportunity-seeking and advantage-seeking behaviors. Thus, managing resources strategically affects the value to be derived from the intangible and tangible assets that organizations use to develop and implement their strategies (Sirmon and Hitt, 2003).

Additionally, the processes involved in managing resources are affected by the environmental context in which the firm operates. Because of high environmental uncertainty and varying degrees of environmental munificence, sustaining a competitive advantage over time is unlikely, with the result that a firm instead will seek to develop a series of temporary competitive advantages. Creating a series of temporary advantages allows the firm to create new value while maintaining the value created in previous periods. Thus, effectively and efficiently managing resources within a firm's given environmental context ultimately determines the amount of value the firm generates and maintains over time (Ireland and Webb, 2006).



**Figure 1: Dynamic resource management model (Simon, Hitt, and Ireland, 2007)**

The causal flow of the resource management model can be seen in Figure 1. Based on processes, the model incorporates a temporal dimension. However, because the firm must have resources to bundle into capabilities and because capabilities must exist for leveraging to occur, the resource management process is at least partially sequential in nature. Furthermore, the model incorporates feedback loops allowing continuous adaptation for synchronization and fit with the environment. Thus, the management of resources is dynamic, with change resulting from adapting to environmental contingencies and from exploiting opportunities created by those contingencies. Then, Table 2 is presented to facilitate identification of and to help distinguish the processes noted in the resource management model.

Industry structure affects the degree of competitive rivalry and uncertainty. The extent of entry barriers in an industry affects the amount of competition a firm experiences (Porter, 1985). In turn, the degree of competition and the amount of rivalry it spawns create change that enhances the potential for uncertainty. However, industry recipes, which are the organizational routines necessary to compete in a particular industry, can moderate the extent to which the degree of competition and the amount of rivalry produce uncertainty. Industry recipes provide heuristics or decision rules that guide managerial actions. But as industry boundaries blur in the competitive landscape, industry recipes become less well-defined. Furthermore, industry recipes are not necessarily stable across different institutional and cultural environments (Wan and Hoskisson, 2003), and heightened competition in global markets has placed a premium on innovation in most industries (Bettis and Hitt, 1995). Innovations often make industry recipes less relevant, especially when they are radical and/or introduced frequently.

The external environment is always characterized with uncertainty (Khandwalla, 1970) and corporate performance can be optimally achieved if the organization can effectively respond to environmental uncertainty (Lawrence and Lorsch, 1967; Selancik, 1978). The uncertainty created by the environmental instability results in a lack of information necessary to identify and understand a causal relationship (Carpenter and Fredrickson, 2001; Keats and Hitt, 1988). A lack of information affects the way how a company should manage resources to create values. Eisenhardt (1989) reveals that in making a strategic decision, a leader who uses more information will require a shorter time to make the decision and this later can improve the company's performance.

**Table 2: Resource Management Processes and Distinctions (Simon, Hitt, and Ireland, 2007)**

Components/ Subprocesses	Description
Structuring	Refers to the management of the firm's resource portfolio
Acquiring	The process of purchasing resources from strategic factor markets
Accumulating	The process of developing resources internally
Divesting	The process of shedding firm-controlled resources
Bundling	Refers to the combining of firm resources to construct or alter capabilities
Stabilizing	The process of making minor incremental improvements to existing capabilities
Enriching	The process of extending current capabilities; although the degree of enrichment can vary, it extends beyond keeping skills up to date
Pioneering	The process of creating new capabilities with which to address the firm's competitive context
Leveraging	Refers to the application of a firm's capabilities to create value for customers and wealth for owners
Mobilizing	The process of identifying the capabilities needed to support capability configurations necessary to exploit opportunities in the market
Coordinating	The process of integrating identified capabilities into effective yet efficient capability configurations
Deploying	The process of physically using capability configurations to support a chosen leveraging strategy, which includes the resource advantage strategy, market opportunity strategy, or entrepreneurial strategy

