Provision and distribution of electrical energy to consumers in the context of decentralized electricity market can no longer be viewed from a purely technical aspect but also from the aspect of management, legal and even socio-economic aspects of society. This is due to the strong correlation between these aspects in the electrical energy production. The technical aspects include the high reliability and quality of generation, transmission and distribution of electric power systems. High reliability associated with the high level of continuity of electric supply to customers by means of low level of power outages in certain periods. Meanwhile, customer expectations are high quality power supply, including voltage and frequency limits of power within defined standards. In the end, customers are not too concerned about technical matters, but it is important that electrical equipment can be operated without experiencing significant disruption within affordable electricity prices.

**Keywords:** Academic Study, Energy Crisis, Gas Supply, Energy Management

I. INTRODUCTION

Electricity energy services with high reliability will certainly have an impact on increasing the degree of socio-economic conditions. A sense of comfort and peace of the community during night time will be obtained if the electricity supply continues to be available to customers. The point here is that the electricity will make the daily activities of people go smoothly and consequently the economic growth and social development. In comparison, if the frequent power outages occur, it would appear the customer dissatisfaction and this problem is compounded by the absence of compensation as results of power outage. Social upheaval and unrest in society will be very prone to appear and ultimately have negative impacts on economic activity [Eka Budianti, 2014].

Aspects of management in an electricity generation has more to do with the process of setting efficiency and coordination between the financial and technical aspects.

Economical cost considerations in determining the flow electricity production and maintenance schedules of equipment ranging from generation site to customers to be part of the management aspects. Likewise, the use of resource-efficient and effective management is the part of operational targets. These factors are particularly relevant to low electrical energy generation costs, including the selection of the type of generator and energy sources for electricity generation. In a broader scale, the management aspects caps a determination setting electricity rates based on the cost of power generation and the ability of customers to pay for electricity [Wayne C. Turner & Steve Doty, 2007].

Legal aspects also play a powerful role in ensuring the generation process and the availability of electrical energy in the context of electricity market deregulation. Single electric power generation company is certainly not able to meet all of the elements related to electricity energy production. Surely there are other companies who support the other implementation of the whole process. For example, there are other companies that act as the primary energy provider or there is another party to buy the portion of the electrical energy that has been raised with the specific agreed price and volume. All the mechanisms mentioned here runs associated with the contract to guarantee the availability of primary energy supply and the portion sale of electricity to customers. Whose name a contract, there are clauses that have been agreed upon by both parties and there is a penalty or compensation that must be paid if in case there are those who are not able to meet its obligations.

If all technical aspects, management, law go smoothly in a electricity supply system, the customers will get electricity power supply. In this case, the electrical authority having power generation capacity or availability of the generator exceeds the customer's peak load capacity. The fulfillment of contract regarding the ability of primary energy supply by a partner company in accordance with the volume and the price agreed upon. This will impact on the purchasing power rates in specified tariff which may be lower than the national standard electricity tariff. The level of customer satisfaction will be created automatically when a high reliability of electricity supply is characterized by low level of power outages with an affordable price of electricity [Kementerian ESDM, 2012].

Electricity energy crisis in Tarakan Island because there are one of aspects mentioned above are not running properly. Based on information obtained during the survey and data collection on site, the total capacity of the generator for the generation of electrical energy which is owned by PT PLN Tarakan; local providers of electricity in Tarakan Island is about 69MW which
is dominated by gas power plants and is supported by back-up diesel generators as peak shaving generation. The generation capacity is almost 2 times the peak load ranging from 33-35 MW, which means that generators are able to serve a total capacity of electricity customers under normal load condition.

At glance, the problems arises when PT MEDCO who became a partner company for gas fuel provider claims not able to provide the volume of gas in accordance with the agreed contract i.e 5 MMBTU for reasons of force major based on company geological survey. Consequently, PT MEDCO only able to supply approximately 0.2 MMBTU of gas for electricity generation, which means that there is a deficit of about 4.8 MMBTU of gas supply which is equivalent to 19.2 MW of customers who did not get a supply of electricity energy on the island. This is compounded because there is no mention of a penalty or compensation if PT MEDCO is unable to meet its obligations. It is supposed be PT PLN Tarakan has strong pressure to PT MEDCO in the preparation of this cooperation contract. If there is a mechanism for compensation, then the power crisis will not happen because this compensation could be used for the purchase of diesel fuel to support operation of diesel power plants owned by PT PLN Tarakan.

As results, most customers do not receive electricity energy, prone to customer dissatisfaction because so far they are spoiled with the adequacy of the supply of electrical energy at lower rate than the national electricity rates. Public distrust point to the Local Government and PT PLN Tarakan Tarakan associated with the handling of the electricity crisis. Most people assume that the local government is unable to provide good policy which leads to the electricity crisis management solutions. While others believe that PT PLN Tarakan is not able to work well to cover the shortfall of electricity supply. Most of people voicing that PT PLN Tarakan is returned to PT PLN (Persero) with the reason the central government may not ignore the island without electricity supply which incidentally the island is the northern boundary of Indonesia. However, others have remained rational thinking that the concept of privatization is still able to run normally by doing some basic electricity tariff adjustments based on the cost of generating energy in accordance with the current financial conditions.

