BUSINESS LIFE CYCLE OF BIOMASS POWER GENERATION PROJECT: A TRANSFORMATION FROM CUSTOMER NEEDS TO SYSTEM SOLUTION

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Abstract

The emissions of nitrous oxides (NOx) from diesel generation or carbon dioxide (CO2)from coal power generation have caused more pollution, while the price of carbon footprint is increasing every day. Biomass power generation seems to be good option for Thailand and ASEAN countries because of abundance of raw material for biomass power production. CLMV countries, Indonesia and Thailand have faced the problem since they do not have technology, experts, and sufficient capital for biomass power generation project. All technologies are imported from Europe and Japan. This research intends to investigate the problems of the business life cycle of biomass power generation, to understand the transformation of customer needs (project owner) to power plant system solution, the researcher was conducted in-depth interview with 4 parties (triangular approach) owners, regulators, investors, and implementers. The research results reveal 4 models of biomass power generation that help project owner to pursue the project financial and technology source e.g. financial project, building operation and transfer (BOT), supplier credit, and joint venture.

Keywords: *Business life cycle, Biomass power generation, Financial project, BOT, Supplier credit*

INTRODUCTION

Biomass power plant generation industry in CLMV countries, Indonesia and Thailand were facing the lack of skilled labors who specialize in biomass technology Moreover, capital investment activity in this industry remains an obstacle for industry competition.

Factor conditions in market showed that the biomass resources in CLMV Indonesia and Thailand were the source of inputs that have high potential for creating competitive advantage of the business. These included freedom of movement of skilled workers entering the AEC considered the standards of skilled workers by using the ability of advance technology to be guidelines for alternative energy in the future.

The demand conditions revealed that the enhancing of quality of life in Asia caused the economy grew rapidly. At the same time the demand for energy was increasing also.

The context of firms strategy and rivalry revealed that the AEC will help foster the growth in trade and investment. In order that relocation or expansion strategy to neighboring countries such as Malaysia was advantages in terms of natural resources, price inputs and international trade distribution which were supported by any policies include AEC policies, investment promotion policies and Feed-in Tariff system.

Related and supporting industries revealed that the industry was completed of cooperation in term of strategy, market competition and market structure

The research results reveal 4 models of biomass power generation that help project owner to pursue the project financial and technology source e.g. financial project, building operation and transfer (BOT), supplier credit, and joint venture.

RESEARCH OBJECTIVE

To study the problems of life cycle of biomass power productionbusiness in terms of business environment of the biomass power plant in CLMV countries, Indonesia and Thailand.

Research Methodology

This study is a survey research which the details of research methodology are as follows.

Target PopulationTarget population in this research can be classified into four groups. For the investment in biomass power plant, thereare power plant operators, public, investors and developers.

Research ToolThis research usedin-depth interview by interviewing the samples. It was an interview between researcher and all 4 groups of samples by in-depth interview in order to find out the answers thoroughly. The samples will explain and give reasons relating to biomass power plant.

Data Analysis

This research has defined a methodology for data analysis classified by purpose of the research as follows.

To study the situation on business environment of biomass power plant, a study of business environment of biomass power plant will be done based on Diamond Model of Michael E. Porter.

To study the supporting factors and obstacles affecting the implementation and development of a biomass power plant investment, and solution guidelines and investment form,will be done by taking data obtained from in-depth interviews of samples to summarize into categories to examine the contents of the answer on various issues.

RESULT AND DISCUSSION

Overview of the cycle of electricity generation from biomass industry by evaluating and analyzing, and linking to see the true potential, strengths and weaknesses of the industry by focusing on the impact of the implementation of the government on creating an atmosphere that will encourage or impede the competitiveness of businesses and industry through the 4 sides of the Diamond Model can be summarized as follows.

Assessing Business Environment

Factor Conditions, Biomass resources of CLMV countries, Indonesia and Thailand are therefore the sources of inputs that have high potential for creating competitive advantage of the business because it is the biomass sources that are diverse and can be used as fuel in the power generation. Most biomass resources are from palm oil, wood and agro-industries. Because havinga space of large palm plantations, hence biomass resources which are agricultural leftover material are sufficient in quantity to be used as fuel to produce electricity continuously and efficiently. Nevertheless, the rest of palm oil was accounted for the largest volume of waste biomass in the country, readily available and has not been fully implemented. Furthermore, sine ASEAN is a main source of palm oil supplies of the world. If in the future after stepping into the ASEAN Economic Community which has CLMV countries, Indonesia and Thailand are the major manufacturers will be a key factor making natural resources of CLMV countries, Indonesia and Thailand have the potential to produce higher than Thailand. While, the biomass used in the present in Thailand including rice husk, bagasse, wood chips, rubber tree, palm kernel shell, and palm fibre were partially used to almost done such as using as a fuel for the production of agricultural industry and be sold as fuel for factories in the nearby areas, as well as some biomass has been already deployed to production such as rice husk is used to produce steam and then drive turbines used in rice mills. Bagasse and palm residue will be burned to produce steam, electricity and to drive a steam engine in the production process. The scrap of rubber treewill be burned to produce heat for drying wood and so on.