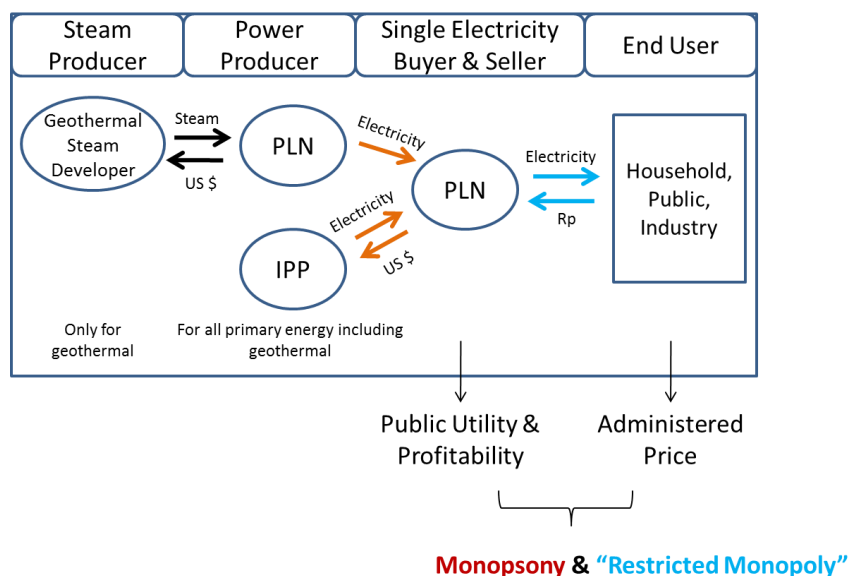
Besides that, Miles and Snow's strategic orientation provides description on environmental analysis and determination of the working attitude of an organization (Rajagopalan, 1996; Rogers and Bamford, 2002). The selection of the strategic orientation typology (strategic choice) is developed to reveal the company's preferred choice of strategic orientation as their response to environmental uncertainty (Segev, 1987; Moore, 2005; Hoque, 2004).

Furthermore, the processes of organizational analysis and learning from the internal or external environment, setting strategic direction, creating strategies, and implementing the strategies in an effort to satisfy stakeholders (Harrison, 2003) as well as managing relationships with stakeholders and managing resources to build competitive advantage to achieve the company's goals (Porter, 1988) are the essence of strategic management.

#### 4. ELECTRICITY INDUSTRY IN INDONESIA

Along with the enactment of the new electricity law in 2009, the role of PLN (state owned electricity company) as an electricity business authority holder (PKUK) turned into business permit holder (PIUPTL). PIUPTL is a license to engage business in supplying electricity to the public interest which includes power generation, power transmission, power distribution, and/or retail of electricity. This electricity supply business can be done in an integrated way by one business entities within one business area (Law 30/2009).

The role of private companies in the electricity sector as public utility is still in the generation of electricity. Meanwhile, businesses should be able to determine the selling price to the consumer based on the principle of monopoly. Hence, PLN is the only entity (single buyer) who buys electricity from independent power producers (IPP) and become monopsony market condition. This condition makes PLN as a company with restricted monopoly and monopsony as illustrated in Figure 2. Then IPPs do not have equal bargaining power in determining the price of electricity. This will certainly have an impact on a relatively long period of negotiations to agree on a price, such as the renegotiation process of Lahendong Geothermal Power Plant which takes about 2 years.



**Figure 2: Scheme of electricity business in Indonesia**

PLN institutional conditions are in line with the studies conducted Chang and Wu (2013) related to institutional constraints in industry development with the conclusion that industry requires integration between economic perspectives and institutional perspective.

According to Day (1991) and Heggstad (1977), the market structure of an industry significantly determines the level of competition, pricing, strategies and profits of the company. A market structure serves as consideration related to the environment in which the market operates (Yusgiantoro, 2000). The environment discusses the number of producers, the cost function, the profit function, and the constraints that prevent those producers to enter into an industry. A monopoly market structure in the electricity industry is influenced by the external environment that cannot be separated from the concept of Institutional Theory.