II. THE CAUSES OF ELECTRICITY ENERGY CRISIS

Based on survey site, the condition of electricity supply in Tarakan island, the main cause of energy crisis can be generalized into two problems, namely the availability of primary energy and electricity price which is claimed to be far lower than the national electricity rates. The lack of primary energy in this case is the reduction in gas supply to PT PLN Tarakan results in decreasing the capacity of the generation capacity. The majority impact in customer’s site is the frequent black out indicated by lack of electricity supply. On the other hand, the low electricity price is the factor of reducing the volume of electricity energy production, especially if the power plants dominated by diesel engine.

The main cause of primary energy shortages to PT PLN Tarakan begins with the inability of PT MEDCO to supply gas energy in accordance with the volume price stated in the contract. The force major claimed by PT MEDCO is unilaterally performed through geological survey. The force major conditions are used as a benchmark in the contract that with this condition, PT MEDCO not be liable to a penalty. In effect, the gas supply from PT MEDCO to PT PLN Tarakan decreased from 5 to 0.3 MMBTU which is equivalent to a deficit of electric power of 19.2 MW. As results, the automatic rolling blackouts were frequent. For now, the conditions of energy deficit by 5 MMBTU covered by the supply of PT Pertamina EP Bunyu so that power outages can be minimized and be focused on continous electrical to household.

There is an interesting point to observe when PT MEDCO unable to meet contractual obligations to supply gas to PT PLN Tarakan. At the beginning of the contract period, the capability of gas production reaches up to 20 MMBTU; therefore no electrical problems. Over time, gas production decreased dramatically to 5 MMBTU and reached the minimum point during the first period of the second contract in January 2012 when the gas production plunged to 0.3 MMBTU. There are oddities in this condition because in the same period, the oil production of PT increased dramatically. It can be pointed out that the target of drilling operations of PT MEDCO switch from gas to oil because at this time the oil price rose sharply from Rp. 6000, - per liter (2010) to Rp.12.200, - per liter (2013). Based on this information the geological drilling is validated refers to layers, where the gas is located the first layer followed by oil and other minerals in the next layers. Therefore, the drilling pipe of PT MEDCO actually leaves the gas zone to get petroleum. Then, it makes sense that the gas volume obtained from drilling results declined sharply, while oil increased dramatically. Thus, the claim of PT MEDCO about decrease in gas volume from geological drilling results is still questionable. There must be an independent team from PT PLN Tarakan to investigate and verify this condition because it is the part of of the gas supply contract clause.

Another thing that deserves attention is during the PT MEDCO only able to supply 0.3 MMBTU to PT PLN Tarakan, there is a new gas supply contract in January 2012 between PT PLN Tarakan and Borneo Manhattan Investment, PTE, LTD or (ICM) of about 5 MMBTU. In this contract, PT ICM is able to provide a supply of gas by 5 MMBTU. But until now, this gas supply contract is not realized yet. Based on the timeline events, there seems to be agreement between PT MEDCO and PT ICM regarding the gas supply deficit that can not be fulfilled PT MEDCO and later replaced by PT MKI. Furthermore, it is impossible for PT ICM as a new investor to be able to supply gas at same price equal to PT MEDCO earlier with reference to the costs incurred drilling. In addition, PT ICM using most gas pipeline which is actually owned by PT MEDCO. Further investigation by an independent team needed to examine this issue.

Apart from these two issues raised above, the electricity crisis in Tarakan island not have happened if there was a sense of caring from PT MEDCO to the city of Tarakan and PT ICM really able to supply gas to PT PLN Tarakan on time. It does not matter that the orientation of the drilling by PT MEDCO switch from gas to oil.
Nevertheless, oil can be subsidized to diesel engine in PT PLN Tarakan. This of course can cover the shortage of supply of electrical power to people with by operating the diesel engine. With the subsidy models are implemented, there is a significant strengthening of the corporate social responsibility (CSR) from PT MEDCO. In this study, it is suggested that the CSR program of PT MEDCO needs to be renewed focusing on provision electrical energy to help the surrounding community. Meanwhile, regarding to the gas supply from PT MKI, the electricity crisis in Tarakan will not occur if delay in supply of gas in absence because all generators fueled gas owned by PT PLN can still operate.