In addition,in the present, the operators in Thailand are experiencing problems and difficulties of managing biomass fuel to produce electricity from the uncertainty of the amount of fuel which is not enough to be used to produce electricity, particularly in the northeast and central regions which arethe sources of country's agriculture. As a result, it is needed to find other type of fuel or from other sources, causing problems in transportation costs which are high-cost, and technology does not support, as well as the risk of rising fuel prices. Moreover, though there are some resources in the countrybothin the north and south of the country is not being fully utilized, but still facing the problem of rejection of the public, resulting in the development of investment opportunities in these industries are unlikely to be done.

However, the ability of science and technology in the production of electricity from biomass fuels in the presentis considered to be the most advanced that has a profound effect on capability development for competitive advantage. It is considered as thedetermination of the use of energy of the country in the future which is considered that the biomass is an alternative fuel that has a long future.Currently, there are the production of heat and electricity using biomass as a fuel widely. This will range from small to power plant level by turning biomass into energy by a chemical-heat process and direct-fired by producing energy from biomass fuel combustion system directly by burning biomass fuel directly. The boiler which produced steam will be used to spin a turbine connected to a generator to make electricity. It can also be designed to take the steam through a Condensing Turbine to be utilized in the form of heat which producing steam and electricity together is called Cogeneration which is the most efficient use of fuel. The study found that technological capabilities of such technologies, Thailand is higher than CLMV countries and Indonesia, compared to the production capacity installed in the country which there are a lot. Sincethe energy production from biomass technology is quite complicated and needs to rely on the observation in the specific issues arise during the operation so that the system can run power production continuously and get the energy value power as defined. However, due to the promotion of biomass energy production in CLMV countries and Indonesia still lack the knowledge and expertise in technologies in responsible and maintaining the system. As a result, the system was damaged and not workable, and caused the attitude of using biomass to produce energy that it wastoo cumbersome. Moreover, in the present CLMV countries and Indonesia also have problems with ashes which contain alkalinecausing slag and agglomeration, making water pipe in the boiler is damaged.If it is the ash, it will look like delicate sand, causing corrosion. Therefore, the implementation of appropriate technology from Thailand to convey is considered an opportunity to expand business opportunities which can help solve technology problems that CLMV countries, Indonesia and Thailand are experiencing in the production of electricity from biomass industry.

Demand Conditions, Same as in Thailand, a rapid growth of Thai economy has caused the use of electricity increased dramatically which requires a tremendous amount of investment to support the demand. To obtain the lowest cost of capital is a key factor which is the first factor of the electricity supply. The second factor is the effective operation and improving its own competitiveness compared to internationally. The study found that currently ASEAN has energy consumption increased by an average of 4.4% per year, but ASEAN has oil demand over the capacity itself to produce. When analyzing trends from current conditions, it is expected that in2030, ASEAN will not be able to rely on themselves in terms of oil and natural gas anymore. Therefore, ASEAN must turn to focus on clean energy development that does not cause pollution of nature around us and is not exhaustive in order to be the solution to the problem of pollution and the depletion of fossil energy with support for alternative energy policy.

In summary, the investment in electricity generation from biomass in ASEAN region ishigh-growing.Choosing to invest in CLMV countries, Indonesia and Thailand should take into account the potential of biomass production as the key. However, biomass is considered as the technology that is accepted and readily available particularly those agribusiness enterprises with goshawk, sugarcane, coconut, rice, palm or pastures as its capital and be able to manage the fuel supply throughout the year particularly palm oil which is most interesting and tends to grow more to replace fossil fuels in electricity production system in the future.

Context for Firm Strategy, Structure and Rivalry, Environment with increased competition is a factor driven businesses needed to improve their efficiency by focusing on efficient use of inputs and creating value added of products and services by creating more innovation. This will make the industry stronger and more competitive in the end. The economic integration of ASEAN in the field of energy is important to produce a planning collaboration, including determining the policies to create energy security in the region such as ASEAN energy network. Pushing member countries to the goal of reducing energy consumption in the region and increasing the proportion of renewable energy in electricity production and etc, any action that happened will be binding on member countries. This is considered an opportunity and a challenge for Thailand as one of the five founding members of ASEAN and origin of ASEAN which will have the important roles and cooperate actively in the implementation of energy of the ASEAN Community.All energy planning is to prepare the readiness of energy that is fluctuates over time which will strengthen energy security for the country in ASEAN in order to have enough energy to use in the future. Therefore, adapting to the competition under competitive environment with more globalized competition to maintain and strengthen the competitive advantage is to move or expand production base to neighbouring countries with the advantage of the natural resources. Prices of inputs and international trade channel are considered important step for getting into ASEAN Economics Community (AEC) in order to reach a much larger market. Besides, the advantage of its geographic location has caused the Thai operator to move manufacturing base to link economic with neighbouring countries to support the entry into ASEAN Economics Community (AEC).

Therefore, formulating key strategy to enter the international markets of Thailand andelectricity production industry from biomass in CLMV countries, Indonesia and Thailand should have a Mix or Combination Strategiesin the level of organization that applies many ways in the business after considering the factors associated with the business environment in order for the businesses to be successful by focusing on Growth Strategies, focusing on selling technology as first priority to increase competitiveness in the energy sector in CLMV countries, Indonesia and Thailand. It is the market penetration that relies on knowledge, ability, and industry experience in both management and technology of personnel with specific expertise in biomass energy with Retrenchment Strategies in the expansion of the four models, including Sub-Contracting, Cross Licensing, Consortium, and Joint-Venture.By collaboration with business partners which will help increase capacity and enhance their competitiveness and foreign investment even more, as well as focusing on Focus

Strategy at a business level by providing all business sectors to help promote each other (Synergy) to increase operational efficiency. By realizing the interests of all parties involved as critical and using the expertise in the field of Focus Strategy particularly in parts of palm plant, rice mill, sugar plant, and independent investors with interests in energy and etc. by focusing on improving performance of operations both in terms of power plant construction technology and reduce costs, including better fuel management. Focusing on marketing is the business that focuses on Corporate Social Responsibility (CSR) based on business growth approach coupled with community development and environmental conservation. For the operation of small renewable energy power plants with key concept on Environment friendly in order to be acceptable to society and the communities in the area which is an advantage in building a strength of the business to step into the international market of entrepreneurs. Nevertheless, to accommodate ASEAN Economic Community (AEC) in 2015 which will make the market is large and growing while the consumers have high demand of power. The adjustment of investment strategy in electricity generation industry from biomass in the neighbouring countries to support such growth is considered in response to the energy needs of ASEAN which is high-growing.

Related and Supporting Industries,The researcher linked the relationship of supporting industry and associated with electricity production industry from biomass from upstream, downstream, distributer, and customers which can be summarized as follows:

Production of electricity from biomass industry is composed of related and supporting industries at relatively intact and is vital to the competitiveness of the industry. Nevertheless, the strengths and cooperation in the industry can generate competitiveness continuously by cooperation in the form of strategy-sharing and helpful information exchange. The overall structure of electricity production from biomass industry of CLMV countries, Indonesia and Thailand have the strengths on the link between upstream and midstream because most entrepreneurs have integrated operations from upstream to midstream. As a result, there is no shortage of raw material in energy production and has good impact on cost management and competitiveness of entrepreneur. Nevertheless, one of thekey suggestions of electricity production from biomass industry in the region is a creation of network link between the materials and establishing cooperation by reducing import tax in order to be bound by the agreement of ASEAN Free Trade Area.

Government Policy, CLMV countries, Indonesia and Thailand are in a group of Asian countries. ASEAN has begun environmental cooperation since 1977 which ASEAN has got cooperation from ASEAN Sub-regional Environment Programme (ASEP) which is one of the three pillars of the ASEAN Community which is ASEAN Socio-Cultural Community (ASCC) that will include cooperation in six areas in which the Environmental Sustainability is one of sixcooperation. The essence is to tackle the world's environmental problems, management and prevention of environmental pollution across the region, promoting sustainable development through environmental education and participation of the public, promoting environmental

technologies, promoting living quality standards in urban areas, coordinating environmental policies and databases, enhancing the management on the conservation of natural resources and diversity, responding to changes, climate and effects management.

Development of renewable energy and recycling energy that is clean and environmentally friendly (Renewable Energy: RE) promote the use of renewable energy to increase the diversity of energy supply and reduce the environmental impact of energy use in the region. It also supports sustainable development of the energy and can stimulate economic and social development.

Summary of the Analysis of BiomassPower Plant Investment Format

From the study of the life cycle problem of the biomass power plant business, it found that there were various types of investment with different condition and interests as follows.

Venture Capital, Venture Capital (VC) is a biomass power plant with an investment of around 7-10 years which the entrepreneur will invest as a partner withfuel ownerswith potential for biomass power plant investment. In addition to financial support, VC also provides financial advisory in investment in biomass power plants, including counselling, providing guidelines in various ways so that biomass power plant business will give return on investment, able to grow quickly and ready to be registered as a public company in the stock market so thatthe venture capital can withdraw the investment through the sale of shares in the stock market or sell it back to fuel owners who invest at agreed prices in the case of not wishing to be listed on the stock exchange or sale of shares to Strategic Partners.

Consideringco-investment can be made from the time there was an idea of investing in biomass power plant (Seed) or the time to start a business just starting having revenues or earnings from operations (Start up) or the time that business is growing, need to expand business (Growth & Expansion) until the time prior to raise capital by selling shares to the public (Pre-Initial Public Offering, Pre-IPO). In addition, co-investment can also consider support biomass power plant with the possibility to regain business (Turnaround Financing) or a group of executives who want to buythe biomass power plant (Management buyout, MBO).

Joint Venture, Business cooperation of biomass power plant from fuel owners, investors, manufacturers and distributors of machinery, and communities can make a contract to a joint venture for the production of electricity from biomass whether funds, assets, land, buildings, manufacturing, technology, personnel, or other under agreement or joint venture agreements by setting objectives and targets of the operation clearly. It will have a determination of proportion of shareholder, ownership rights, duties and responsibilities, including the benefits to be derived from the operation. If the damage occurs, it must be a shared responsibility or if there are profits then it will allocate the benefit in proportion to the investment.

Consortium, The business operation is the collaboration between fuel owners, investors, vendors, and biomass power plant machinery to invest in biomass

power plant, joining together to make biomass power plant investment completed as business planned. Each party will use their talent and expertise to work on responsible project to complete according to project and the work are clearly separated. Each side issues invoicing and receipts only their own company but each party is responsible for their part, does not have a joint venture or a share of profits and losses between each other. When the power plant supplied the electricity by a certain time then it will end as a joint venture. The joint venture has no name under the Civil and Commercial Code, and Revenue Code so that it does not have to ask for taxpayer identification, but there is a tax payment on the profit of each company.

Mergers and Acquisitions, Mergers or acquisitions mean that the investor and biomass power plant that has been already operating and agreed to merge. After the merger agreement then there is only onecompany and the remaining companies will close its business or if the investors have invested with biomass power plant that has been already operating agreed to joint venture to set up the new biomass power plant company and close all the old biomass power plants. This merger is called consolidation by the new biomass power plant must issue new shares to shareholders in the existing biomass power plant that was closed down.

Acquisitions mean that the investors or funds purchase biomass power plant that has been already operating. There are 2 major types including the first type is the case that investors or funds purchase the assets of a biomass power plant only while thebiomass power plant that is sold still can continue to operate further. This acquisition is known as Asset Acquisition. The second type is the case that investors or funds purchase both assets and liabilities of biomass power plant that has been already operating by purchasing stock. As a result, the existing shareholders lose power in the administration. This acquisition is known as Share Acquisition and Takeover.

Supplier Credit, Manufacturer and supplier of biomass power plant can provide investment assistance to the investors who invest in potential biomass power plant in developing project, but still lack of investment factor as a source of funds to investors. The machine suppliers will jointly invest 10-49% of the capital without being main shareholder. Withdrawal of investment will sell shares to the owners of biomass power plant or find new investors based on shares to be repurchased based on the price agreed in the joint venture contract or manufacturer and supplier of biomass power plant machinery will pay the money to purchase machinery for the operator initially and make long-term leasing contract with operators. The operators are required to make payments of principal and interest periodically and equallythroughout the life of the lease.

CONCLUSION AND RECOMMENDATIONS

The investment in biomass power plant should set clear standards and have technical experts to assess and monitor the implementation. There should also be a support of the introduction of technology from foreign countries that are successfully

to be used in order to transfer technology and support the development of research by emphasizing on problem solving in a real project conducted by private sector, supporting the development of technical expertise, as well as allowing the operators to reduce the risks by giving technology owners to jointly invest or guarantee the power supply produced.

There should be the investment guideline in electricity generation from biomass industry in various forms in CLMV countries and Indonesia with financial analysis of biomass power plant projects of various sizes by using the primary fuel that are a lot in the country. Nevertheless, to be an informed decision to entrepreneurs interested in the industry. This information is important in providing preliminary introduction to the operators for understanding and assessingto build real confidence to operators and financial institutions. Since the renewable energy industry is a relatively new industry and getting attention from various sectors, but there are limitations due to they are mostly small entrepreneurs which is experiencing the early stages of financing and investing in development due to it is needed to invest in advanced technologies which financial sector does not understand and is not confident in their ability to repay.

Therefore, the preparation of complete information both technicaland financial aspects will help financial sector in developing a better understanding of this business and take part as important funding source for survey resources and processing power. In addition, it may need to develop the central market of buying and selling raw materials, and there should be a support in part of risk warranty in the first period.

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