North (1990) defines institutions as the rules of the game among the society or, more formally, a tool used by humans as a limitation in the interactions among humans. This limitation can take a form as either formal rules (contract system, statute, regulations) or informal rules (conventions, beliefs, social norms and cultural norms) along with their enforcement rules that facilitate or shape the behavior of individuals or organizations within the community.

#### 4.1. Electricity shall be regarded as infrastructure or commodities

Grigg (1988) defines infrastructure as a physical system that provides transportation, irrigation, drainage, building, electrical, and other public facilities, which are required to meet basic human needs both social needs and economic needs. This understanding refers to the infrastructure as a system within a system that is inseparable from each other.

Thereby, the development of infrastructure on a system would be a basic requirement in the existing activities in an area that is connected with social systems, economic systems, and environmental systems. Moreover, availability of infrastructure will improve people's access to resources; improve the efficiency and productivity that led to the economic development of a region.

Concerning the electricity as infrastructure, it was over a social function to be provided to support the government. However, when connected with the company also serves as corporations; electricity will be the commodities start by taking into account the sale in stages originally. Finally, as a commodity as well as infrastructure, it has an important role for the economic development of a country. Based on the data from World Energy Outlook- IEA, low-growing GDP of a country means low electricity consumption per capita. This shows that the growth of the economy moving fine if supported by the availability of electricity consumption (Mochtar, 2010). PLN manages electricity infrastructure on a really unique archipelago country from Sabang to Merauke. Because of that, as a developing country, Indonesia should consider electricity for rural infrastructure. Thus, as of electricity will be able to promote investment, and to stimulate the economy thought industry development. One of the country's success stories is that china's development of electricity and starting to build the infrastructure.

Decision-making by an organization is incremental, intertwined and influenced by contextual factors (content-objective) and psychological factors (Das, 1986; March, 1981; Neustadt & May, 1986; Quinn, 1980; Bateman & Zeit haml, 1989), performed by the managers, not the organization, in response to changes in environment (Child, 1972). The process of decision making in organizations is complex and influenced by a variety of aspects (Hitt & Tyler, 1991; Eisenhardt & Zbaracki, 1992).

Meanwhile, according to Ami and Schoemaker (1993), decision-making performed by top management deals with: (1) uncertainty, which among others is resulted from rapid changes in the economy, industries, regulation, social and technological environment, the behavior of competitors, as well as changes in customer preferences; (2) complexity, which is associated with relationships and causes that make up the corporate environment, interactions in the competition and differences in the perception to perceive the environment; and (3) intraorganizational conflicts between decision makers and parties affected by decision that often lead to a conflict.

#### **4.2. PLN become restricted monopoly enterprise on electricity supply**

The objectives of establishing PLN are: (1) to provide electricity for the public interest while at the same time seeking profits according to the principles of corporate management; (2) to promote electricity supply in sufficient quantity and quality in order to improve the welfare and prosperity of the people fairly and equitably, encourage increased economic activity, and seek profits in order to finance the development of the supply of electricity to serve the needs of the community; (3) to pioneer the electricity supply business activities; (4) to run other businesses that support the electricity supply business in accordance with the legislation. (Government Regulation 23/1984).

Changes in the organizational form have given effect to PLN position in the supply of electricity in Indonesia. When as public state company (Perum), PLN is mandated to provide electricity infrastructure without thinking its operations should be profit or loss. However, the conditions change when PLN become a limited company, in addition assigned to provide electricity, PLN should also profit.

PLN whose purpose to make a profit and at the same time has task to meet the electricity needs is still faced with different objectives from 3 ministries. State Owned Enterprise Ministry focused on how PLN could achieve profit, the Ministry of Energy and Mineral Resources focuses on how the electricity needs available for public demand, and the Ministry of Finance focuses on controlling subsidy. This condition eventually should be compromised by PLN in order to balance of the three conflicting objectives.

The author argue that although the Ministry of State-Owned Enterprises serves as the Government's representative in their possession of PLN, it is also inevitable that their position and role and the position and role of the Ministry of Energy and Mineral Resources and the Ministry of Finance are in the same level of governmental structure with different performance measures. So, based on the dilemma in the performance achievement with what PLN is confronted against the goals of the Government as a shareholder as a whole, the author assume that the responsibility of PLN cannot be separated from the responsibility of the Ministry of State-Owned Enterprises, the Ministry of Energy and Mineral Resources and the Ministry of Finance or it can be concluded that PLN has 3 masters under 1 shareholder.

In connection with PLN, the principal refers to the Government (the state) as a shareholder, while the agent refers to the director board of PLN and PLN itself is a state-owned enterprise that is completely owned by the 'state'. The state in this context can be interpreted very widely, although it has been represented by the Ministry of State-Owned Enterprises as a shareholder. The management of state-owned enterprises is done using the concept of stakeholder economy, i.e. company should have responsibility for a number of interested parties (stakeholders), including shareholders, employees, creditors, communities, and so on (Wheelen and Hunger, 2000).

In line with the Agency Theory (Jensen and Meckling, 1979) with the concept of the relationship between the principal and the agent, it is defined that shareholders serve as the principal while the management as an agent. The management is contracted by the shareholders to work for the interests of the shareholders and given partial authority to make decisions for the best interests of the shareholders. On the contrary, the management shall be accountable for all its actions to shareholders.

There are different views in providing the priority order electricity supply by PLN, namely: (1) group that puts a view to meet the electricity demand. This group will have the support of the people directly that led to the support of government. Therefore, the development of power plant tends to be sporadic. The views of this group look, even though PLN serves as entrepreneurs as regulation after 2009, but it still has role as a state enterprise to meet the electricity demand. Then, for financial matters in this case is subsidy entirely the responsibility of the state; (2) group looked at PLN as a corporation as its goal. The group is very concerned with the financial health of the company that also has an impact on controlling the amount of subsidy. The views of this group tend to look PLN as a purely business player who have the same position as other business players. Therefore, power plant development activities tend to be well planned in order to achieve long-term security of electricity supply, even though within the construction, the people will criticized PLN because there will be a transition period with the risk of blackout until the operation of new power plants.

The monopoly company aims to maximize profit, but not to maximize price. In the case of the Ministry of Energy and Mineral Resources knows that PLN as a monopoly, then the goal should be to maximize services. However, it would be a debate if PLN rents diesel power plant to maximize services. The subsidy becomes greater for operating costs than investment cost. Meanwhile PLN would obtain asset if given investment subsidy.

#### **4.3. Dilemma in electricity tariff and subsidy**

Basic electricity tariff is selling electricity rates set by the government based on the approval of the House of Representatives (DPR) for each group of customers. The government provides subsidy to the customers which the tariff is still lower than cost of supply.

The components that affect costs of electricity supply, i.e.: (1) the purchase of electricity as well as rental of power plant; (2) fuel cost consisting: fuel oil, natural gas, geothermal, coal, oil, lubricants, surface water; (3) maintenance cost; (4) personnel cost; (5) administrative costs; (6) depreciation on operating assets; and (7) interest expense and finance (PMK 170/2013). Meanwhile, the fuel cost has the largest share of all costs which is about 65.3% in 2013 (DGE, 2014).

In this context, electricity subsidy granted as compensation because the government does not allow PLN to raise basic electricity tariff, whereas the applicable tariff is not sufficient to cover the cost of supply. Having received proposals from PLN of electricity subsidy, MEMR evaluates and delivers the amount of subsidy to the Finance Minister as proposed in order to preparation of compilation draft of state budget and its changes that will be discussed and get an approval of the House of Representatives.

#### 4.4. Options for IPP Selling Electricity to PLN

The role of private enterprises in electricity supply is limited to power generation systems through the projects of IPPs (Independent Power Producers), in which the generated electrical energy is sold to PLN. Then PLN subsequently distributes the electricity to end-users of electricity. There are also private entities that build power plants for its own purpose, for examples, for the purposes of factories, hotels, and so on as well as provide electricity supply through *the isolated exclusive right* (not using the network owned by PLN) and sell the excess of their electricity supply to PLN through Power Purchase Agreement (PPA) as what PT Cikarang Listrindo does.

Private participation in power generation development plan by PLN can be through: (1) based on scheme of build-operate-own (BOO); (2) the entire production of its power to be sold to PLN and PLN should buy it; (3) the selling price of electricity from investors to PLN set by the government based on the results of negotiations both parties.

Considering the construction of electricity supply facilities are still insufficient, then the required acceleration program that intended to reduce fuel consumption significantly, to meet the growing demand for electricity, as well as to avoid the electricity supply crisis that occurred in some areas. Acceleration Program of 10,000 MW Phase I used coal plants (Presidential Decree 71/2006). Then proceed with Acceleration Program of 10,000 MW the Phase II that composition of primary energy usage was dominated by geothermal energy, water, and coal (Presidential Decree 4/2010).

To implement the projects, IPPs request government guarantee for PLN, a guarantee from the government over PLN ability to meet its financial obligations with respect to the risk of default of the payment, risk termination of the obligation to buy the project according to calculations based on the Power Purchase Agreement between PLN and private power developers. The guarantee will be issued by the Minister of Finance after evaluating proposals PLN.

#### 4.5. Concept of business area and power wheeling to enhance competitiveness of the electricity industry

Lately PLN's financial condition was compounded by obligation private power that become PLN's liability based on ISAK 8 (Interpretation of Financial Accounting Standards) accounting system, so that Power Purchase Agreement with IPP includes a lease agreement and impacts on the Debt Service Coverage Ratio (DSCR), Consolidated Interest Coverage Ratio (CICR) and other financial ratios. Therefore, as alternative in order to PLN no longer completely off-taker is prepared some schemes, namely: ownership of business areas, power wheeling, and excess power, thereby providing the opportunity for third party non-IPP to build and supply electricity.

The criteria of a business area are (PP 14/2012): (1) the proposed area not yet covered by existing holders of business areas; (2) the holder of an existing region not capable of providing electrical power or electric power distribution network with a level of quality and reliability; or (3) the holder of an existing business area to restore part or whole of its business area to the Minister. Furthermore, between business areas may cooperate in order to fulfill the obligation to supply electricity for its business area with the pattern of business to business.

Power wheeling is a joint utilization of the transmission network by the permit holder to supply power to particular load of owned by other parties; with paying the rent of transmission include the cost of reliability. The purpose of this scheme is in order to utilize optimally assets of transmission and distribution as one of the national asset, as well as speed up additional national generating capacity to support the growth of national economy. These options are opened on the basis of the limited PLN's investment ability and private companies can be more flexible in terms of getting permit.

### 5. DISCUSSION

Investments in the field of electricity require: (1) very long lead times that require system planning processes, pre-feasibility studies (such as: surveys, site investigation, identification of the primary energy sources, technical specifications), feasibility studies, permit, financing, procurement, signing the contract, construction and testing; (2) very long economic life that usually lasts for 30 years or more; and (3) very capital intensive, for examples the construction of geothermal power plants requires approximately US\$ 4 million per MW (Prasetyo, 2013).

In order to achieve the targetted growth of electricity supply primarily in terms of geothermal development, PLN should have similar plan and a view as the plan and view that the government has as its shareholder. The existing fact puts PLN in a difficult position to select power supply selection strategies because it is confronted with with a dilemma in the form of performance indicators from 3 ministries (Nugroho, 2005), namely: (1) the Ministry of State Enterprises, in which the KPIs consist of profitability and dividend, growth, equity (2) the Ministry of Finance, in which the KPIs consist of tax revenues, subsidies, and loans; and 3) the Ministry of Energy and Mineral Resources, in which the KPIs consist of electricity growth, the electricity base tariff, network losses and subsidies.

Furthermore, the implementation of the key performance indicators provided by the stakeholders clash even result in sectoral conflicts that are difficult to resolve although the technical mechanism related to the relationship among the Minister of State-Owned Enterprises and the Minister of Finance as well as the Sector Minister has been set accordance with the position and function of each ministry, i.e. the Minister of Finance as the financial manager of the state, the Minister of State-Owned Enterprises is appointed to represent the government as a shareholder, and the Sector Minister serves as a regulator.

There are different view on party responsible for electricity supply in Indonesia, i.e.:(1) group that agrees of electricity fulfillment to the people is the responsibility of the government, and (2) group that assumes although regulation mention as a responsibility of government, while the other article in that regulation said that government shall designate PLN in conditions there is no other business entity interested, so that PLN could not slip away within national electricity supply business.

PLN has two opposing sides of roles, i.e. business-oriented and socially-oriented. From the business aspect, PLN should be able to run a business to generate profits. In fact, the electricity base tariff that serves as one of the main sources of income for PLN is determined with the approval of the Government and the House of Representatives. From the social aspect, PLN is expected to continue to assist the people of Indonesia who have not had access to electricity by the power distribution network expansion and the added capacity of power generation although these attempts are not necessarily financially lucrative (Koerniadipoera *et al.*, 2010).

Understanding of the institution through cognitive support (Scott, 1995; Peng & Heath, 1996) gets different response to the responsible party in electricity supply. This is possible since liability of the state in the supply electricity is mentioned separately with government liability to assign SOE (PLN) if no one can supply electricity in a region (Law 30/2009). Therefore, this raises an ambiguous meaning and of course would increase uncertainty in the society (North, 1990) within fulfillment of demand for electricity for the public interest.

This condition is in line with Shirley (1983) and Kikeri *et al.* (1994) which concluded that the general problem of public companies, i.e.: (1) have many goals or conflicting (social and economic); (2) bureaucratic interference; (3) excessive centralization of decision-making; (4) lack of capitalization; (5) lack of managerial skills; and (6) excessive personnel costs. In reality, SOEs get much bureaucracy and political intervention that making ineffective principal-agent relation. Replacement of directors may occur due to non-corporate intervention, such as: politics, bureaucracy, interest groups and even public intervention. Problems that occur are too complex, many institutions that influence the decision of shareholders (Prasentiantono, 2003).

The excessive government intervention would weaken the competitive position of SOEs in the market. Generally form of intervention to SOEs more pragmatic than an ideological in the interests of the company in the long term (Glade, 1991; Cowan, 1990; Savas, 2000). Therefore, the SOEs apply multiple controls; determination of the control factor refers to aspects of an SOE resource dependency on the state, political visibility, characteristics such as firm size and performance, competition and the uncertainty of demand (Lioukas *et al.*, 1993).

Considering the structure of the electricity industry in the Indonesian market, bargaining power of the suppliers of primary energy sources becomes weak because there is only one single buyer who buy their products, i.e. PLN. Private Parties have the courage to propose long-term power purchase contracts in foreign currency denominations since: (1) the magnitude of the urgency to pursue growth in load demands according to the supply-demand forecast, (2) strong foreign parties lobbying the government, (3) the inability of PLN to meet electricity generation on its own funding (Christiana, 2003).

Based on the strategic choice perspective, corporate managers should assess the corporate environment, formulate strategies and implement the chosen strategy (Child, 1972; Staber and Sydow, 2002). Economic institutions can affect the strategic choice (Reger *et al.*, 1992). Several aspects of the economic institutions that affect the strategic choice are the structure of the market (North, 1990), exploitation policy, property rights, governmental regulation, investment freedom (Cuervo and Villalonga, 2000; Peng and Health, 1996).

According to Wooten and Hoffman (2008) in relation to the Institutional Theory, sources of organizational actions serve as an exogeny to the organization itself. Environment is not only seen as a source of contingency and obstacles that require an organization to adapt to them in a rational manner, but as a socially-constructed context that prepares the initial decision-making process of the organization itself (Scott, 2001). Moreover, the presence of strategic leadership, an organization can make a decision for its short-term success and long-term sustainability amidst market changes and demands (Rowe, 2001).

The purchase certainty of electricity generated from geothermal energy by PLN is a crucial factor in initiating investments after the auction of the work areas and before starting exploration activities. The structure of the electricity market in Indonesia consists of monopoly and monopsony. This is the key differentiator of geothermal energy utilization in other countries such as the United States, New Zealand, and Japan, where the structure of the electrical market is in a state of perfect competition with the price level determined by the market.

To select sources of primary energy supply, PLN refers to the least cost. In 2009, the Ministry of Finance in cooperation with JICA conducted a study related to acceleration of the development of geothermal energy with the calculation results of the electricity price amounted to US\$ 8.2 cents/kWh for coal power plants and US\$ 11.9 cents/kWh for geothermal power plants without considering environmental factors from the reduction of greenhouse gas emissions. On the other hand, PLN rents a diesel generator to meet electricity needs and achieve the target of electrification in which the cost of diesel power plants reaches US\$ 35 cents/kWh. This raises a paradox in the resource selection decisions.

Moreover, learning from accelerating program 10,000 MW phase I, the price of electricity from coal power plant is around US\$ 7 cents/kWh, while the electricity price from geothermal power plant approximately US\$ 10 cents/kWh. However when the operating and maintenance costs are calculated according to the contract of 30 years, the coal power plant that using Chinese technology must be ensured not more expensive than electricity price from geothermal power plants.

Geothermal energy is a renewable energy source that is very feasible to develop to meet energy supply for power generation. Geothermal energy has the highest reliability of other renewable energy sources indicated by the plant capacity factor (JICA, 2007), namely 80-100% for geothermal energy, 30-60% for hydropower, 20-30% for wind power, and 10% for solar power. In addition, geothermal energy is environmentally friendly energy. It is also local energy spreading all over the areas of Indonesia. But on the other hand, geothermal energy cannot be transported (as what can be done to petroleum, natural gas, coal) and this affects the construction of the generator that must be built on site where the geothermal resources are found.

Indonesia has the largest geothermal energy potential all over the world (IEA, 2010), but its use remains less than 5%. Geothermal development in Indonesia from 1980 - 2013 only generates installed capacity of geothermal power plants by 1,343.5 MW.



## 6. CONCLUSIONS

Along with the enactment of the new electricity law in 2009, the role of PLN as an electricity business authority holder (PKUK) turned into business permit holder (PIUPTL) that engage business in supplying electricity to the public interest which includes generation, transmission, distribution, and retail of electricity. This electricity supply business has to be done in an integrated way by one business entities within one business area (Law 30/2009). Then, the role of private companies in the electricity sector as public utility is still in the generation of electricity. Meanwhile, businesses should be able to determine the selling price to the consumer based on the principle of monopoly.

The strategic decision-making on electricity supply by PLN cannot be separated from the position of the company. PLN performs electricity supply business to the public at the price that is determined by the Government while on the upstream side, PLN has primary energy supply in accordance with the market price.

In the planning stage, PLN implements least cost planning. Meanwhile on the operation stage, PLN has to deliver electricity at any cost. To create long run marginal cost of electricity supply, power plants development has to be followed by industrial growth. Then, PLN chooses the least cost according to type of load, so geothermal compared with coal. Because geothermal price is higher, PLN will receive an assignment from the government. In relation with the advancement of technology, there is possibility to develop geothermal binary power plant as a peaker plant.

In electricity supply industry, the investment decision made today will give impact to the economics of electricity systems for many years to come. What about the commitment to the planning when management team has been replaced less than 5 years.

There are possibilities that can be done beside scheme of independent power producer, namely: ownership of business area and power wheeling scheme. These schemes emphasize cooperation among PIUPTL as well as between industry and PIUPTL.

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