Other causes of energy crisis is the price of electricity is too low so it is not able to cover the operating costs of generation PT PLN Tarakan. Based on data from PT PLN Tarakan, the price of electricity to PT PLN Tarakan far below the national electricity tariffs for almost all categories of electric customers. As initial overview, the cost of generating electricity using diesel engine is about Rp4000,- while the electricity is sold to customers ranging from Rp500,- to Rp1300,-. This value is calculated at the moment there has been no increase in the price of diesel fuel. The consideration of inflation for goods/services increasing from 6.96% in 2010 to 10.35% in 2013, while there has been no tariff adjustments at all. The problem becomes greater when the government raised the price of diesel fuel into the range of Rp.12,700,- while there is no change in electricity rates results in a big loss for PT PLN Tarakan if they operate a diesel generator. In this case, PT PLN Tarakan has diesel engine with similar capabilities 4 MMBTU (approximately 16 MW capacities). However, it should be noted that diesel engine is only used for peak shaving or operated at the time of peak load.

III. EFFECTS OF ELECTRICITY ENERGY CRISIS

Muddle of social problems in society arise when the frequency of rolling blackouts during peak load periods. It can not be avoided because of the ability PT PLN Tarakan to supply the base load only in the range of 20 MW. The ironic point is while enormous public expectations as they have spoiled the abundant supply of electric energy. Almost every time, demonstration demanding the improvement performance of PT PLN Tarakan continues and a peak riot occurred in March 2013. Meanwhile, emerging feelings of mutual suspicion between PT PLN Tarakan and local government (LG) about who is responsible for the problem of this energy crisis. The LG disbelieve that PT PLN Tarakan losses on the basis of the current electricity tariff refers to the lifestyle of employees compared to other company employees. Oppositely, PT PLN Tarakan claims that they can survive because of cross subsidy from the management center in the form of shareholder growth and bond issuance by considering interest, taxes and other cash flows.

On the other hand, PT PLN Tarakan view that local government does not wholeheartedly handle electrical problems in Tarakan. This was evidenced by the time when LG cannot facilitate the land acquisition funds for 4x7 MW power plants. In addition, the agreement on the responsibility of purchasing diesel fuel by LG of Tarakan can not be realized for the reason of PT PLN Tarakan is private so it can not receive government subsidies following the rules of law. Meanwhile, PT PLN Tarakan also considered the LG giving more priority and wider access to PERUSDA to build power plant with capacity of 2x15 MW.

Apart from all causes and the polemic of energy crisis in Tarakan, the efforts from all stakeholders are required to work together to think the solution to do in the most rational thing. Academic study results provide a number of recommendations for all stakeholders so that issues/crisis can be resolved and similar events in the future does not happen again. In this academic study, it is not important to find who is most responsible for the problems of energy crisis on the island of Tarakan. However, the solutions and recommendations to solve the energy crisis problem becomes the most urgent. Solutions short, medium and long will be the target of the study is accompanied by positive and negative implications of all the recommendations given.

IV. THE EFFECTIVENESS PROBLEM SOLUTIONS

Effectiveness of problem solutions related to unreliability of electric energy supply in Tarakan island is affected by the clarity of identification problem and the main cause. In conjunction with this approach, the identification of problems is used through brain-storming and interviews with stakeholders of electricity in Tarakan and secondary data analysis. Brain-storming activities have been carried out by discussion and exposure along the City Government of Tarakan, Tarakan City Council, PT MEDCO E & P, PT Pertamina EP Tarakan, PT PLN Tarakan, Tarakan City PERUSDA and the Electrical Contractors Association of Indonesia (AKLI). The method of analysis used is based decision analytic methods Hierarcy process (AHP) which covers aspects of electrical system reliability, pricing, social, economic, financial and legal. In consideration of these aspects of the academic study can provide recommendations if the supply of electricity back to PT PLN (Persero) or remained with the PT PLN Tarakan.

One option is the electricity management handed back to PT PLN (Persero) due to the growing in Tarakan city community. This is supported by reason of priority regions and the time required is not too long because of the location of the area which is the northern border of Indonesia, so that the government would seek to quickly supply of electrical energy as it relates to national pride. However, this does not necessarily solve the problems of the electricity crisis quickly. A number of reasons such as the formation of PT PLN Tarakan it under the provisions of the Decree of State Minister for Investment and

Development of State-Owned Enterprises No. S-392 / MBU / 2003 so that the dissolution of the company will take a long time; it will also make difficulty in the management and long bureaucracy. The effects can be long outage because the system must be initially started, where PT PLN Tarakan must go first and the local government taken care of all the administration. Consequently, electric rates will be automatically much higher than current rates because it would follow national rates, so the
solution to go back to PT PLN (Persero) will create a public panic. Likewise, the return to PT PLN (Persero), does not necessarily solve the problem of electricity in Tarakan city, considering the many problems faced by PT PLN (Persero) in Indonesia is marked with the number of power outages in some areas in Indonesia [LPPM-UNHAS, 2014].

V. CONCLUSION

Academic study of electricity crisis in Tarakan can provide alternative solutions to problems related to primary energy supply chain system. The study is effective in supporting the reliability of the electricity supply system in Tarakan city, the energy sustainability, rationalization of regional electricity tariff recommendations and the effectiveness of recommendation status of PT PLN Tarakan. Thus, a target that the energy supplies to customers should remain normal in terms of improving the legal status and good management of the electricity system.

REFERENCES: