

EVALUATION OF FRANCHISING  
BUSINESS MODEL APPLIED TO  
SOLAR ENERGY MARKET IN VIETNAM

LAHTI UNIVERSITY OF APPLIED SCIENCES

Faculty of Business Studies

Master Programme in International Business Management

Master's Thesis

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Autumn 2009

Lahti University of Applied Sciences

Master Programme in International Business Management

NGUYEN THI THANH BINH: Applying the franchise business model to solar energy industry in Vietnam.

Master's thesis in International Business Management, 92 pages, 3 appendices.

Autumn 2009

## ABSTRACT

The shortage of energy, the running out of natural resources, the concern for environment pollution and the advantage of potential solar resource has become an opportunity for foreign investors who have intention to enter Vietnam's solar energy market. There are so many entry modes for the investors to choose from but the application of franchising business model to solar energy industry is still a new concept not only in Vietnam but also all over the world. Therefore, this study works on the evaluation of the possibility to set up the new solar energy business under the form of franchising model. This study will focus on market research, the analysis of franchising model advantages, dealing with technology transfer barriers and getting responses from potential franchisees.

The aim of the theoretical part focuses on analysis of franchising model and technology transfer issues. To overcome the barriers of technology transfer to developing countries like Vietnam is a significant concern for new investors. Almost all the barriers will be overcome in this part also. Moreover, it is necessary for the readers to have a background of the updated solar energy technology, which is mentioned in the technology review section. Finally, the theory part will illustrate that the franchising model has been applied successfully to the energy sector by focusing on some existing energy franchises all over the world.

The empirical part will analyze the situation of Vietnam's solar energy market, the policy framework of the Vietnamese government for renewable energy and the developing trend of Vietnam's energy market from now until 2020. Finally, the empirical part will be the most important part of this study, which is the analysis of potential opportunities to set up new solar business in Vietnam. Depending on the qualitative research method, this study collects information and data from three different respondent groups including the Energy Department of Ministry of Industry and Trade of Vietnam (MOIT), the potential franchisees and the consumers.

Key words: Vietnam, solar energy market, competitive power market, franchising model, technology transfer, independent power plant (IPP), Electricity of Vietnam (EVN), business opportunity, SWOT analysis, PV solar, market research.

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## **GLOSSARY**

- AC: Alternating current
- B2B: Business to Business
- B2C: Business to Customer
- BKSE: Back Khoa solar energy
- CDM: Clean Development Mechanism
- CIGS: copper, indium, gallium and selenium (CIGS)
- DC: Direct current
- DIAC: Draft International Antitrust Code
- EVN: Electricity of Vietnam
- ERAV: Electricity Regulatory Authority of Vietnam
- GHG: Green house gas
- HID: High intensity discharge
- ICC: International Commercial Chamber
- IPR: Intellectual property rights
- IPP: Independent power plant
- JV: Joint venture
- KIDIVINA: Kim Dinh of Vietnam
- KW: Kilo watt
- kWh: Kilo watt hour
- LED: Light-emitting diode
- MOIT: Ministry of Industry and Trade
- MOSTE: Ministry of Science, Technology and the Environment
- MT: Million tons
- MW: Mega watt
- PPA: Power purchasing agreement
- TRIPs: The Agreement on Trade-Related Aspects of Intellectual Property Rights
- SELCO: Solar Electric Light Company
- SHS: Solar home system
- SME: Small and medium enterprise
- Solar PV: Solar Photovoltaic
- SPP: Solar power plant
- SWOT: Strength, Weakness, Opportunity and Threat analysis

VBARD: Vietnam Bank Agriculture and Rural Development  
Vinacomin: Vietnam National Coal and Mineral Industries Group  
VWU: Vietnam Women's Union  
UPOV: International Union for the Protection of New Varieties of Plants  
WIPO - World Intellectual Property Organization  
WTO: World trade organization

## **Acknowledgement**

Firstly, I would like to express my immense gratitude to Dr. Maija Romo, Principle Lecturer, Lahti University of Applied and Sciences because of whom I got the opportunity to study the Master programme in International Business Management.

My profound thanks to Dr. Brett Fifield, the Head of Master in International Business Management Program, who has supported and encouraged me to complete this study.

I am sincerely grateful to Dr. Ulla Kotonen - Principal Lecturer, Dr. Jaana Loipponen, my supervisor, who have closely supervised and given invaluable suggestions to develop my field research. My deep thanks to Mr. Keith O'Hiobhaird – Linguistic lecturer at Lahti University of Applied Sciences, who has supported my study in linguistic aspect.

This study could not have been completed without generous assistance of various individuals, who shared their knowledge and expertise, especially Mr. Ta Van Huong – The Head of Energy Department of Ministry of Industry and Trade of Vietnam, Mr. Mai Dinh Trung – The Deputy Director of Project Management Board on Rural Electrification and Renewable Energy of MOIT, Mr. Tran Thanh Danh – The General Director of Solar Electric Light Company (Selco) Vietnam, Mr. Claudio F. Kellenberger – The General Manager of Asian Trails Vietnam, Dr. Bui Tuyen – The Head of Technology Transfer Research Center of University of Technical Education Hochiminh City.

Finally, allow me to express my thankful to my own family, particularly to Mr. Nguyen Van Phien - my depart grandfather who became a motivation for me to finish this study.

To all of you, I extend my deep and sincere appreciation.

Mrs. Nguyen Thi Thanh Binh  
Lahti, October 2, 2009

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## 1. INTRODUCTION

### 1.1. Background

Vietnam is a developing country which became the WTO's 150<sup>th</sup> member on 11 January 2007 (wto.org, 2007). The Vietnamese government calls for the foreign direct investment from the overseas market to develop the domestic economy. The Vietnamese government welcomes all businesses, which have intention to do business in the renewable energy sector in order to reduce the pressure on other types of independent power plant (IPP) as well as to protect the environment. Until now Vietnam still does not have any solar power plant, even though Vietnam stretches from 8 30' to 23 22' North latitude and from 102 10' to 109 30' West longitude, which is in the potential solar resource area (baria-vungtau.info, 2009).

Currently, Vietnam has to face with the shortage of electricity in both rural and urban areas. According to Electricity of Vietnam (EVN), Vietnam is facing a lack of around 10% of its total capacity during rush hours. EVN has estimated that from now until 2020, Vietnam will lack around 10,000 MW (topnews, Mohit Joshi, 2008). Recently, EVN has to pay around USD 20 million per year to import power from China with an average price of 0.45 cents/kWh that is by 0.05 cents/kWh higher than the domestic suppliers. Besides that, the exhausted oil and coal resources threaten the thermal power plants. Thermal power plants are not long-term solutions because the coal and gas capacity of Vietnam is limited to only for the next 20 years (vietnamnet.vn , 2007). Global warming brings a negative effect to hydro power plants during dry season. Last but not least, the national grid still does not cover all areas of Vietnam, therefore, the demand for electricity in some areas such as highlands, mountains, island areas need to be fulfilled. As a consequence, alternative energy takes an important role to find a solution for the shortage of electricity in Vietnam and also solves the lack of electricity in off-grid areas.

To solve the shortage of power, the Vietnamese government has set up the target for the electricity sector from now until 2050 corresponding to the development plan for renewable energy. Particularly, the electricity sector has to reach the target of boosting the ratio of alternative renewable energy sources to 3% of the total energy sources in 2010; to 5% in 2020 and to 11% in 2050 (Provision 1855/QĐ-TTg Prime Minister, 2007, p.2). In fact, until now, there are 1,250 kW of Photovoltaic solar power system, which has been installed in Vietnam (adb.org, 2009). Solar energy has become one of the best solutions to solve the lack of electricity in the rural, mountainous and island areas that still cannot access to the national grid.

Therefore, this is a good chance for solar energy development in Vietnam as well as for the new investors to set up solar business in Vietnam. This study will help these investors have an overview of Vietnam's electricity market. Finally, this study will give recommendations for these investors to choose the right entry mode when entering the solar energy market in Vietnam.

At the present, franchising model is not applied broadly to heavy industry or high technology sectors due to technology transfer and intellectual property right (IPR) issues. However, the international or multinational business development and the competitive advantages of the franchising business model leads to the blooming of franchising model in all economic sectors. This model attracts investors more than other models based on the advantages of trademark and technology transfer. The franchisee benefits from being a part of a well-known trademark with an established name, business model and product. This model also has a lower business risk compared to other business models such as joint –venture or subsidiary. For instance, the franchisee will be offered a product or service or technology that has been already successfully developed, tested, refined and sold already in the market place. Applying franchising model, the franchisor has opportunities to expand the market share with less investment involvement. In addition, the franchisor gets the ability to obtain more profit from selling franchises such as training fee, lump sum, royalty and down payments. The marketing cost can be centralized by the franchisor, which helps the franchise

system to benefit from professional marketing strategy to compete with other competitors. It can be seen that the franchising model has become a new trend for new businesses, which are entering the competitive market.

## 1.2. Research objectives and scope

### 1.2.1. Aim of this study

This study is based on the theory of technology transfer in renewable energy, legal rules of technology transfer and the franchising business model to answer the reason why the franchising model should be chosen to apply to the solar energy industry in Vietnam.

The aim of the empirical part is focusing on the market research in Vietnam's energy market as a macro level and Vietnam's solar energy market as a micro level. The market research will be implemented by collecting information from the Energy Department of Ministry of Industry and Trade (MOIT), EVN and other institutions such as universities, research centers. In addition, getting responses from potential franchisees and consumers to discover the demand of solar energy in Vietnam, which can help the investors could see the real opportunity to do business in solar energy in Vietnam. Finally, this study will analyze the most potential opportunity and build up the potential business model.

### 1.2.2. Objectives

This study aims to the main objective is to find out the opportunity for investors who are interested in doing solar energy business in Vietnam. To obtain this objective, this study focuses on finding out the answers for the primary question and four sub-questions, which are listed below:

Primary question:

Is franchising a possible business model for the solar energy industry in Vietnam?

Sub-questions:

- What is the situation of Vietnam's solar energy market?

- Has the technology transfer been done under the form of franchising model?
- What are the advantages and disadvantages of the franchising model?
- How does the potential business model work in Vietnam?

### 1.2.3. Limitation

This study focuses on the following limited respondents:

- Five potential customers (islands and resorts).
- Top five existing solar energy businesses in Vietnam.
- The Energy Department of Ministry of Industry and Trade of Vietnam.
- The Educational Technology University of Hochiminh City.
- The Energy Reservation Center of Hochiminh City.
- This study will be valid within only five years.
- This study focuses on four main regions: Hanoi Capital, Nha Trang City, and Hochiminh City.

### 1.3. Research methods

This study applies the qualitative method. It is based on the result of collecting of non-standardized data, which requires classification and is analyzed through the use of conceptualization. (Ghauri & Gronhaug, 1948, pp.87-88). This study includes the process of qualitative analysis, interview, observation, documents, summaries, self-memos and maintaining a writer's diary. This study depends on the advantage of qualitative method in which the data is collected from a specific situation rather than through email and over the phone. Moreover, this research can only be carried out with a limited number of respondents, which makes it impossible to apply the quantitative method. As Ghauri & Gronhaug stated that: "Low numbers are also justified because we often want to do in-depth studies or provide 'thick description' which is not possible in cases of numerous observations. Qualitative methods are, therefore, most suitable when the objectives of the study demand in-depth insight into a phenomenon". (Ghauri & Gronhaug, 1948, p.88)

#### 1.4. Research structure

This study is divided into five main sections: introduction, theoretical, methodology, empirical and conclusion. In particularly, the following table will show the general structure of this research.

TABLE 1. Study structure

Introduction	Chapter 1	Background, objectives and scope.
Applying franchise model to solar energy industry.	Chapter 2	<ol style="list-style-type: none"> <li>1. Franchising issues.</li> <li>2. Technology transfer for renewable energy.</li> <li>3. Solar PV technology review.</li> <li>4. Existing solar energy franchises review.</li> </ol>
Methodology	Chapter 3	Research methodology.
Solar energy market research in Vietnam.	Chapter 4	<ol style="list-style-type: none"> <li>1. Vietnam's energy market overview.</li> <li>2. Vietnam's solar energy market overview.</li> <li>3. Analysis of solar energy demand in Vietnam.</li> <li>4. SWOT analysis of opportunity to set up new solar energy franchise in Vietnam.</li> <li>5. Summary.</li> </ol>
Recommendation	Chapter 5	Recommendation and conclusion.

## 2. APPLYING FRANCHISE MODEL TO SOLAR ENERGY INDUSTRY

This part concentrates on the two main issues related to franchising model. First, to answer the question why franchising model should be applied to solar energy industry in Vietnam, this study finds out and analyzes the strengths and weaknesses of this business model. Moreover, depending on the operation of several existing renewable energy franchising all over the world, which have applied the same business model to the same industry sector, this study will demonstrate the competitive advantages of the proposed business model. Secondly, this study will deal with some issues related to technology transfer in renewable energy sector. Therefore, the investors will have a basic understanding of some barriers and rules of technology transfer before entering Vietnam's solar energy market.

### 2.1. Franchising

The first commercial retail franchise in the world was set up by Singer Sewing Center and developed by Isaac Singer in 1858 in the United States (Gamet – Pol, 1994, pp.1-7). Isaac Singer had invented the sewing machine and faced with two problems while running his business. First, he had difficulties in guiding the customer how to use the new invention before they make decision to buy it. He also faced with the lack of capital to manufacture the sewing machine in a large volume. He had decided to sell the rights to local business to sell his machines and train the customers. His business had grown rapidly depending on the license fees collected from the franchisees. That was the fastest way for him to increase the capital to invest in manufacturing. In this model, the franchisor is able to expand the business with a lower required capital since the franchisees have to support finance by themselves. Eventually, there were several industries copying Singer's business model such as Coca-Cola, Standard Oil and Texaco oil companies, Henry Ford, MacDonal'd's, Howard Johnson's Motor Inns, Kentucky. (Gamet – Pol, 1998, pp.7-8).

First, the following section will give out the definition of what franchising means.

### 2.1.1. Definition

According to the European Franchise Federation, franchising is defined as:

“Franchising is a system of marketing goods and/or services and/or technology which is based upon a close and ongoing collaboration between legally and financially separate and independent undertakings, the franchisor and its Individual Franchisees, whereby the franchisor grants its Individual Franchisees the right and imposes the obligation to conduct a business in accordance with the Franchisor's concept. The right entitles and compels the individual franchisee in exchange for a direct or indirect financial consideration to use the franchisor trade name and/or trademark and/or service mark, knowhow, business and technical methods, procedural system and other industrial and/or intellectual property rights supported by continuing provision of commercial and technical assistance within the framework and for the term of a written franchise agreement, conducted between parties for this purpose.” (Gamet – Pol, 1958, p.10)

Basically, franchising has been divided into three basic forms: Direct franchise, master franchise and joint-venture franchise.

#### *Direct franchise*

The franchisor signs the contract directly with a franchisee unit. In this model, the franchisor grants franchisee unit the right to set up a business that uses the franchisor's trademark within a specific location. The franchisor provides the franchisee assistance and training. This type of franchise is common used for domestic franchises but it is more difficult to set up franchise at an international level. This model requires a high level of supervision by the franchisor. As a result, the geographical distance will become a significant obstacle. On the other hand, the franchisor has to take part in providing initial budget for marketing at an international level. However, the franchisor does not have to share revenue to a third party. (Gamet – Pol, 1958, p.6)

### *Master franchise*

In this mode, the franchisor does not deal the contract directly with franchisee unit. Instead, the franchisee unit signs the contract with master franchise. The franchisor grants the master franchise the right to set up franchises in a limited location. The master franchise will develop the franchising system within a specific area. This type of franchise is suitable with international franchising due to its flexibility and adaptability to each country's distinction.

(Gamet – Pol, 1958, p.7)

### *Joint venture*

The franchisor enters a joint-venture company with a foreign partnership from a country where the franchisor wants to develop the franchising system. The new joint venture will develop the franchising system. This system has the advantage of being flexible and adaptable model to local business and legal environment.

(Gamet – Pol, 1958, p.9)

After getting the background of franchising, this study comes up to a deeper analysis by pointing out the advantages and disadvantages of franchising model. This study will help investors to realize the strengths and weaknesses of this business model before making their own decision to choose this mode of entry or not.

### 2.1.2. Advantages

There are some differences between franchising and other business modes of entry such as direct export, subsidiary and joint-venture. Normally, a new business always has to face with investment capital, technology, marketing budget and trademark issues. Franchising seems to be set up to solve these issues. That is why the franchising model has attracted so many investors all over the world.

Franchising is even suitable for those investors who never can run their own business as before. The franchisees can copy almost the whole business model as well as the technology or intellectual property right from the franchisors and receive training support from them. It can be seen that it is the easiest way of doing business in a competitive market.

Getting into deeper analysis to understand why both franchisor and franchisee can benefit from this model.

### *Enlarging the market*

First, the franchisor can have the opportunity to enlarge his market with less investment involvement. The more franchises will be set up, the broader and more efficient market share the franchisor will have. Besides, since almost all investment capital is provided by the franchisees, the franchisor does not have to spend a lot of money in investment. (Matthew, 1999, p.16)

### *Low business risk*

Reduced business risk is one of the main advantages of the franchising model because its operation relies on existing business model, which has been tested, experienced and proofed to be successful. Therefore, the franchisee will face with lower business risk. (Matthew, 1999, p.16)

### *Selling business*

This is another advantage, which can help the franchisee to get more profit. For example, when the franchising model works well, the franchisor has an opportunity to enlarge the profits by selling franchises, raw materials and equipments. (Matthew, 1999, p.17)

### *Centralized marketing cost*

There are several advantages related to trademark and marketing cost. With a franchise model, the marketing or public relations cost can be centralized at the head office. By using the franchising fee, the franchisor can produce professional and huge marketing campaigns in order to compete with its competitors. (Matthew, 1999, p.17)

### *Well – known trademark*

Finally, this model will attract investors more than other models based on the advantage of trademark. The franchisee may benefit from national marketing and being a part of a well-known trademark with an established name, format and product. The franchisee will be offered a product or service or technology that has been successfully developed, tested, refined and sold already in the market place. (Matthew, 1999, p.17)

### 2.1.3. Disadvantages

As with any business, franchise model has its disadvantages. This study points out several disadvantages that might bring unexpected impacts to the franchise.

#### *High pressure on franchisor*

To be efficient in operation, at the beginning a franchisor must invest a big amount marketing cost in order to be strong enough in the international market scale. It may put a high pressure on the franchisor to support marketing cost for a whole franchise system. (Matthew, 1999, p.18)

#### *Continuing cost*

Another disadvantage that needs to be taken into account is the continuing cost. The franchise fee includes three separated main categories: the initial fee, the royalty fee and the ongoing management services fees. The franchisee pays the initial fee to have the right to operate the franchise system. The royalty fee is a payment, which the franchisee needs to pay the franchisor for using his patent or intellectual property right (IPR). The calculation to figure out royalty fee can be generated by a percentage of the franchise's gross turnover after deducted value added tax (VAT). The ongoing management service fees are paid for training, advice and support services. The problem is that the franchisor may increase the price of his services or production as a mean of increasing the turnover. This can result in higher fees to be paid by the franchisee and the conflict between franchisor and franchisee may be occurred. (Matthew, 1999, p18)

#### *Losing control*

Franchisors may lose control of the network since the franchisees is operating independently. The relationship between franchisor and franchisee involves distance and a possible difference in language and culture or environment, to which the franchisor may not be familiar. In some cases, franchisees only pursue short-term benefit and can damage the reputation of the franchisor. Therefore, the quality of products or services or technology should be strictly supervised to avoid getting differences in quality uniformity and service levels. (Matthew, 1999, p.19)

### *Becoming dependent with franchisor*

The franchisee must follow the rule and regulations stipulated by the franchisor lead to the franchisee will become less flexible in doing business. The franchisor will define what price to set, what advertising to use and what type of staff to employ. (Matthew, 1999, p.19)

Franchising in the energy sector always requires technology transfer involvement. Moreover, this study focuses on renewable energy in Vietnam, a developing country. Therefore, the problems of technology transfer for renewable energy from one developed country to one developing country should be taken into account in the next section. It addresses both the problems in technology transfer and the ways of how to overcome all the barriers that may occur during the transferring process.

## 2.2. Technology transfer

Transfer technology under the form of franchise model has not been a popular concept and it is one of the essential steps in establishing a new franchise business. In this section, this study will mention the types of technology transfer, the technology transfer legislation in both international and national level. In addition, this section also points out some existing problems relating to technology transfer in Vietnam.

### 2.2.1. Forms of technology transfer

There are four basic forms of technology transfer. Technology can be transferred through direct sale, license to end-users, strategic alliance with a third party that includes contractual alliances and joint venture (JV). Finally, technology transfer can be accomplished through a merger or acquisition.

#### *Direct sale*

In a direct sale, the transferor's technology is sold without the transferor retaining any significant controls over transferee's use and retransfer. This option, the

transferor supposes it to be impractical to impose restrictions on the transferee. This technology applies to low cost and high volume items or to produce products that must be disseminated in large volume such as electronic products. (Harry, 1995, p.70)

*Direct end-use licensing*

Technology and its relative products can be licensed directly to the end-user. Direct end-user licensing is applicable for products that are highly intellectual property intensive, expensive technology and where the maintenance service is required for the end-user. The transferor can reach consumers in the targeted market without the assistance of local parties. The transferor has a disadvantage while there is no distributor, agent or representative offering the warranty or maintenance service to the transferee. Moreover, the transferor should cover the costs of establishing a marketing network in the target country. In contrary, the transferee benefits from the way of controls over the dissemination and protection of property rights. (Harry, 1995, p.71)

*Strategic alliance with third party*

In this category, the transferor co-operate with a strategic partner in order to support, customize and further develop the technology in the target country. Strategic alliance includes two types of structures: contractual alliances and joint venture.

The simplest and most popular form of international technology transfer is the contractual strategic alliance where the technology is transferred to the end-users through a contractual partner such as agents, sales representatives, franchising or distributors. All the contractual strategic partners are licensed to use and retransfer all or parts of the technology and the transferor's trade -marks, goodwill and know-how subject to specified conditions. (Harry, 1995, pp.72-76)

The second type of strategic alliance is joint venture which is formed by the foreign transferor and its strategic partner in the target country to establish a new legal entity. A joint venture entity can take two basic legal forms: a joint venture as a corporation and joint venture as a partnership. (Harry, 1995, pp.84-85)

### *Merger and acquisition*

The basic structure for transferring technology in this form is simply to merge with or acquire an entity that possesses the desired technology or has an attractive marketing network, R&D or manufacturing base in the target country. (Harry, 1995, p.96)

Understanding of applicable law for the technology transfer will take an important role to solve problems in the case either franchisor or franchisee breaks the rules in the franchise agreement. Depending on the law, both sides will assume responsibility to follow the rules and pay attention on how to avoid getting punished by the law. The next section will deal with technology transfer legislation.

### 2.2.2. Technology transfer legislation

The franchising model will not make sense if the technology transfer legislation cannot be used as an efficient tool to protect the trademark and IPRs for the franchisors. In the next section, the study will explain and discuss technology transfer legislation issues.

### *International regulations*

The selection of the applicable law for the technology transfer transactions takes an important role to set up the formation and performance of the technology transfer contract. Based on the applicable law, both sides of the contract will have the resolution of any disputes that may occur during the negotiation or implementation process.

The technology transfer has been strongly influenced by a series of international regulations. The Paris Convention for the Protection of Industry Property of 1883 covers the patents, industrial designs, models, trademarks and unfair competition. There are other patent rules such as the Strasbourg Treaty on Patent Classification of 1971, the Patent Cooperation Treaty of 1970, the Hague Agreement on Designs

of 1960, the International Union for the Protection of New Varieties of Plants (UPOV) Convention of 1961. There are a number of international treaties on trademarks, trade names, indications and appellations of origin such as Madrid Treaties of 1891, the Nice Classification Agreement of 1957. For the protection of copyrights, there is only one convention named the Revised Berne Convention of 1886. (Heath & Liu, 2002, p.9)

The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) that came into force as Part 1C of the Annex of the Agreement establishing the World Trade Organization in 1995. TRIPs sets up the minimum standards for the protection of intellectual property for many countries which had little knowledge of Paris and Berne conventions. TRIPs agreement contains Unfair Competition Law (Article 17) and Anti-trust Law (Article 8(2), Article 31, Article 40) which relating to technology transfer legal. (Heath & Liu, 2002, p.10)

The Draft International Antitrust Code (DIAC) 1993 contains four main restrictions of licensing contract: restrictions consistent with the scope of the exclusive right, restriction consistent with the scope of an intellectual property right, restriction of contractual extension of the period of patent protection and obligation to use a certain trade mark when selling merchandise manufactured under a patent.

(Heath & Liu, 2002, p.11)

It would be clearer and more efficient if the applicable law for technology transfer is looked at from various respects. Beside the international legislation, the national legislation will be mentioned in the next section.

### *National legislation*

In 1998, the legal framework in Vietnam avoided defining the term technology transfer in general, listing particular activities considered to be technology transfer, such as:

- (i) Transfer of ownership or the right to use patents, utility solutions, industrial designs and trademarks, within the duration and under the protection of Vietnamese law and is permitted to be transferred.
- (ii) Transfer of know-how, including technical know-how, technical solutions, technological processes, computer software, drawings, formula, technical data attached to or separate from machine and equipment.
- (iii) Technical services, training and consultancy.  
Providing other services to rationalize production, consultation on technology management. (Wilkins, 2002, p.162)

The scope of technology transfer is expanded to cover not only the intangible assets but also machinery, equipment and technology being transferred. According to Sec. 4(5) Decree 45/1998/ND-CP (1998), any sale of machinery and equipment that require advanced technology may be defined as commercial sale of modern machinery and equipment as technology transfer agreement. (Wilkins, 2002, p. 163)

Recently, the Vietnamese National Assembly has approved the Law on Intellectual Property of Vietnam No. 50/2005/QH11 of 29<sup>th</sup> November, 2005. This law came into force on 1<sup>st</sup> July, 2006 with the main subjects as Copyright and Related Rights, Geographical Indications, Industrial Designs, Layout Designs of Integrated Circuits, Patents (Inventions), Trademarks, Unfair Competition or Undisclosed Information -Trade Secrets. (World Intellectual Property Organization -WIPO, 2009). This is the most important national law, which is the applicable law for technology transfer in Vietnam. This law will be attached in this study as Appendix 1. (Vietnamese National Assembly, 2005)

*a. Regulation of technology transfer contract*

The technology transfer contract must be in writing and approved or registered by the authorized state agency. The minimum of the content of the contract must include the description of technology, rights, and obligations of the parties, supply of equipment, personnel training, price and payment, quality guaranties.

Regulation of registration: Any technology transfer contract exceeding USD 30,000 (excluding the value of the equipment), which is signed between a foreign party and a domestic party, must be registered at the Office of Evaluation of Technology Environment for Investment Projects. This is a department under the Ministry of Science, Technology and the Environment (MOSTE). After receiving the complete registration file, MOSTE must examine the contract within seven days. If the application is approved, MOSTE will issue a registration certificate and the contract can only take effect from the date of issue of that certificate. (Wilkins, 2002, pp.163-164)

*b. Anti-trust issues, restriction on the transfer agreements*

The law on the technology transfer in Vietnam has a number of restrictions that aims to prevent the transferor from abusing the market.

The duration of technology transfer contract should be agreed by parties but not exceed a period of seven (07) years. However, MOSTE can accept an extension for three years but the duration of the contract must not exceed ten (10) years with the following exceptions:

- (i) The technology belongs to the world's advanced high technology and the transferor is obliged to continually transfer further improvement.
- (ii) The transferred technology is of particular importance for Vietnam's economic development.
- (iii) The transfer technology has contributed to new export products.

Prohibition of anti-competitive clauses: Vietnamese laws prohibit a number of anti-competitive clauses that include:

- (i) Clauses which prohibit the transferee to prevent from improving technology being transferred.
- (ii) Clauses which obligate the transferee to transfer to the transferor unconditional any right to use improvements or renovation of the technology created by the transferee from the basic technology transferred, right to apply for industrial property rights to improvements.
- (iii) Clauses which discharge the transferor from his warranty obligation.

(iv) Clauses which prohibit the transferee from continuation of utilizing the technology after the contract has expired.

(v) Clauses which obligate the transferee to accept restrictions: Scope of production and product quantity, selling prices of products

(Wilkins, 2002, pp. 165-166.)

However, following the economic development trends, Vietnam was forced to renew the policy toward the private economic sector in general and to foreign investment in particular. Requirements and procedures for setting private enterprises were minimized and investors need only register their investment with the authorized state agencies. Vietnam's government has tried to balance two main issues to minimize the gap between developing countries and industrialized countries by promoting technology imports, protecting the interests of Vietnamese transferees and against transfers of outdated or useless technology.

One of the fundamental barriers which is often faced in transferring technology to developing countries is that the technology being transferred is not appropriate to the local context or is not adapted to the local environment. It is important to understand the local situation in developing countries to identify the key barriers and address them before they become a problem. Moreover, learning from past experiences is the best way to overcome certain barriers in technology transfer in a developing country. In the next section, this study will deal with some significant barriers in technology transfer from developed countries to developing countries and how to overcome those barriers.

### 2.2.3. Barriers of technology transfer in Vietnam

This section analyzes the impact of each barrier to the renewable energy technology that will be transferred to Vietnam. There is a multitude of factors that influences the success or failure of technology transfer in a developing country generally and in Vietnam particularly.

*a. Information exchange, education and training*

There are some barriers to renewable energy technology transfer related to information exchange, education and training issues:

- Lack of access to information.
- Lack of local skilled labor and capabilities.

*Access information*

In order to make technology transfer successful, it is necessary to have a clear overview of the potential market for the use of that technology. There is often lack of accurate information on the potential renewable energy resources for the communities and businesses. They poorly understand technology and the product that can be provided by the foreign transferor; therefore they have no demand about the new technology. Further, they still are not familiar with renewable energy technology and cannot distinguish between good and bad equipment to make the best choices. (Wilkins, 2002, pp.123-134.)

*Skilled labor*

Referring to the lack of local technically trained staff, installation, operation and maintenance of renewable energy equipment is a big problem. IPP are often located in remote rural areas, therefore it is difficult to recruit and select skillful workers or maintenance staff. If the equipment does not receive the required maintenance regularly, its productivity can be reduced. (Wilkins, 2002, pp.123-134.)

*b. Financing*

Developing countries often face a lack of capital to invest in high technology. Technology imported from industrialized countries is generally more expensive than the technology manufactured locally in developing countries. It is difficult for the transferee to afford the high quality system with a limited financial budget. The main barriers to renewable energy technology transfer which are related to financing issues are:

- Lack of access to capital
- Lack of investment
- Inappropriate subsidies
- Scale of system
- Size of organizations

(Wilkins, 2002, pp.123-134.)

#### *Access to capital*

Many installers or sellers are new companies and have limited records of their accounts and assets, since they have some specific difficulties when applying for a loan from the bank. Normally, the banker requires substantial evidence of book-keeping or transaction record that shows the company to be creditworthy. The new business has to face a lack of capital leading to less investment and less competitive technology. For the potential consumer, a renewable energy system is still very expensive. In many areas, especially remote areas that are out of the electricity grid, the consumer may find it difficult to make the regular monthly payment as their income will be irregular and depending on the harvest of crops or the sale of handicrafts. (Wilkins, 2002, pp.123-134.)

#### *Investment*

Lack of investment can occur due to a lack of understanding of investment profiles and life cycle costs for renewable energy systems. For instance, the investors could not understand the higher up-front cost with the longer-term benefits. They just focus on the short-term benefit. Moreover, it is very difficult for many SMEs to attract investors when they are not large enough to show their profitability. (Wilkins, 2002, pp.123-134.)

#### *Subsidies*

Subsidies on other forms of energy technology or fuel may make it difficult for a renewable energy system to compete on an equal basis. Normally, the government subsidies for fossil fuels or coal prices can be a barrier to renewable energy systems. Therefore, the renewable energy is unattractive to investors in comparison with traditional energy.

In addition, the government subsidizes renewable energy for a limited period of time and then the subsidy is removed or cut, the consumer who has been receiving financial support for a long time is not willing or unable to pay. Therefore, there are many projects to fail or easy to fail by expanding. The consumer has tendency to delay purchasing the new technology by waiting for the promise of a subsidized project. (Wilkins, 2002, pp.123-134.)

#### *Scale of system*

Many renewable energy technologies operate on a smaller scale than fossil fuel technology. The fixed costs related independent with the project size and it means that the smaller project scale is, the higher transaction cost the project has. Due to, it is a disadvantage to attract the private investment sector.

#### *Size of organizations*

Renewable energy technology companies are so small compared to oil and gas technology companies and due to lack of financial strength required to invest in large scale manufacturing. (Wilkins, 2002, pp.123-134.)

#### c. Others

Other noteworthy barriers to renewable energy technology transfer are:

- Inadequate supporting infrastructure
- Lack of confidence in new technology
- Security

#### *Supporting infrastructure*

Lack of supporting infrastructure in remote rural areas is a sustainable barrier to the development of renewable energy systems. The technology transfer process faces with some obstacles such as physical infrastructure and human capacity. The people who have been trained and had the technical skills are not willing to work at some lack of supporting infrastructure areas lead to the installation and maintenance services are not following the required standards. On the other hand,

transportation and communication networks are not well supported for distributing spare parts and maintenance, which leads to the failure of technology and poor quality control (Wilkins, 2002, p.136).

#### *Lack of confidence in new technology*

If the systems are designed not to meet the requirements of the local conditions, then projects will not be successful. In addition, if poor quality technology is used or the whole systems are not maintained regularly, a technical failure will occur. All factors relate to lack of confidence in technology due to the investors will be confused to provide funds and develop the market (Wilkins, 2002, p.140).

#### *Security*

One high risk, which should be taken into account is the theft of Photovoltaic (PV) modules as they have a good resale value and are easily transported. Not only PV but also the components, batteries and controllers could also be stolen. The value of one system including solar panel, batteries, controller and other components is high so how to protect them to avoid losing from theft is one big question for the installer as well as the buyer (Wilkins, 2002, p.141).

After identifying several barriers related to technology transfer in developing countries, in order to achieve success, there are some issues that need to be addressed to encourage the transfer process as well as to overcome all those barriers to ensure the successful transfer of renewable energy technology. In the next section, this study summaries the specific options and needed actions, which should be taken into account.

#### 2.2.4. Overcoming barriers

There are several actions that need to be carried out to make sure that solar home systems (SHS) projects or programmes will be successful and barriers can be overcome.

*Reducing import tax on PV technology*

High cost of SHS has become one of the main reasons why SHS is less competitive compared to other options. How to reduce the cost of SHS and make it more affordable to buy? Reducing import tax on PV technology can help to lower the cost for consumers. On the other hand, the cost also can be reduced by continued research and developing new PV technology. Increasing the volumes of manufacturing PV will help the price of SHS come down as well (Wilkins, 2002, p.162).

*Encouraging investment in SHS projects*

Government should set a clear plan for rural electrification and targets for PV to attract investment. Access to credit and getting loans from financial institutions through micro-financing schemes need to be taken into account. For instance, non-cash methods of payment will allow the consumers to access the technology if they cannot afford to buy SHS. The problem is, the suppliers must guarantee buyback of SHS at a depreciated value over time and then a type of loan guarantee can be offered to the end users. (Wilkins, 2002, p.163).

To overcome several barriers of technology transfer in renewable energy, which are mentioned in Section 2.2.3, there are some more actions that need to be carried out from both public and the private sector and public-private cooperation. The following table will show which actors play the main role in different actions and which actors play a supporting role.

TABLE 2. Overcoming barriers to solar home system projects (Wilkins, 2002, pp.218-228)

<i>Barrier</i>	<i>Example</i>	<i>Options for overcoming the barrier</i>
<i>National policies and programmes</i>		
Inappropriate fiscal policies	High duty and VAT on imported SHS components (up to 30-40% in some cases) as compared to zero import duty on conventional grid electrification technology.	The governments should remove or reduce import tax on SHS components, particularly batteries, PV panels, controllers and energy-efficient DC lights.
Lack of support mechanisms	Grants and soft loans	Government grants and soft loans are preferable to international financing as there is no exchange risk. However, the funds available from international sources are often much bigger. Ways to mobilize government funds include levies on fossil fuels or electricity. For example, the Energy conservation fund in Thailand is collected by a levy on transport fuels.
<i>Information exchange, education and technical training</i>		
Lack of skilled labor and capabilities	Lack of locally trained people in installation, operation and maintenance in remote areas due to lack of education regarding new technology (both PV systems and direct current appliances)	Developing country governments should consider introducing relevant training in schools and universities on direct current technology for household electricity. PV demonstration units in schools (even in electrified regions) will play a promotional role if people understand what they can do with minimal amounts of electricity. Developers should consider training local people to install and maintain equipment. It can be good to train women in maintenance skills as they may be less likely to migrate to urban areas for better paid jobs.

<i>Barrier</i>	<i>Example</i>	<i>Options for overcoming the barrier</i>
<i>Information exchange, education and technical training</i>		
Lack of skilled labor and capabilities	Lack of locally trained people in installation, operation and maintenance in remote areas due to lack of education regarding new technology (both PV systems and direct current appliances)	Developing country governments should consider introducing relevant training in schools and universities on direct current technology for household electricity. PV demonstration units in schools (even in electrified regions) will play a promotional role if people understand what they can do with minimal amounts of electricity. Developers should consider training local people to install and maintain equipment. It can be good to train women in maintenance skills as they may be less likely to migrate to urban areas for better paid jobs.
Technical factors	Unfamiliarity with local environmental conditions, e.g. local levels of insulation, appropriate system positioning, orientation and angle, proximity to fast-growing vegetation, corrosive marine environment, etc.	The technology and its installation need to take into consideration local conditions. Local isolation levels need to be measured to size the system correctly against the requirements of the household. The geographical location of the site has an impact on the orientation and angle of panel mounting. If the site is near the sea, wiring needs to be installed to prevent corrosion where possible. Technology needs to be easily maintained by field technicians or households (i.e. keeping delicate circuitry and the need for tools to a minimum). Some basic maintenance skills and knowledge must be taught to the household and local technician, including: keeping the panels free from shading by vegetation; cleaning the panels regularly to remove dust and dirt; using clean water (preferably distilled water) to top up the batteries; checking the battery regularly with a hydrometer to catch any damage to cells early enough to reverse the process; installing systems with the minimum amount of wiring and connections to reduce system losses; making wire connections with proper connecting blocks, not just

		<p>twisted wires, to reduce system losses; mounting panels securely to withstand storms and high winds</p> <p>There are many elements of good practice for system design, installation, use and maintenance of the systems. Users. Installers and maintenance technicians should be given regular training to keep their skills updated, particularly when systems start to get older and skills in diagnostics and more difficult maintenance are required</p>
<i>Barrier</i>	<i>Example</i>	<i>Options for overcoming the barrier</i>
<i>Information exchange, education and technical training</i>		
Lack of technical standards and quality control	<p>A lack of standards leaves users unable to differentiate between good and poor-quality systems. Poor-quality technology is more likely to fail. Manufacturers cannot give standard guarantees for locally manufactured technology if their quality control is poor.</p>	<p>Users need to be able to choose technology on performance as well as price. Therefore, it is important to have technical standards against which performance can be measured and quality of the technology assessed. ODA could be used to assist developing countries in the task of setting standards. International standards should be adopted if possible so that technology exported is accepted by others countries. International standards should account for different climates where possible (dry, continental, humid, tropical etc.)</p>
<i>Financing</i>		
Lack of access to capital	<p>Lack of micro-financing packages available to households. Difficulties in convincing banks of creditworthiness and reliability in repaying loans</p>	<p>It is reassuring for financiers to have local government backing for loan applications by households, to confirm they are not already in debt and live at the address intended for SHS installation. It is also reassuring for financiers if a well-respected and effective local cooperative or union (e.g. the VWU in Vietnam) is involved in collecting monthly fees and can put some social pressure on households to keep up to date with payments. Loan guarantees provided by the developer</p>

		<p>are effective in reducing the risk to the bank of nonpayment, thus increasing confidence to provide the loan (this is being done successfully by SELCO in Vietnam). It is important to identify to whom in the household it is best to make the loan. For example, lending to women has shown better repayment rates in India and Bangladesh.</p>
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### 2.3. Solar technology review

There are two major types of solar systems that apply to solar energy industry including solar thermal and solar photovoltaic (PV).

#### *Solar thermal*

Solar thermal systems depend on collecting the energy of the sun with either flat-plate or concentrating collectors and using that energy to heat air or liquid. The hot air or liquid can be used for wide range of heating applications such as grain drying, water heating and generating steam for large –scale generation of electricity.

It is estimated that solar thermal electricity costs 8.5 cents per kWh by 2010 and it can be reduced to 6 cents per kWh by 2015. (Thornton, farmfoundation.org, 2009)



FIGURE 1. Solar thermal model (Source: usolar.vn)

### *Solar Photovoltaic (PV)*

Solar PV system is made by semiconductor materials to convert the energy to direct-current (DC) electricity and then DC electricity can be inverted to produce alternating – current (AC) electricity. Therefore, PV system can be often used in off-grid applications where the capital cost of PV system is less than to setting up a new power line or disrupting the existed infrastructure system. By combining with battery storage or wind energy or hydro energy or integrating with the grid, PV systems can provide very high reliability, which can provide continuous operation when the sun is not available.

(Thornton, farmfoundation.org , 2009)

There are three different of PV technologies: mono crystalline, poly crystalline and thin film solar technology. Mono crystalline is the original PV technology that was invented in 1955 while poly crystalline entered into the market in 1981. (dako.co)

Mono crystalline and poly crystalline are grouped under the crystalline technology, which use silicon to produce solar cells. While, thin film technology or Amorphous silicon (a-Si) alloy technology is often use non-silicon semiconductor materials including copper, indium, gallium and selenium (CIGS) to create solar cells. The non-silicon materials can be also printed on flexible or light substances, which can create new applications for solar energy. (uni-solar )

### *Mono crystalline solar panel*

Mono crystalline modules (panels) are composed of solar cells cut from a piece of continuous crystal. The material forms a cylinder which is sliced into thin circular wafers. The cells may be fully round or maybe trimmed into other shapes.

Because each cell is cut from a single crystal, it has a uniform color, which is dark blue. It is slightly more expensive than a poly crystalline solar panel.

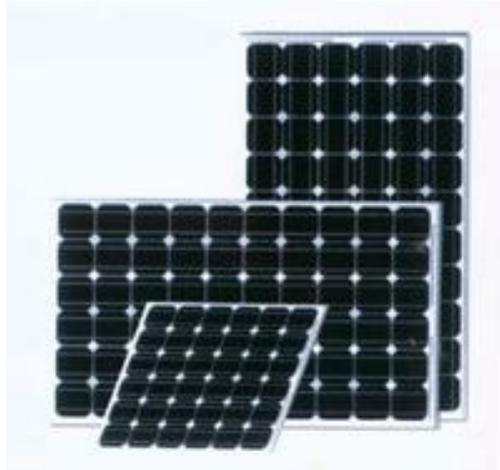


FIGURE 2. Mono crystalline solar panel model (Source: dako.co.za )

### *Poly Crystalline solar panel*

Poly crystalline solar panel is made from the same silicon material with mono crystalline, except instead of being grown into a single crystal, it is melted and poured into a mold. This forms a square block that can be cut into square wafers with less waste of space or material than single crystal or boundaries. Poly Crystalline solar panel's efficiency is slightly lower than mono crystalline module lead to the size of a finished poly crystalline module per Watt is bigger than a mono crystalline module per Watt. Poly crystalline solar panel has high durability which can be warranted nearly 20 years and it is the same for mono crystalline solar panel.

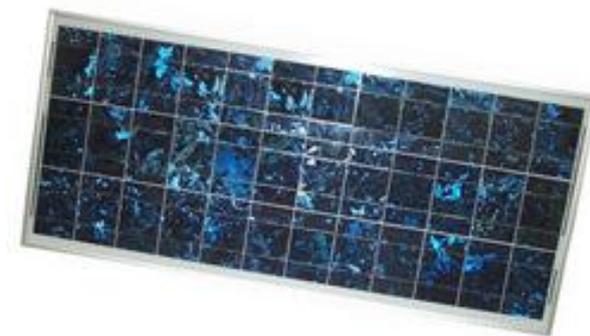


FIGURE 3. Poly Crystalline solar panel model (Source: dako.co.za)

### *Thin film solar panel*

Thin film technology offers an opportunity to reduce the materials cost of solar cells because the thin film solar cell thickness can be 100 times less than its

crystalline counterpart. Therefore, PV products using thin film technology can have advantages of light weight, flexibility and lower price. (Uni-solar). However, thin film solar cell have its own disadvantages such as lower efficiency (lower ability to absorb solar radiation) and uncertain durability if compared with crystalline technology. (dako.co.za)



FIGURE 4. Thin film solar panel (Source: uni-solar.com )

The following table will make a comparison between three different types of solar cell by focusing on the material, thickness, efficiency, color and features.

TABLE 3. Different types of solar cell (Source: pvresources.com )

Material	Thickness	Efficiency	Color	Features
Mono crystalline Silicon solar cells	0.3 mm	15 - 18 %	Dark blue, black with AR coating, grey without AR coating	Lengthy production procedure, wafer sawing necessary. Best researched solar cell material - highest power/area ratio.
Poly crystalline Silicon solar cells	0.3 mm	13 - 15 %	Blue with AR coating, silver-grey without AR coating	Wafer sawing necessary. Most important production procedure at least for the next ten years.
Amorphous Silicon solar cells	0,0001 mm + 1 to 3 mm substrate	5 - 8 %	Red-blue, Black	Lower efficiency, shorter life span. No sawing necessary, possible production in the form of band.

#### 2.4. Review of existing renewable energy franchising

The review of businesses, which have applied the franchising model to renewable energy sector, is one of the best answer to the question of has the technology transfer been done under the form of franchising model. Based on the internet resources, this study has discovered two different franchisors working on renewable energy sector.

*Yes! Solar Solution Company*

The first solar energy franchising has been set up in California, USA. Yes! Solar Solution is a subsidiary of Solar Power Inc. which is an international solar company. Yes! Solar Solution is a manufacturer of high quality solar modules and other system components that is able to offer turnkey solution. Yes! Solar Solution has a unique business strategy since it can bring the new opportunity and an easiest entry mode for individuals, small and medium enterprises to enter the energy sector. Yes! Solar Solution distributes its own brand of PV solar module and related solar products through its retail energy outlet. Yes! Solar Solution outlets provide customers a place to come and learn about everything from how sunlight is converted to power, how PV solar home system is installed and the economic as well as the environmental benefits of solar power. The store is designed to attract customer by interactive solar bar, variety of videos and animated presentations. Solar PV is an educational product requiring the supplier must offer the buyer different kind of before and after sale services such as consulting, installing, maintenance, warrantee. The buyer still involves with the supplier during at least five years or even ten years due to the long life cycle of solar PV. (Yes! Solar Inc., 2008)

Yes! Solar Solution has expanded its franchising system from 2008 until 2009 with the following list of territory franchisees:

- November 5, 2008:  
Sold Franchise Territory to San Francisco Bay Area Investment Group.
- November 24, 2008:  
Sold First East Coast Franchise Territory to North Carolina Investment Group.
- January 22, 2009:  
Sold two Franchise Territories in Northern California.

- June 3, 2009:  
Sold two more Franchise Territories in East Coast California.

*Seabell International Co.Ltd*

The second example of franchising in the energy sector is Seabell International Co.Ltd in Japan, which is a renewable energy technology research and development company. Seabell specializes in micro hydropower generation systems development and just supply the distribution only with franchise partners. Seabell develop franchising model to save the shipping cost to ship a whole micro hydropower generation system to other countries. Seabell works on innovation, R&D in new technology to generate power from various energy resources such as wind and hydro energy. Seabell just deals with partnership through franchising model. This is a new way of doing business helping both franchisor and franchisee to cut the shipping cost as well the high labor cost in developed countries like Japan. With franchising model, Seabell is able to increase the utilization of their technology and innovation globally without caring about the distance or logistic issues. (Seabell Inc., 2009)

It can be seen from two existing energy franchisors mentioned above that the franchising model is a possible business model for the energy sector. However, this study must be taken into deeper analysis to answer that is franchising a possible business model for solar energy in Vietnam? The franchising model has been tested at least by two existing renewable energy business.

### 3. METHODOLOGY

This chapter will provide an outline of the approach and methodology of this study. The application of qualitative method to this research will be explained in this study approach section. Following this study approach, this study strategy will include the quotation and material resources outline. Data collection as well as the selection of sample will be analyzed after presentation of research strategy. Next, the method to analyze collected data will be mentioned in the data analysis section. Finally, the reliability and validity with references will be discussed in the last section.

#### 3.1. Research approach

This study approach method is chosen based on sample capacity, the characteristic of this study topic and the respondent's backgrounds. Solar energy is still a new conception in Vietnam thus the number of respondents and their background about this topic is limited. That is the main reason why this study has chosen the qualitative method of approach. Moreover, qualitative research can help this study to expand the range of knowledge and to get an in-depth analysis based on detailed responses from interviewees. The interviewer has the opportunity to give open-questionnaires to the interviewee in order to receive responses that are not limited by yes or no answer without explanation.

Qualitative research method is defined: "Qualitative research seeks out the 'why', not the 'how' of its topic through the analysis of unstructured information – things like interview transcripts and recordings, emails, notes, feedback forms, photos and videos. It does not just rely on statistics or numbers, which are the domain of quantitative writers. Qualitative research is used to gain an inside view into people's attitudes, behaviors, value systems, concerns, motivations, aspirations, culture or lifestyles. It is used to conduct business decisions, policy formation, communication and research. Focus groups, in-depth interviews, content analysis and semiotics are among the many formal approaches that are used, but qualitative research also involves the analysis of any unstructured material, including customer feedback forms, reports or media clips." (qsrinternational.com, 2009)

This study has relied on Moon, Dillon and Sprenkle's point of view when they illustrated the advantage of qualitative method that: "The meaning of naturally occurring complex events, actions and interactions in context, from the point of view of the participants involved" (University of South Africa, 2009, p.75)

Lastly, according to Kelly, qualitative research, contrary to quantitative research, is less concerned with finding truths but focus more on making sense of "human experience from within the context and perspective of human experience" (University of South Africa, 2009, p.77)

This study prefers to base on the experiences coming from various respondents in different position with different point of view. Therefore, the overview of Vietnam's solar energy market will be described in details and adequate.

### 3.2. Research strategy

This study focuses on three various respondent groups, who are MOIT, the potential franchisees and the consumers to answer the question: "Is the franchise model a possible business model for solar energy in Vietnam?" The theory part was collected from relevant books and reliable websites. This study carries out a number of interviews occurring over three different regions in Vietnam. This study will focus on Hochiminh City located in the South, Nha Trang City located in the Central Region and Hanoi located in northern of Vietnam. In addition, this study will provide the general information about market research by focusing on the top five solar companies in Vietnam. The Education and Technology University of Hochiminh City will support information about the techniques that are applied to produce solar panel as well as solar equipment in Vietnam. The Energy Department of MOIT of Vietnam will take an important role to supply information about all existing types of independent power plant as well as the specific plan for renewable energy in Vietnam. Potential franchisees will be interviewed to answer questions relating to problems they have to face. Moreover, this study creates a new concept in their mind by setting a new solar franchise business, which enables them to find a new business opportunity.

### 3.3. Data sources

Churchill has recommended that: “Do not bypass secondary data. Begin with secondary, and only when the secondary data are exhausted or show diminishing returns, proceed to primary data”. It can be seen that, secondary data is the first choice for any writer since it can save time and money. It can also provide a comparison instrument, which help the researcher interpret and understand the primary data. The combination information from secondary and primary data can be answered best for this study questions. (Ghauri & Gronhaug, 1948, p.78).

The researcher can collect primary data, which are relevant to a particular study and research via observations, experiments, surveys and interview. Therefore, the researcher can know about respondent attitudes, intentions, behavior for particular questions. All this information may not be available in secondary data. (Ghauri & Gronhaug, 1948, p.82).

Based on requirements of this study, both secondary and primary data should be used to integrate and implement their advantages as well as disadvantages. The secondary data almost all supports the theory part while the primary data mainly provides information for the empirical part. Secondary data is collected from relevant books, reliable and online newspapers and selected websites carefully. Due to the solar energy franchising and technology transfer for renewable energy being new topics still, which are very difficult to collect data from primary data, this study has to rely mainly on secondary data published in books and posted on internet websites, newspapers, studies and reports. On the contrary, information about solar energy companies in Vietnam is not available on internet websites or public newspaper. This study bases on the primary data collected from Energy Department of MOIT, top five solar businesses and target customer groups in Vietnam.

### 3.4. Validity and reliability

This study will only be valid for about the next five years because the developing of solar energy in Vietnam as well as the rise of new solar energy technologies.

Moreover, after 2015 the competitive power market in Vietnam will be set up following the master plan to establish the competitive power market, which has been approved by the Vietnamese Prime Minister in 2006. (Prime Minister, 2006, Provision number 26/2006/QĐ-TTg)

All the information contributed to this study is provided by the Board of Management of the top five solar companies in Vietnam, by the Head of Energy Department of MOIT, directors and managers of some resorts and islands in the Central Regions of Vietnam. It can be seen that the data and information is collected from reliable websites as well as the updated resources.

### 3.5. Research problems

It has been forecasted that it will not be easy to collect financial data from the top five companies to estimate their market shares. This is a common situation for many other studies since the interviewed companies are always careful with internal information that may become troubles for them. It is not an exceptional case for this study when almost all of the interviewed companies had provided the writer an extra financial data that cannot be relied on. That is why this study has been failed in creating the top five solar companies' market shares, which is considered one of the important objectives of this study.

The second problem that must be mentioned is that the potential franchisee or partnership group has been withdrawn from this study's respondent list due to time limitation. These missing tasks will be suggested for further research after this study.

Finally, this study just focused on the top five solar businesses, which are not enough to cover all the rest of the participants in the Vietnam's solar energy market. The collected information and comments only depend on a limited respondent group. The smaller solar companies may have different points of view and estimates about the market, which is one limitation of this study.

## 4. SOLAR ENERGY MARKET RESEARCH IN VIETNAM

### 4.1. Vietnam's energy market overview

Vietnam has two main types of independent power plants including hydropower, and thermal power plants. In recent times, to meet the demand of electricity, EVN gives high priority to the development to hydropower plants and thermal power plants using fossil fuels, which are mainly coal and gas.

#### 4.1.1. Hydropower plant

This study gives out the basic operation model of how hydropower plants work and then gets into deeper analysis of advantages and disadvantages of this type of power station.

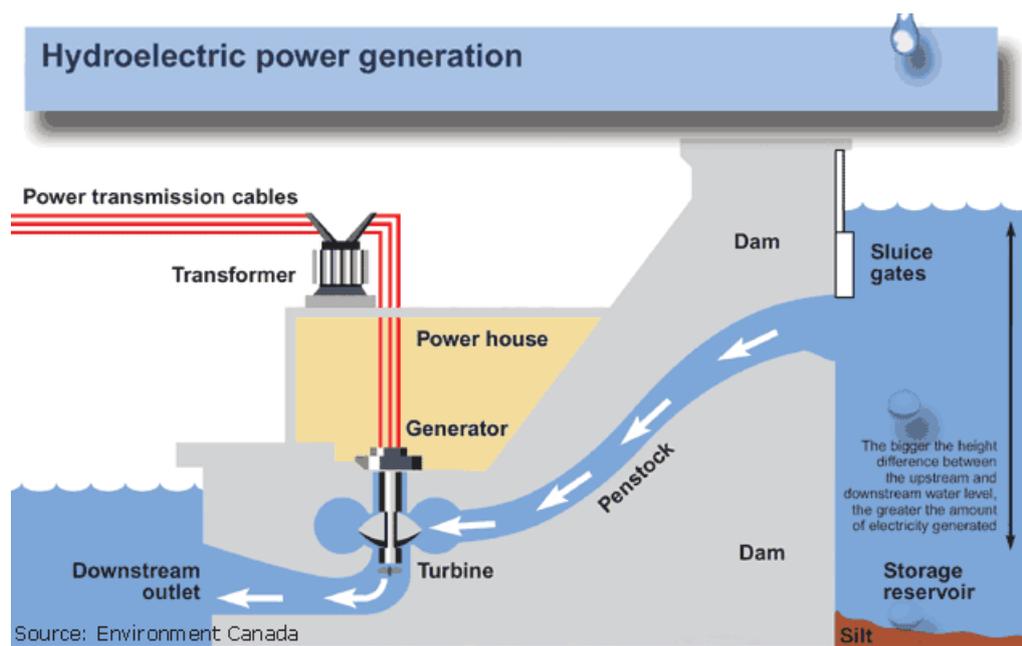


FIGURE 5. Hydropower generation model

(Source: <http://ga.water.usgs.gov/edu/wuhy.html>)

By 2010, the total capacity of existing and under construction hydro power plants is approximately 10,211 MW. This represents about 38%-40% of the total capacity of all the types of power plants in Vietnam. (Dr. Dam, VNCOLD Document for the

Meeting of ICOLD Committee on “Dams for Hydroelectric Energy” (DHE), 2008). The following table shows the percentage of hydropower plants of the total capacity of power plants in Vietnam from 2005 until 2015:

TABLE 4. Generation capacity of Hydropower plant in Vietnam  
(Sources: <http://www.vncold.vn>, Dai, EVN)

<b>Year</b>	<b>2005</b>	<b>2006</b>	<b>2010</b>	<b>2015</b>
<b>Electricity production (billion KW)</b>	53.50	60.60	124.00	257.00
<b>Electricity sale (billion KW)</b>	45.60	51.50	107.00	223.00
<b>Total capacity of PP (MW)</b>	11,286	11,837	27,000	70,000
<b>Hydro PP (MW)</b>	4,198	4,749	10,211	19,847
<b>% of hydro PP in total PP</b>	37%	40%	38-40%	28-33%

To have a clear overview about hydropower plants in Vietnam, this study focuses on the analysis of some significant advantages and disadvantages that hydropower plants in Vietnam are facing from recent times until 2020.

First, focusing on what are the advantages of hydropower plants?

#### *Potential resources*

According to the Energy Balance Report of Vietnam by 2020 (eneken.ieej.or.jp, 2009), Vietnam has a potential resource for hydropower plants totaling an estimated potential capacity of 300 billion kWh per year of which about 80 billion kWh is efficiently utilizable. About 60% of the total hydropower resource is in the North of Vietnam, 26% in the Central Region and the remaining 14% in the South of Vietnam.

It can be seen that hydroelectricity is the only renewable energy utilized on a large scale and there is only a quarter of its potential resource yet exploited. Therefore, the government has planned to build up to 200 hydropower plants with capacity of 1 MW to utilize efficiently the potential hydro energy resources. (Greenbiz, 2009)

### *Lower operation cost and long life expectancy*

In addition, another advantage is that hydropower does not depend upon the price of gas or oil or coal. Moreover, many hydropower plants can operate over fifty to one hundred years. That is why electricity generated from hydropower has a lower cost and is more stable. It also does not require a large number of laborers to run a hydropower plant because it can be operated by an automatic program. Therefore, the operation cost can be reduced effectively by the advantages of labor cost and energy cost.

### *Green and clean energy*

The pollution created by hydropower power plant is quite minimal because it does not produce radioactive waste or pollution waste from burning coal or gas or oil. Hydropower is a green and clean energy like solar and wind energy that does not bring bad impact to the environment like thermal or nuclear power.

### *Flexible installation*

One more advantage of a hydropower station is it can be set up in almost any size from small to large size. That just depends upon the location of river or stream used to operate them. Moreover, it does not rely on natural exhaustible resources.

### *Lower production expense*

Generally, if compare with other types of power plant, a hydropower plant has a lower production expense which will be illustrated in detail by the following table:

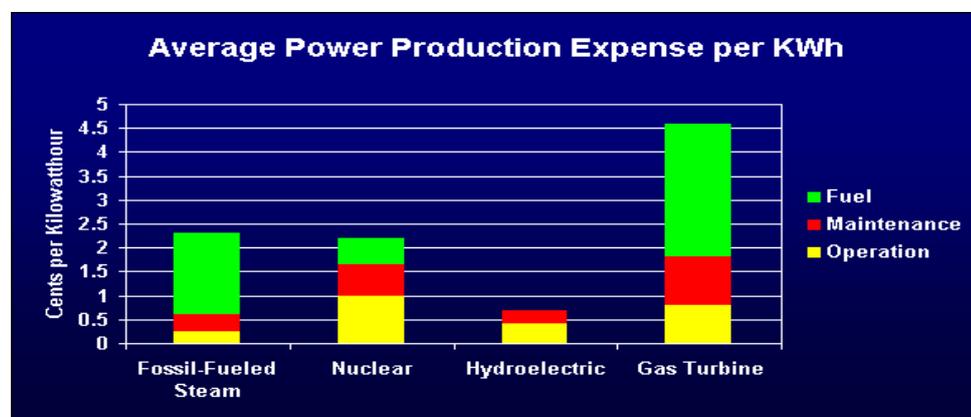


FIGURE 6. Average power production expense per kWh (Source: edu.pe.ca.com)

However, any kind of power plant has its own disadvantages and there are some main issues relating to drawbacks of hydropower stations. The main difficulty in running a project to build a hydropower plant is the requirement of a large area of land for installation. There are many problems that involve the natural ecosystem as well as the human beings surrounding it. The second issue is that the most potential areas for building new hydropower plants in Vietnam are already occupied. In this section, this study will analyze which problems can occur during the time for construction of a new hydropower plant, especially, in Vietnam in recent times.

#### *Requires large area*

A large piece of land has to be cleared to build dams, power generation units and the transmission system that connects the power station to the national grid. This is the main reason that the natural ecosystem in the surrounding forest areas could be disrupted. A large number of trees have to be cut not only destroying the plant life but also the animals dependent on them.

On the other hand, it is not easy to convince people to leave their land that has been their home for hundreds of years. Therefore, a big plan for resettlement should be set up and implemented to convince the surrounding residents who are willing to shift to the other land. This type of big movement always requires government support involvement. It depends on the scale of the hydropower plant, some big projects require at least three to four years to complete the process of clearing a large area for construction.

(Khemani Haresh, brighthub.com, 2008)

#### *Running out large scale hydropower plant*

According to an interview published on 17 Apr 2008 between Ms. Ngoc Lan – journalist of KinhteSaigononline newspaper and Mr. Tran Viet Ngai – President of the Energy Association of Vietnam, the opportunity for investors interested in a large scale hydropower plant in Vietnam has been exhausted, since almost all hydropower projects located near some main biggest basins in the North, Central and South have been exploited. Therefore, new projects or under survey projects should be calculated carefully to avoid loss or failure. Almost all hydropower

projects in Vietnam except a few large plants cannot be used during the dry season when the flow of rivers is exhausted. The investors will lose or get less profit if they invest in a project that just can be run in the rainy season only and does not have electricity to supply during the dry season. This is also one of the weaknesses of hydropower plants in Vietnam. Hydropower plants often face with the biggest issue of lack of electricity during dry season and oversupply during the rainy season leading to lose balance of supply and demand in the electricity market as well as not reaching its highest productivity. Moreover, some small hydropower plants have to face with the threat of impossibility to sell electricity to EVN during the rainy season, as bigger hydropower plants are also in oversupply status. (thesaigontimes.vn, 2008)

According to the interview held on 25<sup>Th</sup> June 2009 between the writer and Mr. Ta Van Huong - Head of the Energy Department of MOIT of Vietnam, there is no opportunity for a big scale hydropower plant in Vietnam anymore since almost all big projects ha been exploited. For the next twenty years, the investors can only be successful vewith small and medium hydropower plants.

#### *Require high investment cost*

If compared with other types of power plants, hydro power plants require a huge investment that may be two or three times higher than thermal power plants. This is one of the primary disadvantages of a hydropower plant even though it has a lot of advantages to attract investors. At the beginning, the investor should invest a lot of capital, which is expected to get pay back after at least ten to fifteen years. It is a long - term investment and requires the investor to have very strong financial support. The investment cost to generate 1 KW of electricity by various power sources will be discussed more detail in TABLE. 5 in the next section.

#### 4.1.2. Thermal power plant (coal, gas, oil)

Thermal power plant can operate by using three different fuels such as coal or gas or oil and the following diagram will describe how does a thermal power station work?

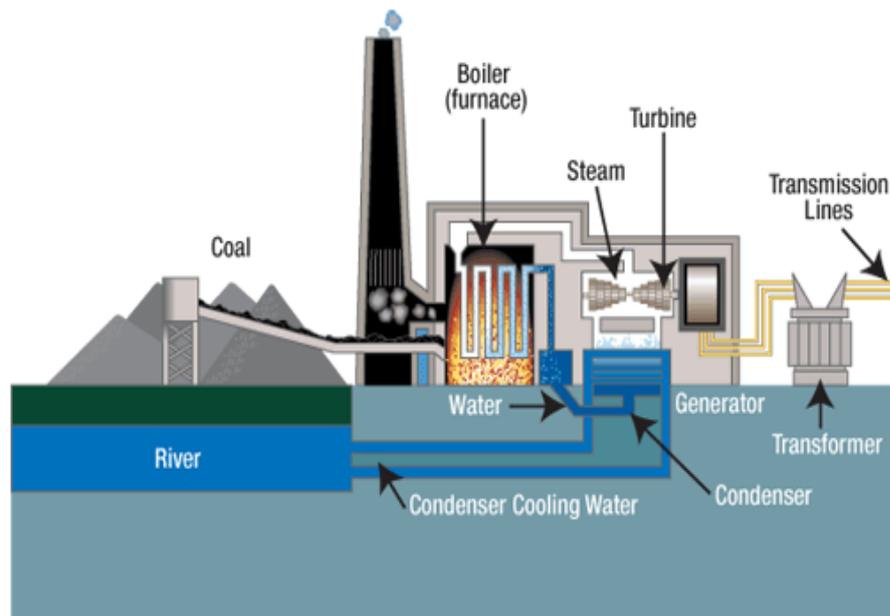


FIGURE 7. Thermal power plant model (Source: [tva.gov/power/coalart.htm](http://tva.gov/power/coalart.htm))

#### *Advantages of thermal power station in Vietnam*

There are two main advantages of thermal power plants which will answer to the question why thermal power plants occupy a majority percentage (46%) of the total capacity power plants in Vietnam. (secorgroup.com, Trung, 2009)

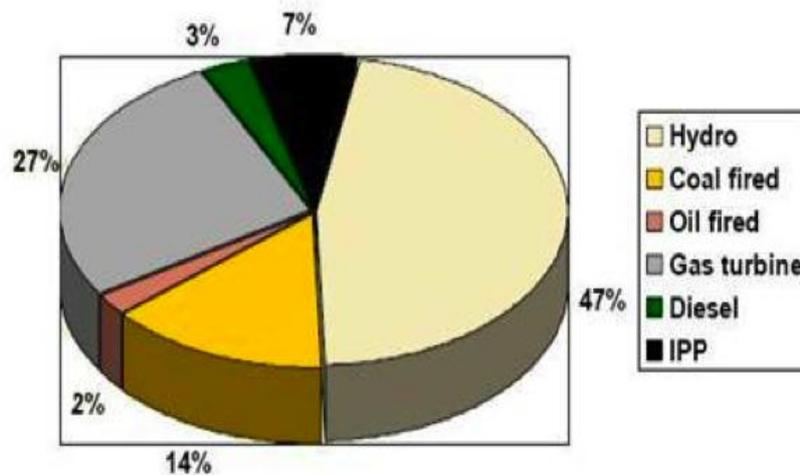


FIGURE 8. Vietnam's electricity generation sources (Source: Vietnam Ministry of Industry, 2009)

### *Potential natural resources*

Vietnam produces about 40 million tons (MT) of coal yearly and exports 50% of total production. Vietnam has two main kinds of coal, hard coal (anthracite) that is used to make steel and soft coal (steam or thermal coal) used for generating electricity. Hard coal occupies a primary proportion of the total Vietnam's coal reserve and it has higher value compared with soft coal. While the price for one ton of soft coal is just under 100USD, the hard coal costs over 300 USD. Various sources mention Vietnam has a total of over 30 billion tons of coal reserves.

Almost all potential coal resources are located at more than a hundred meters depth in the Red River Delta. Therefore, having a potential resource has become one main advantage of running a thermal power plant.

Besides coal, oil and gas reserves have become one of the strengths of Vietnam and according to Vietnam oil and gas report for Quarter 3, 2009 issued on 1<sup>st</sup> May 2009, collected by Business Monitor International, Vietnam will contribute with 1.49% of Asia Pacific regional oil demand by 2013 while being able to provide 4.4% of total supply. It implies that Vietnam can export 2.91% of the total oil demand to Asia Pacific countries. Vietnam's gas consumption contributed with 2.27% of Asia Pacific gas demand and its share of production is contributed at 2.75% in 2008. By 2013, it is estimated that Vietnam's gas consumption will occupy 3.81% of the total gas demand and accounting for 4.33 % of total gas supply for Asia Pacific countries. It is assumed that oil and gas liquids production will peak at 400,000 barrels per day in 2010 and then it may have a slow down to 385,000 barrels per day by 2013. Gas production is expected to rise from 10 billion cubic meters in 2008 to 27 billion cubic meters in 2018. (Business Monitor International, marketresearch.com, 2009)

### *Lower investment cost*

Coming up to the next advantage, the graph below will illustrate how much investment capital is required to generate 1kW electricity from many different kinds of power station in Vietnam. In general, a coal thermal power plant costs less than a hydropower plant. It is the same for oil and gas thermal power plants, they even require less cost by two or three times compared to coal and hydro power plants.

TABLE 5. Illustrative Costs of Hydro, Coal and Gas-Fired Electricity Units  
(All Costs are per Kilowatt of Capacity or kWh for fuel and O&M)  
(Source: fetp.edu.vn, 2008)

	Capital Cost/KW	Years to Build	Variable O&M/kWh	Fixed O&M/kWh
Large Coal	\$1200	4	0.4 cents	0.4 cents
Chinese Coal	\$600	4	0.5 cents	0.5 cents
Combined Cycle	\$600	3	0.2 cents	0.2 cents
Gas Turbine	\$400	1-2	0.3 cents	0.4 cents
Diesel	\$200	1	0.5 cents	0.5 cents
Hydroelectricity	\$1400	3-6	0.1 cents	0.1 cents

This study continues with the analysis of some main disadvantages of a thermal power plant in Vietnam by focusing on coal reservation and environment pollution issues as well as the increase of world coal price.

*Running out of coal resources in the next 25 years*

According to Vietnam National Coal and Mineral Industries Group (Vinacomin), (vietnamnet.vn , 2008), the demand for electricity is expected to increase by 17-20% per year therefore, the domestic demand for coal is expected to increase to 35-42 MT a year by 2010 and up to 80 MT by 2025. It is estimated that, by 2010, coal export will drop to 12 MT and Vietnam will stop exporting coal to other countries in 2015. It is supposed that Vietnam has a vast local coal resource of over 30 billion tons. This is almost all located deep underground in the Red River Delta. It needs more exploration, drilling and supports with good infrastructure facilities in order to bring the coal to the surface. It will take time as well as investment capital and inspection and exploration with a specific long - term strategy.

It can be foreseen that Vietnam will need to import around 30 MT of coal for power plants a year in 2012-2015. As a consequence, hard coal will be exported three times higher than soft coal. Vietnam has the intention to export hard coal to

get higher revenue and import the cheaper coal from overseas to meet the demand for coal for generating power in the domestic market. (eneken.ieej.or.jp , 2009)

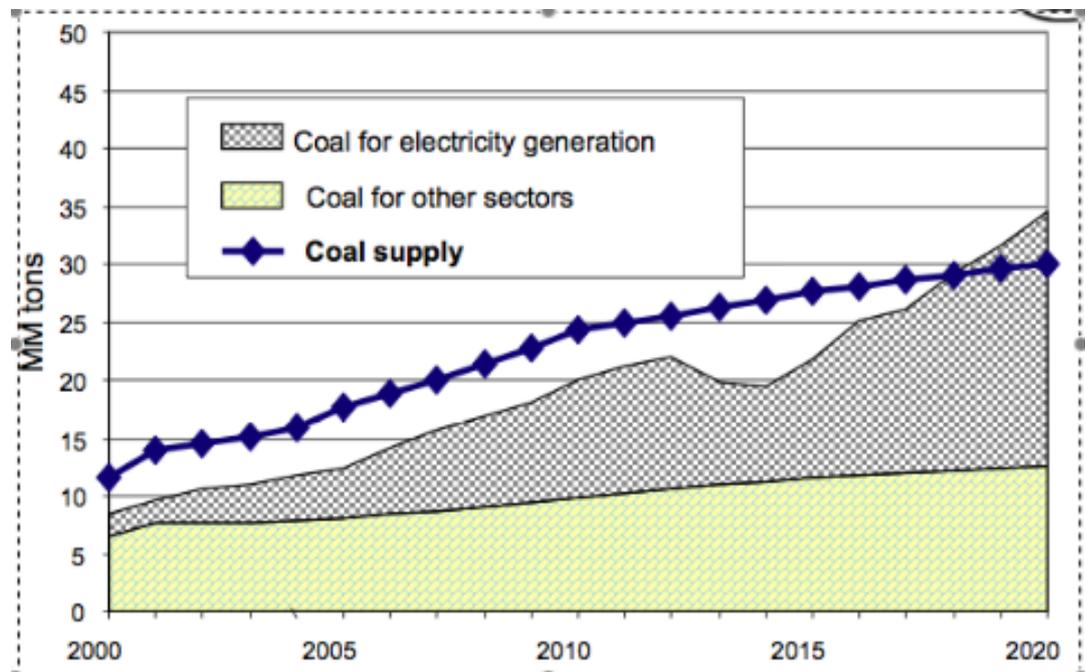


FIGURE 9. Vietnam's coal supply – demand balance by 2020 (Source: [eneken.ieej.or.jp](http://eneken.ieej.or.jp) , April 2009)

#### *Environment pollution*

Moreover, according to MOIT, industrial coal is still being used inefficiently and out-dated technology leads to serious environment pollution. It is necessary for coal thermal power plants to improve or update the technology to eliminate the waste of coal.

#### *Increasing price for imported coal*

Finally, MOIT added information of coal prices rising and the demand for coal is rising parallel with world prices. These factors have created more disadvantages for coal thermal power stations in Vietnam. Recently, Vietnam's coal power plants have tried to find potential suppliers from the overseas market in order to reduce the cost of generating electricity. For example, Vietnam looks for new potential suppliers from China and Australia.

This study comes to the next section, which focuses on the concern to for renewable energy on the part of Vietnamese government. What are the specific actions, which have been planned by the government to develop the power market as well as the solar energy market in Vietnam?

#### 4.2. Government policy for renewable energy in Vietnam

The Prime Minister of Vietnam, Nguyen Tan Dung, has approved decision number 1855/QĐ-TTg, The National Strategy of Energy Development until 2020 and the vision of 2050, on 27<sup>th</sup> December 2007 in Hanoi. This decision has mentioned the plan to develop the power sector generally and the renewable energy in particular, which will be discussed in details in the following sections.

##### 4.2.1. Targets for the power sector up to the year of 2020

The Vietnamese government has set up a plan to develop the electricity sources and networks, ensuring sufficient electricity supply for economic development, boosting the reliability rate of electricity supply to 99.7% in 2010. In this plan, the rate of alternative renewable energy sources will be boosted to 3% of the total energy sources in 2010; to 5% in 2020; and to 11% in 2050. Accomplishing an energy plan for the mountainous and rural areas; encouraging 50% of the rural houses to use power for cooking in 2010 and 80% in 2020. By 2010, 95% of the rural houses are expected to have access to electricity and that figure is expected to rise to 100% in 2020. The government is trying to shift the current power market to a competitive power market under governmental control, forming competitive retail power market from the year 2020 onwards and forming coal and oil market from now to 2015.

(Prime Minister Nguyen Tan Dung, Provision 1855/QĐ-TTg, 2007, section 2)

##### 4.2.2. Orientation for renewable energy development

The government is making plan to:

- Boost the use of renewable energy sources to supply power for people living in rural, mountainous and offshore island regions. To form managerial staff to maintain and develop electricity sources for these areas.
- Integrate the use of alternative renewable energy sources into energy-saving programs and other national schemes such as rural electrification, forestation, hunger elimination, poverty diminution, fresh water supply, etc.
- Encourage enterprises to build places for manufacturing, assembling and repairing renewable energy equipment such as hot water generators, wind engines and biogas...
- Co-operate in buying new technology from developed countries to assemble hi-tech accessories like solar cells, wind turbines, etc., gradually leading to domestic assembly and manufacturing.
- Support investigative and research programs, to build up specific regions using only renewable energy sources, to reduce tax on imported alternative technology as well as on the production and transportation cost; protect patent copyrights of valuable inventions.
- Allow individuals and economic organizations inland and overseas to cooperatively invest and exploit renewable energy sources on the basis of bilateral profitability.

(Prime Minister Nguyen Tan Dung, Provision 1855/QĐ-TTg, 2007, section 3)

This study also summarized several notes from a discussion, which held on 25<sup>th</sup> Jun 2009 between the writer and Mr. Ta Van Huong - Head of the Energy Department of MOIT. There are several main issues related to why solar energy is still a very new concept in Vietnam and does the government have any specific policy to encourage renewable energy?

### *Budget deficit*

First, Vietnam is still a developing country, which is facing lack of energy and Vietnam does not have enough money to develop green or clean energy. The General Statistics Office (GSO) has announced on 31<sup>st</sup> Dec 2008 that Vietnam's GDP per capita was at USD 1,024 in 2008 but it is actually too early to give out the conclusion that Vietnam has escaped from the list of poor countries.

(vietnamnet.vn, 2009). This is why Mr. Ta Van Huong just mentioned that Vietnam is still on the way to close the gap between demand and supply of power. Thinking and planning on a specific policy for developing renewable energy should only start when the shortage of energy will have ended.

Moreover, with a very limited income, Vietnamese people cannot afford high technologies such as wind and solar energy, which often require high cost compared with other types of energy. They still do not demand clean and renewable energy and they absolutely lack information and knowledge about green energy. To eliminate the distance between developing and developed countries, it will take at least ten or even twenty years. In this situation, Vietnam's government just focuses on the remote areas such as islands, mountains and rural areas in order to reach the target of 100% of Vietnamese people being covered by the national grid by 2020. Therefore, solar and wind energy is considered by the government as an alternative energy to be supplied to remote areas.

#### *Action to develop renewable energy by Vietnam's government*

Through tax policy, Vietnam's government can support renewable energy development by reducing or cutting off the import tax for a full system or production, which can be used to install a small renewable power station or to generate power from renewable energy such as solar panels, wind turbines, solar cells, battery systems and other related components. The importer needs to apply to get a certificate of renewable energy equipment facilities issued by MOIT to receive support from the Tax Office. However, the procedure to get this certificate is too complicated and takes quite long time for businesses.

The following section is the most important decision from the Government, which focuses strongly on the power market in Vietnam. Actually, this master plan will create a big change not only for the energy market but also for the whole domestic economy in Vietnam from 2015 until 2020.

#### 4.2.3. Plan to set up a competitive electricity market in Vietnam

The Vietnamese government has approved the master plan and conditions to establish and develop the competitive power market through 3 levels (phases):

- Phase 1 (2005 - 2014): Competitive generation power market.
- Phase 2 (2015 - 2022): Competitive wholesale power market.
- Phase 3 (from 2022): Competitive retail power market.

Each phase will be implemented in 2 steps: pilot and completed, details as follows:

a) Step 1 - Phase 1: Pilot competitive generation power market (from 2005 to 2008).

- Organize the competitive generation market among the generators owned by EVN to test the competition in generation following the single buyer model. The generators, transmission companies and distribution companies owned by EVN will be re-organized into the business independent accounting companies.
- The Independent Power Plants (IPPs) which are not owned by EVN will keep selling to EVN following the signed long term power purchase agreement (PPA).
- At the end of the pilot step, the big generators with important role in the power system currently owned by EVN should be re-organized into the independent generators as the independent state owned companies; the remaining generators should be changed into the independent generators as the joint-stock companies to prepare for the completed competitive generation market.
- The Ministry of Industry is to issue the rules to regulate the market activities as well as to provide instruction to implement these rules.

b) Step 2 - Phase 1: Completed competitive generation power market (from 2009 to 2014).

- Step into the completed competitive generation market once the preconditions required for this step are met.
- The IPPs are allowed to offer to begin the completed competitive generation market (following the single buyer model); the generators will sell into the market

through the PPAs and provide offer in the spot market with the rate between the two components of each generators defined by the ERAV.

c) Step 1- Phase 2: Pilot Competitive Wholesale power market (from 2015 to 2016).

- Operate the Pilot Competitive Wholesale power market once the preconditions required for this step are met.

- Some distribution companies and big customers are selected to establish the Pilot Competitive Wholesale power market. Some new wholesalers are allowed to be established to enhance competition in wholesale business. The current transmission companies are integrated into a single national transmission company under EVN; the distribution companies, system operators and market operators remain managed by EVN.

d) Step 2 – Phase 2: Completed Competitive Wholesale market (from 2017 to 2022).

- Operate the Completed Competitive Wholesale power market once the preconditions required for this step are met.

- The distribution companies owned by EVN are allowed to change into the independent companies (SOEs or joint stock companies) to directly purchase from the generators and conversely, the generators also compete to sell to these companies. The wholesalers also compete to sell to the distribution companies and big customers.

e) Step 1 - Phase 3: Pilot competitive retail market (from 2022 to 2024).

- Operate the Pilot competitive retail market once the preconditions required for this step are met.

- Some distribution network areas with appropriate size are selected to implement the pilot period. Basing on the consuming level defined by ERAV, customers are allowed to choose the power supplier for their demand (the retailers). The retailing function of the selected distribution companies will be separated from distribution network operation and management functions; the retailers will compete to sell to each customer and purchase from the wholesalers.

f) Step 2 – Phase 3: Completed competitive retail market (since 2024).

- Basing on the consuming level defined by ERAV, customers are allowed to choose the power supplier for their demand (the retailers) or directly purchase from the market.

- The organizations, individuals who can meet the requirements of the power activities are allowed to establish the new retailers to compete in retailing. These retailers have the right to purchase from the generators or the market to retail to the end users.

(Prime Minister, 2006, Provision number 26/2006/QĐ-TTg.)

There is a positive signal for the power sector after the master plan has been approved to establish the competitive power market in Vietnam. Based on this plan, after 2015, the competitive wholesale power market will be set up, which gives a chance for power producers to choose who are the best wholesalers for them. As a consequence, EVN will not anymore control Vietnam's power market as a mono seller. The price of power will not be set up by only EVN but also by several power wholesalers. For that reason, the monopolistic power market in Vietnam will be diminished by 2015, which will be a revolution for Vietnam's energy industry. Furthermore, the investors can expect that they will have a bright future in Vietnam since the competitive retail power market will be set up after 2022.

#### 4.3. Vietnam's solar energy market overview

It is estimated that Vietnam will lack about 10% to 20% of its domestic demand for energy by 2020 and 50% by 2050. To close the gap between the total supply and demand for energy from 2020 to 2050, Vietnam will have to import fuel to generate electricity. However, the price of fuel on the world market is on an upwards trend. Energy security is an essential responsibility for Vietnam in the recent now. Vietnam's solar energy market is contributed to by two main products including solar water heater system and solar photovoltaic (PV).

#### 4.3.1. Solar water heater market

Looking into the solar energy market in Vietnam, it is easy to realize that the solar water heaters are the primary products that have been selling in the domestic market. In other words, it can be seen that, the solar water heater is the main product that has set up solar energy market in Vietnam. In the past three years, there were hundreds of both domestic and foreign suppliers joining the solar energy market and this number will be increasing in the future. Therefore, in the domestic market, there is a wide range of water heaters utilizing solar energy. It is estimated that the total capacity of electricity for running water heaters in Vietnam consumes around 3.6 billion kWh of electricity each year. The demand for solar water heaters is predicted to increase rapidly in next few years.

(Kieu Nga, monre.gov.vn, 2009)

This is the list of top five well-known brands dominating Vietnam's solar water heater market:

- SOLAR- BK (Bach Khoa Solar J.S Co.)
- Polar Sun (Red Sun Energy J.S Co.)
- USOLAR (VnSolar J.S Co.)
- Sun Flower (Tan A Co.,Ltd)
- Thai Duong Nang (Son Ha Co.,Ltd)

However, Vietnam is facing some difficulties in developing solar water heating systems. Especially, the equipment that is required to produce the solar water heater still has to be imported from China. Bach Khoa Solar is the only supplier able to manufacture a whole solar water heater system in Vietnam. All the other suppliers have to import a full solar water heating system or do business under the form of wholesale of some well-known trademarks in the world. For example, Vnsolar is a wholesaler of USOLAR, which is an American company that has manufactory in China. The majority of solar water heaters sold in Vietnam are imported from China since the income of the Vietnamese consumer is still not high enough to afford higher quality products with higher prices. This is one of the main barriers for domestic manufacturers who have to face many competitors coming from China. Moreover, how to compete with China's solar water heaters in both quality and price is a big question for new investors with the intention to enter Vietnam's market. However, it does not mean that the solar water heater

market is not a potential market. According to Mr. Thai Son Do, Research Associate, Energy & Power Systems Practice, the government has recently launched a national program to call for public participation to utilize solar energy. Through this program, more than 30,000 solar water heaters need to be put in the market in 2013. The program aims to get benefits of saving more than 57 million kWh of electricity as well to reduce greenhouse gas emissions by 23,541 tons per year. (Do, frost.com, 2009).

However, the solar PV market is high-lighted more than the solar water heater market in this study because the technology to produce solar water heater is just a simple technology so that the technology transfer is not required anymore. The domestic suppliers are able to have their own technology and know-how process. In addition, the domestic producers cannot compete with China for this kind of product in both quality and prices. According to Vnsolar, the company has chosen the wholesaler of a well-known trademark as a business model instead of buying technology and producing a solar water heater. Vnsolar supposed that in this situation, Vietnamese workers still are not able to produce high technology products. The investors will have to deal with low quality issues and bad reputation in the market. In fact, adapting high technology is still a difficulty or even a big problem for Vietnamese manufacturers.

#### 4.3.2. Solar Photovoltaic market

The solar Photovoltaic (PV) market in Vietnam is dominated by the off-grid areas such as remote areas, mountain areas, islands where the consumers must rely on alternative energies to generate electricity. Up till now, there are more than 800 kW of solar PV systems have been installed to generate electricity for small home systems, telecommunications, hospitals and schools. Most of these installations are located in the South of Vietnam where the solar radiation is higher compared to other regions. (Do, frost.com, 2009). That is still not to mention to the other small and big islands, for instance, the Truong Sa islands have become a potential target for the top five solar PV suppliers in Vietnam recently. One of the most remarkable achievements of Vietnam's solar PV market is Redsun Energy, which has become the first manufacturer able to produce solar PV by using imported

solar cells from Europe. This is a big step for the domestic solar PV market to have more opportunities for market development over the next few years.

#### 4.3.3. Demand of solar energy in Vietnam

This study has recognized the importance of testing market demand for solar energy in Vietnam, which helps the investors, to find out the real opportunities to invest in a potential market. By discussing with respondents who are general directors of the top five solar companies in Vietnam, Mr. Mai Dinh Trung – Deputy Director of the Project Management Board on Rural Electrification and Renewable Energy, Mr. Godfrey Vas – General Manager of Six Senses Hideaway at Ninhvan Bay in Nha Trang, Dr. Bui Tuyen – Head of the Technology Transfer Research Center of University of Technical Education Hochiminh City, the writer has collected and summarized all the information relating to the real demand in Vietnam's solar energy market. The demand for solar energy in Vietnam will be analyzed by focusing on various target customers such as industrial zones, consumers in off-grid areas, hotels and resorts, telecommunication companies, public lighting companies and farms.

##### *Industrial zones*

Setting up a solar power station to supply electricity for industrial zones in Vietnam in the recent is impossible even though the legislation allows the investors to sell electricity direct to the end-users through their own local grid. For example, Tan Tao industrial zone has been approved a project cooperating with foreign partner to build 100MW local thermal independent power plant (IPP) to ensure its power supply stability. (tantaocity.com , 2007).

Why building a solar power plant in industrial zone is an impossible project in Vietnam, recently? One the main reason is that electricity generating from traditional energy is sold by EVN and other IPPs at the highest price in rush hours at 10 cents per kW (1.674 VND per kW), the average price is 5 cents per kW (949 VND per kW). While, the current cost of PV power ranges from 18 to 23 cents per kW (farmfoundation.org. 2009). PV power costs higher than traditional power two to four times.

Moreover, the capacity of solar power cannot meet the demand of specific capacity of power using for manufacturing. Finally, the investment cost to build a 10MW solar power plant that will be built in the South of Chicago, USA is USD 60 million equivalent with 1,020 billion VND (fairhome.co.uk, 2009) while it requires only 1,000 billion VND to build 100 MW thermal power plant in the Tan Tao industrial zone. (tantaocity.com, 2007).

This does not mean that there is no opportunity for investors to access the industrial zones. According to Mr. Thanh Danh Tran, Selco Vietnam Director, there are some manufactories in industrial zones invested in solar power systemd to ensure that the production process will not be interrupted when electricity is cut off. In addition, they also use solar power to contribute one fourth (1/4) of the total electricity demand to implement the Kyoto Protocol (an international environmental treaty to reduce green house gas (GHG) emissions to protect the climate systems). When became a member of the Kyoto Protocol, industrialized nations agreed to reduce their GHG emissions by purchasing Carbon Offsets Credits (consists of clean forms of energy production such as wind, solar, hydro and biofuels) or Carbon Reduction Credits (consists of the collection and storage of carbon from the atmosphere through reforestation, forestation, ocean, soil collection). Therefore, there are some manufactories such as Colgate Palmolive, Sony Inc., who have purchased Carbon Offsets Credits in Vietnam to implement the Kyoto agreement. Since Kyoto Protocol is still a new concept in Vietnam, sooner or later, it will be implemented popularly and that will open a wide door for solar companies doing business in Vietnam. This is a great business opportunity for solar energy sector in Vietnam.

#### *Off-grid areas*

The PV solar market concentrates on some remote areas such as mountains, islands and rural areas where the national grid still does not cover. Especially, there are some big islands such as Phu Quoc, Truong Sa, Hoang Sa, Bach Long Vi, Con Dao which rely on alternative energy. With perfect climate conditions in Vietnam, utility of solar and wind energy is the best solution for supplying power for those islands. According to Mr. Huy Phuong Nguyen, Sales Vice – Director of

Solar Bach Khoa, it is necessary to combine solar, wind and thermal energy to generate power for off-grid areas. In case, one backup power system is not available to operate the power station, the whole system is still able to run normally without interruption. For example, the solar panel will be used efficiently in daytime but wind energy is the best backup solution during nighttime. When can the thermal energy be used? In some bad weather conditions like storm and heavy rain, solar and wind energy both are not available or useless. There is still one significant segment of Vietnam's solar PV market, which should be considered. NGOs and other international organizations would like to help the Vietnamese government to solve the problem of lacking of electricity for remote areas. Therefore, the orders from this client groups normally are big projects not only for domestic suppliers but also for international suppliers.

#### *Hotels and resorts*

Hotels and resorts often focus on solar water heater and drying systems since the electricity expense contributes significantly to their operation cost. Therefore, using solar energy to alternate traditional energy has become a new trend for hotels and resorts. One more benefit of solar energy alliance to hotels and resorts is that this group can be confident to supply high - class services in a green, clean and environment friendly way. Solar Bach Khoa is the leader of Vietnam's solar water heater market focusing on the hotels and resorts segment.

In future, the electricity price will be adjusted by cutting financial support from the government for the electricity sector. To get more information about the demand for solar energy in Vietnam, this study focused on several resorts such as Seahorse Resort and Oceanblue Resort (both 4 – Star resort) in Binh Thuan Province and Six Senses Hideaway (5 – Star resort) in Ninhvan Bay in Nha Trang city. According to Mr. Godfrey Vas General Manager of Six Senses Hideaway, one of the top luxury resorts in Asia, solar water heater system has been installed and utilized efficiently for Evason Ana Mandara, inland resort in Nha Trang city. Moreover, the investor plans to set up a local power station on Six Senses Hideway island run by the combination of solar, wind, hydro and thermal energy. A combined renewable energy power station will take the place of several small local thermal power stations now operating.



FIGURE 10. Six Senses Hide Away resort, Ninhvan Bay, Nhatrang City.

(Source: Six Senses Hide Away in Vietnam)

#### *Street and traffic light systems*

KIDIVINA Corporation is considered the biggest solar company in the North of Vietnam. KIDIVINA has its particular strength in supplying the solar street and traffic light systems. For some particular projects, the investment cost to build a streetlight system by using traditional electricity is more expensive if compared with solar streetlight. It requires a big budget to set up an underground electricity pipeline system as well as the cost to invest in the power line transmission from the main power station to the local power station. That is why KIDIVINA has won a bid for solar streetlight system in Venezuela.

Using alternative power source for public lighting is a practical solution, which not only helps saving power but is also a solution to apply clean, environmentally friendly energy. Public lighting using solar energy is still not very popular in Vietnam, yet it has been carried out in many countries all over the world. The combination of solar and wind energy is an effective solution to reduce the dependence of renewable energy on the weather condition. The decrease in solar energy during rainy seasons will be made up for by the increase in wind energy, which helps to balance the energy sources.

In early 2008, with the initial success of the “solar-power generated Bolivar Boulevard” project in Caracas, the capital of Venezuela, KIDIVINA imported

Taiwanese and Japanese lighting technology using LED (Low energy discharge) and HID (high intensity discharge). The light is operated by an intelligent control panel with 3 functions: it automatically switches on (at 6:30 pm) and off (at 5.30am) lights in accordance with solar power; automatically charge and balance wind and solar power and always set a priority for alternative energy sources. When wind power exceeds the designed capacity, the panel will stop the wind engines and block charging to protect the batteries.



FIGURE 11. Solar streetlight system in Bolivar Boulevard, Venezuela, 2007 (Source: KIDIVINA)

In Vietnam, KIDIVINA has been applied this technology at Hoa Lac hi-tech zone by installing 2 lights with wind or solar power integrated technology using LED lamp with a solar battery panel, a wind turbine and reserving batteries.

KIDIVINA expects to make public lighting plans on a national scale with striking proposals: replacing all current lights in urban areas with those using alternative energy.

According to Mr. Quang Minh Nguyen - General Director of KIDIVINA, the cost of trenching and installing an underground wiring system often makes solar street lighting has become an economically feasible lower cost option. Therefore, the Central Regions of Vietnam will be the best location for installing the solar street light systems since the solar radiation concentration in those areas is intensive and higher than other regions. Quang Tri Province plans to co-operate with KIDIVINA to design and install solar street lighting for testing first and if the project is successful, it will be applied more broadly for the other areas. It can be

seen that solar streetlights will become a potential opportunity project for solar energy in Vietnam.

#### *Telecommunication*

Telecommunication lines often pass through remote areas where there is no infrastructure existing. The transportation and installation cost to set up a local power station or the transmission cost to connect with the national grid is much more expensive compared with the investment cost for solar combining wind power repeater station. Moreover, the local power station located in rural or mountain areas has to face with a lack of skilled labors, operators and maintainers who are not willing to work in those areas. The telecommunication sector is not allowed to have connection problems. Therefore, finding the best solution to eliminate disconnection is a great concern for the telecommunication suppliers. A solar power repeater has become extremely reliable and a suitable solution for this site. Four to six solar panels are connected to each solar converter, which converts the solar power into controller to supply power for telecommunication equipment. In bad weather conditions, it is required to connect an alarm signal to the nearest station, which is operated or supervised by available maintainers to make sure that they can be able to come and solve problems in the earliest time.

In Vietnam, there are four big telecommunication suppliers such as VNPT (Vietnam Post and Telecommunications Corporation), Viettel Mobile Telecom Company, Vinaphone Mobile Telecom Company, Mobilephone Mobile Telecom Company. The demand for installing solar power repeaters is increasing while the number of strong solar companies is still limited. This is a potential customer group for the PV solar panel market in Vietnam.

#### *Other utilizations*

Almost the same with common electricity, solar power can be utilized in various sectors such as it can be used to power water pumping systems, drying agricultural products, cooling systems, recharging batteries for ambulance and vaccine refrigerators, electrical home systems, recharging batteries for boat and alert systems in the sea. There are still many more other solar utilizations that are not mentioned in this study.

It can be seen that the demand for using solar power for pumping systems in the South of Vietnam, especially, in the Mekong Delta regions is a potential market. The fact that there are long sunshine hours per day and there is no winter season has become an advantage for the Mekong Delta regions to use solar power to substitute traditional power.

This study has opened for new investors real opportunities to set up a business in Vietnam by focusing on the demand of Vietnam's solar energy market. Now is time for investors to start thinking about the next steps to set up a business in Vietnam. This study follows step by step the process of doing market research, which is used to find out information about markets, target markets and the demand of the market, the competitors in the market, market trends, customer's expectation and satisfaction about the products. Seeking and analyzing information about the overview of the energy market as well as the solar energy market and the demand for the solar energy market in Vietnam has been done in the previous parts. What should the next step be?

#### 4.4. Analysis of potential business model

The next step should start by identifying the strengths, weaknesses, opportunities and threats, which will impact directly on the any new businesses. SWOT analysis is an efficient tool, which helps business have a very good preparation before entering a new market.

The following figure high-lights the main factors, which will be analyzed in every single detail in this section.

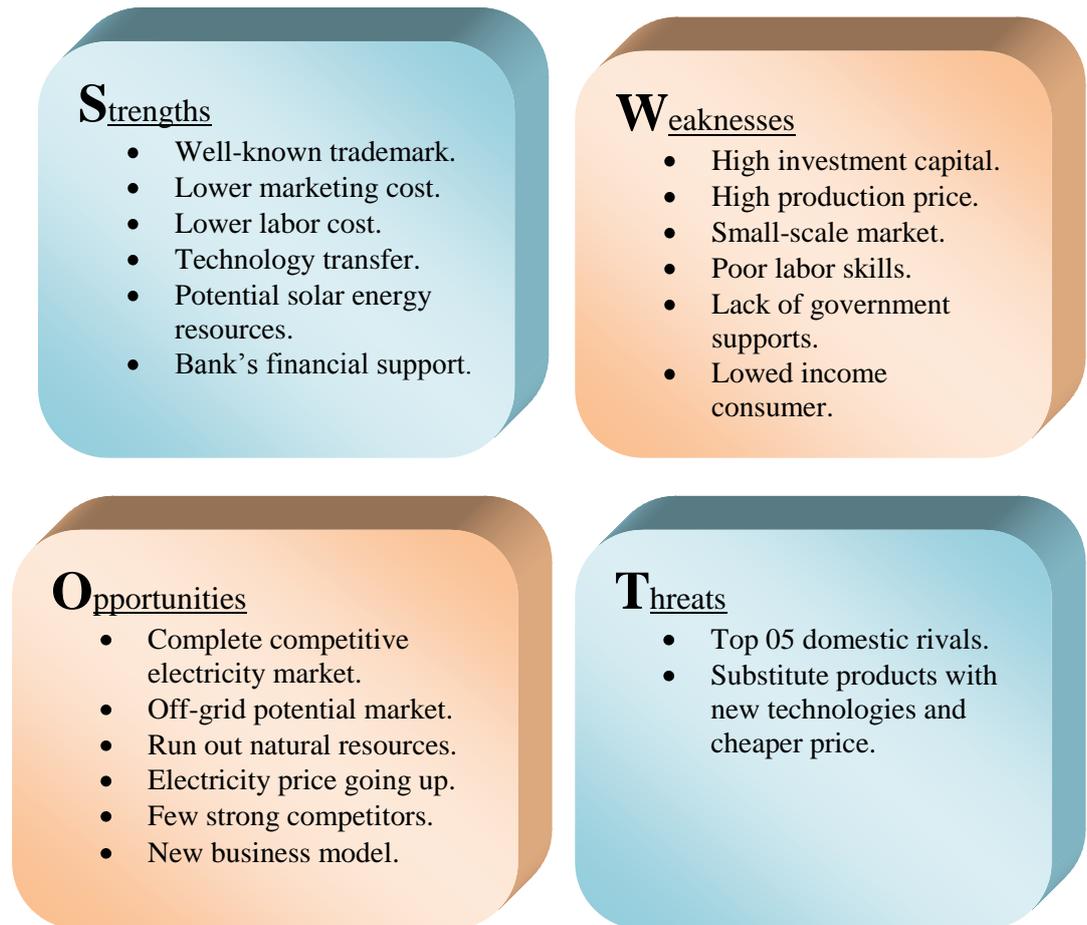


FIGURE 12. New franchise SWOT analysis

#### 4.4.1. Strengths

##### *Well-known trademark*

The new franchise will benefit from being a part of a well-known trademark with good reputable name, high quality product and efficient business model given by the franchisor. The franchise model can give individuals and small businesses the opportunity to start a new business with a brand name successfully developed, recognized and accepted in the market. A well-known trademark has its own distinctive characteristics, which makes the new franchise easier to access into market as well it can bring economical interest and competitive advantages compared with a common or normal trademark.

Moreover, a well-known trademark is a valuable and intangible asset with significant commercial value for the new franchisee. Therefore, it helps the franchisee to have stronger marketing advantages and to obtain a stronger legal protection to avoid copying of intellectual property and technology. It does not only help the franchise to easier access domestic market but also the international market. How difficult is it for new players to enter a new market without a well-known trademark? They have to face with already existing competitors whose consumers already know their brand names. It takes usually at least three to five years for a new trademark to be known in the market. Shortening this period could save a lot of time and operating expense (OPEX) to the new franchise. Lets calculate how much money a small and medium business has to pay during three or five years for operating expense? It is difficult to make sure that a new business can create and build a successful trademark or not. This is why the benefit from a successful trademark is one of the strengths for the new franchise.

The top five solar businesses in Vietnam are almost all built on Vietnamese trademarks, except Selco Vietnam, the only trademark known in foreign markets by using the trademark of Selco Inc. (USA's trademark). BK Solar is the best Vietnamese trademark in the domestic market. The second strongest trademark is Vnsolar, one of the wholesalers of USolar (USA's trademark). Redsun has just been set up and joined domestic market last year but it is a quite famous trademark, which has built the first assembling solar panel manufactory in Vietnam. Recently, the Vietnamese solar energy market is dominated by a majority of small businesses with unknown trademarks due to the market being divided into many various segments and it is difficult for consumers to choose, which the best trademarks are.

#### *Lower marketing cost*

Another strength of a new franchise is that the franchisor will cover almost all marketing activities. This is an advantage over any other business, which has to pay for and manage its own marketing plan. A good marketing plan should cover all things such as printed advertisements, TV and newspaper advertisements, online advertisements and creative and innovated marketing ideas. The benefit of group advertising can help the franchisor to reduce the total marketing cost for a whole franchising system.

Moreover, the funds for a marketing plan generated by franchise fees are sufficient enough to produce a huge, high class and professional marketing plan to replace a low class and inefficient marketing plan. Therefore, the franchisee can rely on the master marketing plan to reduce the marketing cost for building up a well-known trademark. They have larger budgets and time to focus on developing their local marketing plan, which does not cost as much as a master marketing plan.

#### *Technology transfer*

As other developing countries, Vietnam has to face with a lack of high technology, which is one of the biggest barriers for the development of solar energy in particularly and for all sectors in Vietnam generally. Looking at the solar energy market, it can be seen that there is no business that can be able to apply their owned Intellectual Property Right (IPR) or technology to produce solar energy products. Technology has become a difficult issue that almost all existing domestic solar companies must solve in order to reduce the price of products. Through the franchising model, the franchisee has a chance to share the IPR with the franchisor. This new trend is attracting more and more SMEs to invest in franchising model without worry of technology issues. This is the biggest distinction of the franchising model that can answer the question of why should the franchise model be chosen by the new investors? Technology transfer is an important key that can help SMEs in Vietnam to access high technology sectors like solar and wind energy.

#### *Lower labor cost*

The minimum wage of laborers working in domestic owned and foreign invested businesses has increased by VND 110,000 – 200,000 per month (equivalent: USD 6-11 per month) since 1<sup>st</sup> January 2009. At present, there are four different minimum wage levels in Vietnam that depends on four various different zones. The highest level is applied to Zone 1 including Hochiminh City and Hanoi Capital, which have the minimum wage for domestic owned enterprises at VND 800,000 (equivalent USD 50) and for the foreign invested enterprise is VND 1,200,000 (equivalent USD 75). The minimum wage for Zone 2 is USD

46.25 and USD 67.5, Zone 3 is USD 43.12 and USD 59.37, Zone 4 is USD 40.12 and USD 57.5, respectively. For trained workers, the employers have to pay at least 7% higher than the minimum wage. (Do, lookatvietnam.com, 2009).

If compared with China, the minimum salary in Vietnam is two times lower, while the average minimum salary in Vietnam is only at USD 50 per month; it has increased to USD 120 per month in China by 2009. That is why there are several businesses shifting the manufactory from other countries or has planned to build a manufactory in Vietnam. (pacificbridge.com, 2009). Labor cost contributes a significant proportion to the total cost of a business and it is also the key factor to be able to minimize the expenditure due to reducing the price of a product. It is a simple but quite effective way to help a business to obtain the competitive advantages in comparison with their competitors.

#### *Financial support from banks*

Banks are more willing to lend money to a business to buy a franchise with a good reputation and well-known trademark rather than offering a loan to a less-known trademark. Banks not only support finance for business to buy a franchise but also are ready to offer a loan to upgrade the capital for investing in equipment and manufacturing. Banks are not confident when making a decision to approve a loan for a business that has just been set up and does not have any proof of becoming a successful business in the future. Especially, banks often wonder if their loan will be paid back or not and how can a new business get profit after one fiscal year?

It would be easier to get a loan from a bank with a great business plan including annual revenue forecast, target customers, potential projects, competitive advantages that can only be obtained from a famous brand name with high technology, good quality products, uniformed store system and ability to dominate the market. In fact, an increasing number of franchise businesses in Vietnam have been successful by getting financial support from banks. An example from a successful franchisor in Vietnam with bank's financial support, Cleverlearn Vietnam has set up the first master franchise in 2006 based on financial support from bank. Until 2009, this master franchise has expanded successfully the franchise model with four franchises operating in various locations. (cleverlearn)

### *Solar energy resources*

A new franchise has a chance to access the market, which has a higher demand for solar energy than other countries due to solar radiation intensity. It is reported by more than one hundred forecast weather stations through the regions that Vietnam has the possibility to develop solar energy in the Central Region and Southern. The average solar radiation intensity has been recorded at 5 kWh/m<sup>2</sup> in those areas, while in the North it is only at 4kWh due to the heavy clouds in the winter and spring time. It is estimated that the theoretical capacity of solar energy generating per year can be equal to 43.2 billion tons of oil equivalent (TOE). The stable solar sources can be used to partly meet the energy demand for rural and remote areas such as mountains, island areas. (monre.gov.vn, 2008).

#### 4.4.2. Weaknesses

##### *High investment capital*

To set up solar cell plants, it requires an investment capital at around USD 1 million/MW capacity for crystalline silicon technology and USD 2 million/MW capacity or even more for the thin films technology. It means that the investors have to invest at least USD 10 million for a 10MW solar cell plant. Moreover, it requires a large area of around 50,000 m<sup>2</sup> for installing a solar cell plant. All these requirements are enough to limit the number of investors because it is not easy for any SME to afford a huge budget as mentioned above. Moreover, the capital for equipment to operate the module assembly plant with the capacity of 5MW will cost around USD 0.5 million. However, the total cost including manufacture, materials, labor can go up to USD 5 million. Recently, Redsun Vietnam is the first assembling solar panel plant with a total capacity of 5MW located in Duc Hoa – Long An province that has investment capital of USD 10 million.

If compared with non-renewable power plants, high investment cost will become a disadvantage for a new solar energy business. Especially, in the recent situation, EVN still is the single buyer who controls the Vietnam's power market by setting up the selling and buying electricity price. According to Mr. Ta Van Huong – Head of Energy Department of MOIT, Vietnamese Government has set up the

floor and ceiling of ROE (Return of Equity) for EVN's power plants as well as other IPPs will be at between 12% and 15% to prevent increasing of electricity price that may effect directly to consumers. Therefore, the high investment cost and the low ROE are two main disadvantages of solar energy businesses.

#### *High price*

The average price of a solar panel in Vietnam fluctuates between USD 8-10/Wp (Watt peak) depending on the quality and standard of various producers and importers. For the whole solar PV system including the battery, controller, inverter, etc., it costs around USD 14-16/Wp. This price is still higher than in other countries such as the USA, while the Vietnamese consumer's income is many times lower compared to the American consumer. Take a family in California as an example and then comparing with a Vietnamese consumer, it can be seen that a solar PV system is still a luxury or a high-class product for Vietnamese consumers.

In America, a solar PV system will cost between USD 8-10/Wp or USD 8,000-10,000/kWp. Everage family with three bedrooms will require a 1.5 - 3 kWp system that can cost between USD 12,000-30,000. For Vietnamese consumers, USD 30,000 is a big cost that just can be afforded by rich or high-class families. In addition, the Vietnamese government is not rich enough to be able to support renewable energy like the US government. The high price of a solar energy product is one big disadvantage for the new franchise.

#### *Narrow market*

Solar energy is still a new concept for Vietnamese consumers and even for the sellers. Therefore, Vietnamese solar energy market can be considered as a narrow market with a limited number of buyers and sellers. The demand for solar energy concentrates mostly on out of national grid areas. On the other side, solar energy requires a huge investment capital that makes it not easy for SMEs in Vietnam to enter this market.

Moreover, the long life expectancy of solar panels and solar water heaters can last for 40 years and 10 years, respectively. Long life product cycle has become one disadvantage for a narrow market that could become even more narrow.

Finally, the low-income consumer is the most important factor that brings bad effect directly to the Vietnam's solar energy market. Even though the demand is high, the benefits of green and friendly energy and potential solar energy resources or perfect weather condition is available, but, a big "but" which should be considered is low – income consumers who do not have ability to afford high technology appliance.

#### 4.4.3. Opportunities

##### *Complete competitive power market*

The Vietnamese Government has approved the roadmap and the conditions to set up a power market in Vietnam by opening a competitive market that will be implemented by the following steps:

- (1) Separating the service of generating, providing transmission grids and distributing.
- (2) Developing a competitive wholesale market in which one retailer can choose to buy power from different wholesalers.
- (3) Developing a highly competitive retail market with many distributors for one area and there will be many buyers and many sellers in the power market.

In this master plan, the State just maintains a monopoly in transmission, construction and operation of large - scale hydro power plants. In the wholesale competitive power market, the power companies and large customers such as large industrial zones will have a choice to buy power from the best wholesaler. In the retail competitive power market, the retail distribution companies have to compete with each other to sell power. All customers will be able to choose which is the best power retailer.

A wholesale and retail market will create a good competitive environment for power producers and retailers to develop the market in a good trend. Based on the competition, all the power companies will have to calculate how to cut costs and make their business work more effectively in order to reduce the selling price as much as possible. The Vietnamese government is planning to eliminate EVN's

monopoly position by dividing EVN into smaller parts including separated departments such as transmission companies, retailers, power generators and electricity traders companies. These changes will help the government establish the competitive power market in Vietnam as well encourage more foreign direct investment for Vietnam's power market.

#### *Run-out natural resources*

Coal, oil and gas can be called fossil fuels and they are not renewable energy resources. Once they are burnt, their reservation will be exhausted by the time, therefore the world will be faced with an energy crisis in the future if there is no alternative energy to replace or back up fossil fuels. In addition, coal and oil are not only used for generating electricity but they are also used to produce many other industrial products and construction materials like steel, iron, copper, rubber, plastics, etc... This is one of the reasons why looking for other alternative energies is a significant action. Sooner or later, this planet must rely on the renewable and green energies to avoid destroying the ozone layer as well as to protect the environment from global warming and greenhouse effect.

Solar energy is one the most potential alternative energies for Vietnam and how to utilize it effectively into the various applications is still a big question for new solar businesses. To find out the answer for that question has the same meaning with to find out the opportunities for their own businesses.

#### *Electricity price going up*

Electricity price increase is considered unavoidable in Vietnam as EVN informed that it should be increased by 20% or even 30% more in order to cover all expenses (chao-vietnam.com). Actually, from the 1<sup>st</sup> of March 2009, Mr. Do Huu Hao, Head of MOIT has officially announced that the current price of electricity must be increased by 8.92% from 2008 (taichinh.saga.vn, 2009) and it also depends on both the coal and oil price. For instance, if the coal increases by 40% and the oil price is stable, the electricity price would be raised by 10%.

Looking into the whole picture of Vietnam energy market, it can be seen that, the oil and coal price will increase, due to the price of thermal power increase parallel. The price of hydropower will remain stable because hydropower plants

are exploited to maximum capacity, while, the demand for electricity is continuously increasing to keep up the economic development. Consequently, the demand for solar energy will be higher in next few years. Especially, the price of solar energy products will be reduced by new technologies. This is opening many opportunities for solar energy businesses in Vietnam.

#### *Few strong competitors*

The new franchise would benefit from advantages of the first foreign solar company entering the solar energy market in Vietnam. There are some strong foreign branch names such as British Petrol (BP) solar, Naps Systems, Kyocera, General Electric (GE) solar, Solar World (Siemens), Sanyo, Schott has sold their products in Vietnam in the form of direct export entry. Some of them are doing business in Vietnam through the NGOs or donor Government's projects. They even still have not set up their representative offices in Vietnam. Domestic solar businesses are limited by only the top five businesses, which are almost all SMEs and rely on imported technology, materials, equipments or even a full solar energy system. It would be easier for new businesses if they start business with a market dominated by few strong competitors.

#### *Selling franchise*

With franchising model, one business can become a master franchisor handling a specific limited location and then it can sell the franchise to other franchisees. The master franchisor's profit can be generated from franchise fees and the whole franchise system would dominate the majority of market shares and monitor the market easily. The franchising model is suitable with SMEs in Vietnam, which are not strong enough to build their own brand name or goodwill in the market. They are stuck in dealing with high technology, know-how process, new appliances and operating skills to run business in a professional and standard way. Depending on the existing and tested business model, technology transfer, well-known trademark, minimized business risk and flexible finance, a new franchise can be able to have a very good start in business.

#### 4.4.4. Threats

##### *Top five domestic rivals*

It is necessary to do a market research for one business before entering into new market. This study focuses on the top five solar businesses in Vietnam to give out the clear picture of domestic competitors. Therefore, the new business will have an overview about their biggest rivals. What are the issues the new business has to fight with and who are competitors that it must compete with? By focusing on their advantages, disadvantages, product ranges, implemented projects, business strategy, business plan, achievement, this study can analyze which are their strengths, weaknesses and also their experiences.

The following table based on the result of interviews which had been held between this writer and the top five solar companies' directors will describe domestic competitors in details:

TABLE 6. The summary of the top five solar companies in Vietnam

	Selco VN <a href="http://www.selco-vietnam.com.vn">www.selco-vietnam.com.vn</a>	BK-IDSE <a href="http://www.bk-idse.com">www.bk-idse.com</a>	Redsun <a href="http://www.redsun-vn.com">www.redsun-vn.com</a>	Kidivina <a href="http://www.kidivina.com.vn">www.kidivina.com.vn</a>	Vnsolar <a href="http://www.usolar.vn">www.usolar.vn</a>
Advantages	<ul style="list-style-type: none"> <li>- Subsidiary of Selco Int'L in USA.</li> <li>- Supply full set of SHS.</li> <li>- Experienced in India, Sri Lanka, China, VN.</li> <li>- Solid relationship with BP, GE, Kyocera, US Battery.</li> <li>- 12 years of experience.</li> </ul>	<ul style="list-style-type: none"> <li>- Best Vietnamese solar energy trademark.</li> <li>- Young, skilled and enthusiastic labors.</li> <li>- Solid relationship Technology University HCMC in R&amp;D.</li> <li>- 6 years of experience.</li> </ul>	<ul style="list-style-type: none"> <li>- First solar module assembling factory in Vietnam.</li> <li>- Solid relationship with Energy Conservation Center (ECC HCMC) and Laboratory Nano Technology (LNT) of National University.</li> </ul>	<ul style="list-style-type: none"> <li>- Best solar company in the North of Vietnam.</li> <li>- Solid relationship with Government's project.</li> </ul>	<ul style="list-style-type: none"> <li>- The exclusive agent of Usolar (USA).</li> <li>- Benefit from high - class products in the market with best quality and high technology.</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Narrow market and high price product. (*)</li> <li>- Weak branch name in the international market.</li> <li>- Face to BID issues when working with state owned businesses.</li> <li>- Non-supports from Government in reducing the imported tax for separated or full set of solar energy equipments. (**)</li> <li>- Face with China's products with lower standard and cheaper price. (***)</li> </ul>	<ul style="list-style-type: none"> <li>(*)</li> <li>- Solar water heater made by BK-IDSE must be tested and examined in the international market. (Ex: Europe)</li> <li>(**)</li> <li>(***)</li> </ul>	<ul style="list-style-type: none"> <li>(*)</li> <li>- New business with only 2 years of experience.</li> <li>- Lack of technology to produce solar cell.</li> <li>(**)</li> <li>(***)</li> </ul>	<ul style="list-style-type: none"> <li>(*)</li> <li>- Weak branch name in domestic market.</li> <li>(**)</li> <li>(***)</li> </ul>	<ul style="list-style-type: none"> <li>(*)</li> <li>- Limited product range. (mainly: solar water heater)</li> <li>(**)</li> <li>(***)</li> </ul>
Product range	PV module, controller, battery, inverter, compact lamp, wiring, switches, sockets, SHS kit, LED lamp.	Solar water heater, PV module, small wind turbine.	PV module, battery, inverter, controller, compact and LED lamp.	PV module, solar street light, decorating light, solar traffic light, compact and LED lamp, small wind turbine.	Solar heat water. PV module, controller, battery, inverter for SHS.

	<u><a href="http://www.selco-vietnam.com.vn">www.selco-vietnam.com.vn</a></u>	<u><a href="http://www.bk-idse.com">www.bk-idse.com</a></u>	<u><a href="http://www.redsun-vn.com">www.redsun-vn.com</a></u>	<u><a href="http://www.kidivina.com.vn">www.kidivina.com.vn</a></u>	<u><a href="http://www.usolar.vn">www.usolar.vn</a></u>
Implemented projects	Coordinated with VWU and VBARD implemented “Electrification the countryside with solar energy” project.  Installed SHS, for National Parks, National conservation zones, army border stations and islands; telecom company, post offices; solar signal light for waterway, airway.	SHW system for hotels: Majestic, Norfolk, Saigon Morin, Le Thanh Ton, Saigon;  Tan Cang restaurant;  Long Thuan resort, Dalat resort;  Vinamilk-Industrial Food company.	SHW for household, farms in the Northern provinces.	Coordinated with CADAPE in Venezuela to install the solar street lights and supply street light equipments;  Installed the high technology saving energy LED lamp system for Han river bridge in Danang city.	SHW for household. Installed some back up system for national grid in some office buildings in Hanoi.
Future plan	- Focus on off-grid areas, tele-communication, National Parks, Reservation Centers, Army stations, islands and Laos, Cambodia and New Zealand market.  - Look for J.V or franchisor to strengthen branch name and technology to launch into overseas market.	- Focus on Hotels, resorts, industrial zones, restaurant, islands, army stations and SHS.  - Orient to SWH market in Europe.  - Look for technology transferor to produce PV module and solar cell with 10 million USD budget.	- Focus on agriculture in Southern provinces (pumping water system, SHS), Phu Quoc island and other smaller islands.  - Look for the technology transferor to be able to produce solar cell.	- Focus on solar traffic, public and street light systems.  - Orient to Venezuela market.  - Look for J.V or franchisor to strengthen branch name and technology to launch into overseas market.	- Focus on the market in the South and Central regions where the solar radiation is much more intensive than Northern provinces.  - Remain to be exclusive wholesaler of Usolar.

If considering about years of experiences, Selco Vietnam was the first solar company that has been set up in Vietnam in 1997. Selco Vietnam is a subsidiary of Solar Electric Light Fund SELF, which is an international organization in the United States, which has subsidiaries in India, China, and Sri Lanka. Therefore, the way of doing business as well as the launching plan in Vietnam’s market are quite impressive if compared with other solar energy companies. Selco Vietnam had launched “Electrification of the countryside with solar energy” project that was implemented by the corporation between Selco Vietnam, Vietnamese Bank of Agriculture Rural Development (VBARD), Vietnamese women Union (VWU) and solar panel consumers via credit payment all over 15 provinces. Through this

project, Selco was considered as the best solar company in Vietnam. Actually, Selco Vietnam seemed to dominate the whole solar energy market from 1997 until 2000. Unfortunately, the project fell into bankruptcy since the VBARD had refused to offer more loans to solar panel customers. Selco Vietnam had accepted risks to sell solar panels to customers in rural areas with credit payment method. The risks had occurred since Selco Vietnam did not have enough staff to collect monthly payments from the low income consumers who depend on crops. This project would be more successful if Selco Vietnam has received supports from banks and the Vietnamese government. In present, Selco Vietnam has a strong focus on telecommunication sector, off-grid projects and looking for new markets.



FIGURE 13. Electrification of the countryside with solar energy project  
(Source: Selco Vietnam)

BK-solar was voted the best Vietnamese SWH trademark by domestic consumers especially by the hotels, resorts sector. BK-solar is just on the first step launch into PV solar market via direct import PV solar from China. However, BK-solar

has experiences in consulting and implementing for large scale and complicated projects, which are located in mountain and island areas.

KIDIVINA focuses on solar public street lighting systems, which can combine with small wind turbine as a backup system. It also has experiences in installing SHS for private houses and villages. KIDIVINA is on the step to experience and test the process to produce solar garden lamps, solar streetlights, solar traffic lights combining with wind energy in order to implement several projects located in the Central Regions of Vietnam and Venezuela.

Redsun has just joined the solar energy market in the beginning of August 2008 but started with an impressive trademark since it is considered as the first solar panel assembling manufactory in Vietnam. Redsun has marked an important step for the development of the domestic solar energy market. In future, Redsun will not only be an assembling manufactory but also looking toward to becoming a solar cell and solar panel producer in Vietnam. However, as the other new investors, Redsun is trying to find the market for its products since the quality of Redsun's products still need to be tested in the market. It takes time for Redsun to become a strong competitor like Selco Vietnam and BKsolar. Moreover, PV solar is a very high-cost product so that the consumers are just willing to pay for products, which the quality has been tested and recommended by the market. Due to Vietnamese consumer's habits, they even accept to pay a higher price to get a better quality with a well-known trademark, especially for household equipment and long term investments.

Vnsolar is an successful business with direct export entry mode applied by Usolar .Intl company. Vnsolar is not strong enough to widen the business core just only limited by SWH product ranges. Anyway, it is known as the best SWH trademark in Vietnam.

A new business not only should care about their competitors but they also have to pay attention to new technologies that may become a significant threat impacting directly to its operation.

### *New technologies*

The leaders of solar energy market are those who focus on the innovation and R&D sector to get their own competitive advantages in technology. Solar energy products still require high production cost due to high price. The only solution to solve this problem is that the manufacturers try to create new technology with cheaper cost and then it has become a competition between competitors. Besides Poly crystalline and Mono crystalline technology, Polymer and Quantum Dots technology (itwire.com & physicsworld.com, 2009) are still examined in the laboratory to produce solar cells. In case, those technologies are successfully utilized in solar cell manufacturing, they would become a serious threat for the existing technologies. Both new technologies have the same strength in lowering the cost less than the cost of conventional solar cells. Therefore, the new franchise may have to face with the coming up of new technology after signing the technology transfer agreement from the transferor.

### 4.5 Summary

This study has completely reached the target that has been set up to draw a clear picture about the energy market and the solar energy market in Vietnam. Moreover, this study has also answered why solar energy is the best alternative energy based on the analysis of the advantages and disadvantages of the existing IPPs in Vietnam. Sooner or later, solar energy will contribute a significant proportion of Vietnam's total energy demand since the other types of nonrenewable energy resources, which will be exhausted in the next twenty years. There is a positive signal for Vietnam's electricity market after the Roadmap to establish the power market (Provision No. 26/2006/QD-TTg), which was approved by Prime Minister of Vietnam on January 26<sup>th</sup> 2006 in Hanoi. This master plan has been divided into three main phases including:

- Phase 1 (2005 - 2014): Competitive generation power market.
- Phase 2 (2015 - 2022): Competitive wholesale power market.
- Phase 3 (from 2022): Competitive retail power market.

Based on this plan, between 2015 and 2020, the competitive wholesale power

market will give a chance for solar energy investors in Vietnam to become the suppliers of several power wholesalers. As a consequence, EVN will not anymore control Vietnam's power market as a mono seller. Due to that reason, the monopolistic power market in Vietnam will be diminished by 2015, which will be a revolution for Vietnam's energy industry. Furthermore, the investors can expect that they will have a bright future in Vietnam since the competitive retail power market will be set up after 2022. Moreover, the price of solar power will be reduced dramatically by new technology and innovation coming from scientists all over the world such as Thin Film, Polymer and Quantum Dots technology (itwire.com & physicsworld.com, 2009).

Based on the competitive retail power market, the investors can sell solar power not only to EVN and other power wholesalers but also to the end users. In addition, there are several business opportunities for new investors depending on the demand for solar energy in Vietnam, which has been discussed in section 4.3.3 of this study.

This study has also referred to Vietnamese government policy to develop electricity sector and renewable energy until 2020 as well the vision in 2050. However, the Vietnamese government did not focus strong enough on renewable energy development. Until 2020, the renewable energy will account for only 5% of the total national energy consumption. Vietnam's solar energy market is dominated by the top five private companies. They have to struggle with lack of technologies and supports from the government. It can be realized that renewable energy in Vietnam has not been much considered by the government and state owned companies.

In addition, this study focuses on SWOT analysis that will help the new entrepreneurs have a good preparation before approaching Vietnam's solar energy market. The top five solar companies' analysis not only has given an overview of solar energy market in Vietnam but also listed all their weaknesses and strengths that will become useful information for new players.

Finally, this study will come to the recommendation part, which is supposed to be the most interesting part for all readers.

5. RECOMMENDATION

Based on the results gathered from the empirical part as well as the writer putting herself into the position of a new investor, this study will recommend several business models for people who are on the way to find out the real opportunities to invest in solar energy in Vietnam.

5.1. Option 1: Joint – Venture Franchising model

Lets start from the business idea with franchising model. The following graph will show exactly how the solar energy franchising works in Vietnam:

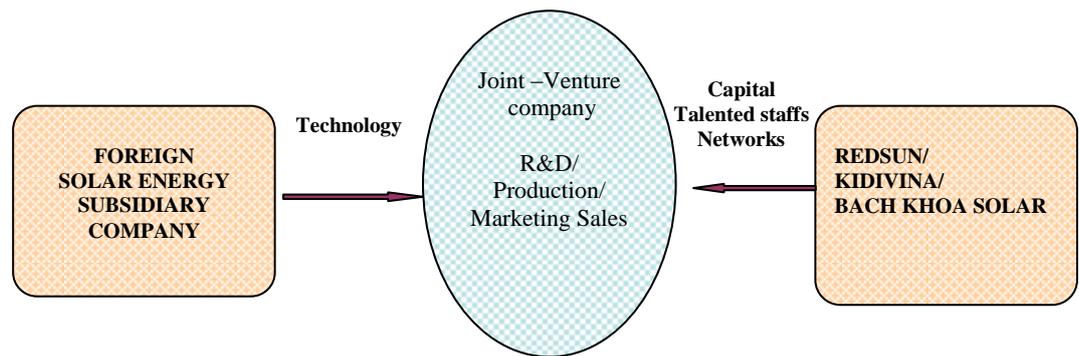


FIGURE 14. Joint –Venture (JV) business model

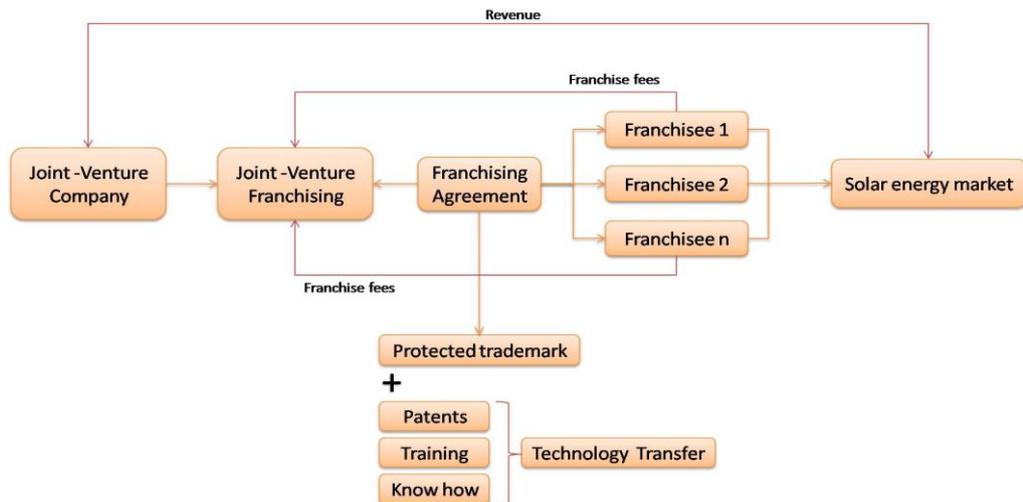


FIGURE 15. JV Franchising business model

Why should the franchise business be set up based on a joint-venture company? Due to the domestic solar energy companies in Vietnam still have to completely rely on technology from foreign companies via direct import entry mode. The ability to build a manufactory producing solar cells, solar panels and SWH without importing materials from overseas, which is still a dream for them. They must rely on technology of their joint-venture partner. After the joint-venture company has been set up, it can widen their business core by setting up a franchise system to sell its business model to other franchisees. The joint-venture franchise company will have two various revenue streams, one is generated from their own sales and one is contributed by franchising fees. The patents, the know-how process as well as the training services will be transferred from the franchisor to franchisee.

Moreover, the franchisees will have a lot of benefits from this business model. Firstly, the franchisees will benefit from cutting of import taxes, shipping cost from overseas market to Vietnam. Secondly, the marketing and training cost will be covered by the franchisor, which helps the franchisee reduce a significant cost since the marketing cost normally accounts for at least 30% of the total operating cost. Lastly, the materials to produce solar energy products such as silicon, copper, indium, gallium and selenium are cheaper in Vietnam if compared with other developed countries. All these benefits will directly impact to lower the price of solar energy products.

#### *Opportunity for franchisees*

New investors with no knowledge about solar energy technology or unfamiliar in doing business in this field, should contact with the franchisor. The new investors have to negotiate with them about all the types of franchise fees including the initial fee, on-going management services fees and royalty fees. In addition, the franchisees will have a chance to produce solar panels and export to overseas market based on their potential customers.

The franchisees should also prepare a very good background in legislation of technology transfer under the form of franchising business model. For the

franchisees, if they do not obey the IPRs and protected trademark laws because lacking of legislation background, they will be fined and have to pay a compensation for the franchisor depending on the punishment clause in the franchising agreement. All of those conditions must be put in one legal franchising agreement according to the International Chamber of Commerce (ICC) Model International Franchising Contract and be enforced by transfer technology legislation such as The Paris Convention for the Protection of Industrial Property, The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) and Intellectual Property Rights (IPRs) law of Vietnam. IPRs law of Vietnam is attached to this study as Appendix 1.

#### *Opportunities for franchisor*

The foreign solar companies who has technology to produce solar cell can co-operate with Bach Khoa Solar or KIDIVINA or Redsun to set up joint-venture company. Those companies are listed in the top five solar businesses in Vietnam, which are seeking potential partners and they are completely interested in the joint-venture or the franchising model. Those companies have competitive advantages in setting up a wide range of customer networks with B2C and B2B relations. Moreover, they have good relationship with the government through several implemented projects. It can be confirmed that both of them have their own strength in customer networks and potential market share in Vietnam's PV solar market.

According to Mr. Minh Quang Nguyen, KIDIVINA General Director, KIDIVINA also has a very clear business plan focusing on the Latin American market such as Venezuela and Costa Rica since KIDIVINA found out this market is a very potential market for solar energy. Trademark and technology are the two biggest obstacles for KIDIVINA to launch this market. Franchising model will help KIDIVINA to solve these issues relying on its advantages. Then, this joint-venture company will look for the potential franchisees and allow them to run their business under one single business trademark.

Bach Khoa Solar and Redsun they have already their own manufactories. Joint-venture company will be the best solution for them to solve the technology

issues. Bach Khoa solar has plan to buy technology to produce solar panel from a foreign company with the total cost of investment estimated to USD 10 million. Redsun has the same situation with Bach Khoa solar. Franchising model will be come more attractive since there are still nearly 50 smaller solar energy companies in Vietnam. Almost all of them are located in Hochiminh City.

It does not mean that there is only one option for the investors to choose if they focus on Vietnam's solar energy market. In case they cannot find any potential franchisees, who can afford the franchising fees, they can turn to the other options, which will be stated in the next section.

## 5.2. Option 2: Building independent solar power plant (SPP)

This study will make a comparison with the first independent wind power plant located in Binh Thuan Province, Central Region of Vietnam, which has just been connected to the national grid in early September 2009. According to BusinessGreen, Fuhrlaender AG, a German wind turbine company has cooperated with Vietnam Wind Power Joint Stock Company to implement this project by installing the first five wind turbines with the initial capacity of 7.5MW in the first phase. In the second phase, there are fifteen more additional wind turbines, which will be installed, which can bring the total capacity up to 30MW. This wind power plant is expected to reach the total capacity of 120MW by 2011. All the equipment for this project, which cost USD 55 million, was sourced from Germany. (Yvonne Chan, BusinessGreen, 2009). Moreover, Thanhniennnews has announced that Fuhrlaender Vietnam Wind Power Joint Stock Company will build a wind turbine manufactory in Binh Thuan province, which has the total investment capital of USD 25 millions. This wind turbine manufactory can supply wind turbines not only for Vietnam but also for overseas markets. (Thanhniennnews, 24<sup>th</sup> August 2009).

Is it a feasible project to build the first solar power plant in Vietnam? Yes, it is. If compared to a 7.5 MW wind power plant in Vietnam which has cost of USD 55 million, the investment cost of USD 60 million to build a 10MW solar power

plant in the South of Chicago, USA, (fairhome.co.uk, 2009) has been a bit lower. Moreover, the solar power plant brings a wide range of other advantages such as it can be located at wherever without care of about noisy effects or it can even be installed in the urban areas and the industrial zones.

Why not start a solar power plant project in Vietnam? It would be better for the investors if they start this project with a joint stock or joint venture company since they can call for investment capital from many domestic investors who can be individuals or corporate. The following model will describe this project in detail:

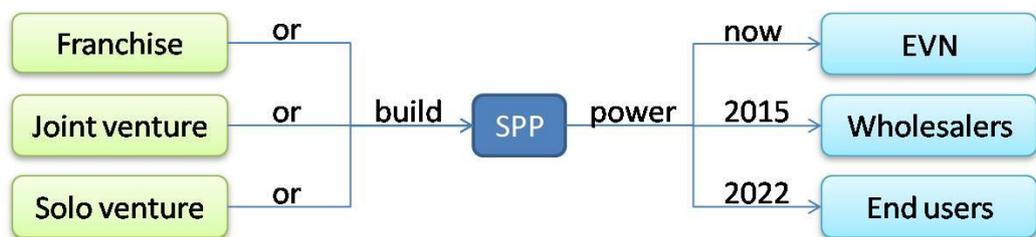


FIGURE 16. Plan to build solar power plant in Vietnam

All types of solar energy business can join in this project. They can co-operate together to build a solar power plant and then they sell power to EVN. After 2015, the solar power plant can sell power to more than one single buyer. At that time, the wholesale competitive power market will have been set up based on the Roadmap to establish competitive power market approved by the Vietnamese government in 2006. Looking forward to 2020, the retailed competitive power market will have been set up, and then there are more opportunities for the solar power plants to negotiate with the end users which the best price for them to sell is.

This study has discovered a real opportunity to build SPP in off-grid areas by focusing on Six Senses Hideaway resort located in an island at Ninhvan Bay, Nhatrang City. Six Senses Hideaway is the best Asia's luxury beach resort and set on 20,000 square meters. This resort has to pay USD 35,000 per month for power or fuel cost, USD 8,000 per month for generator maintenance cost. This resort requires at least an average of 178,000 kWh per month and the cost for 1 kWh is

USD 0.18 which is equal to solar power. That is why this resort must find the best power solution in the future in order to solve the noisy and air pollution coming from six local diesel generators (Figure 17.). This resort is under discussing and planning to build a combined power station by using solar, wind, and hydro energy (Figure 19.). In the first step, this resort has installed solar water heater systems for hosting buildings and kitchen area (Figure 18.).



FIGURE 17. Six local diesel generators in Six Senses Hideaway resort  
(Source: Six Senses Hideaway in Vietnam)



FIGURE 18. Solar water heater systems in Six Senses Hideaway resort  
(Source: Six Senses Hideaway in Vietnam)

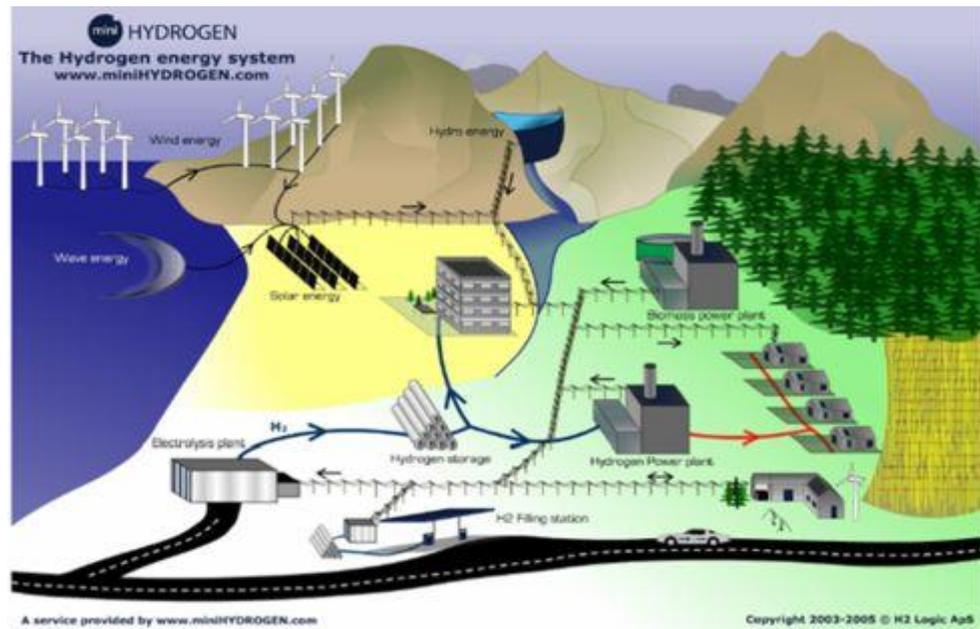


FIGURE 19. Solar –Wind- Hydro combined power plant model  
(Source: minihydrogen.com)

### 5.3. Option 3: Subsidiary model

A subsidiary is also a possible business model, being a traditional entry mode for almost all foreign companies. It will be illustrated by the following model:

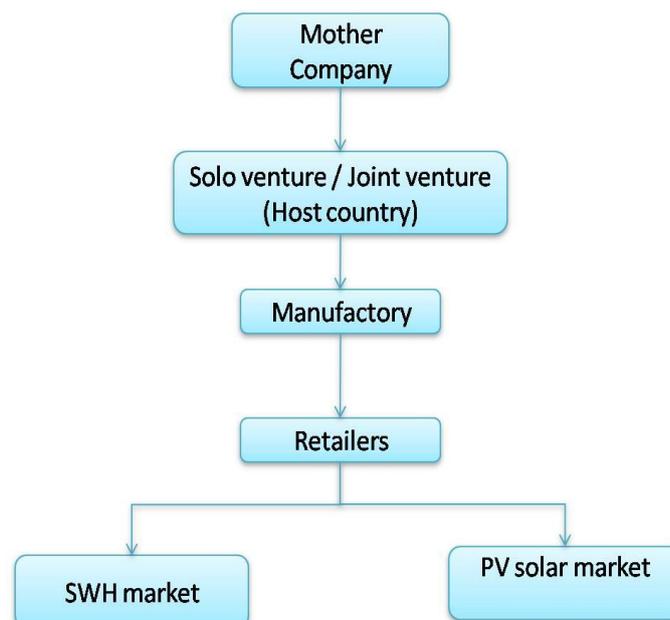


FIGURE 20. Subsidiary model

In this model, the mother company in the home country will set up a subsidiary in the host country. The subsidiary can be a solo venture or a joint-venture company cooperating with a domestic company. The mother company allows its subsidiary to contribute the value of technology as the value of capital to join with a domestic company, which has advantages of customer networks and investment capital. Each partner has its own strength and will be together to build a manufactory, sell products to the solar energy market through the retailer system. The investors can co-operate with KIDIVINA or Bach Khoa Solar or Redsun company to set up joint-venture company which is illustrated via figure 14.

#### 5.4. Option 4: Direct export model

This is exactly the business model most foreign solar energy companies applied when they launched into the Vietnamese market. BP solar, Kyocera solar, Usolar have chosen this model via wholesale entry mode. However, there is not any foreign company has chosen this entry mode via subsidiary entry mode.

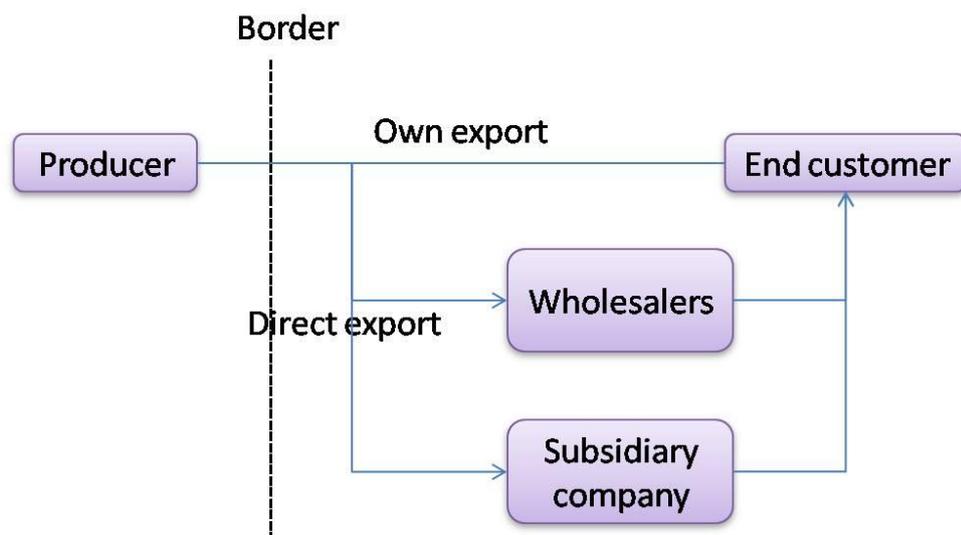


FIGURE 21. Direct export model

Before choosing direct export as an entry mode to enter Vietnam's solar energy market, the new investors should consider both quality and price of their products. Depending on the market research for solar energy, which has been done in Vietnam, this study can show the strongest competitors who the new investors need to know. Usolar is elected the leader in Vietnam's SWH market. Based on vacuum-pump technology, Usolar water heaters have satisfied consumers' expectation by the advantages to overcome the water pressure issues. Usolar water heaters are able to absorb the highest sunlight heating via copper conducting pipes.

The second strongest competitor in the SWH market is BKsolar, which is known as one of the strongest Vietnamese trademarks. BKsolar has its own strengths in consulting and installing SWH large scale system such as hotels, resorts, restaurants, food industry sector. BKsolar SWH has advantages in price competition if compared with other similar product ranges. To be successful, new investors have to be strong enough to compete with Usolar and BKsolar in both price and quality before entering SWH market in Vietnam.

How about the PV solar market is? It can be seen that Selco Vietnam is the leader in this market. Selco Vietnam has become the main PV solar supplier for several domestic solar energy companies based on special offers or discounts that it can get from producers such as Kyocera or BP solar. Moreover, Selco Vietnam has received the "Sales Achievement Award 2008" issued by Morning Start Corporation in the USA, which is one of leaders all over the world in supplying solar controllers and inverters for solar energy system. The strength of Selco Vietnam is that this company sells a full solar power system rather than separated equipment. Relatively, Selco Vietnam has achieved a remarkable sale target for solar panel products. Selco Vietnam seems to be an unbeatable PV solar supplier in Vietnam in both price and quality. The new investors should take this competitor into account, if not it will be difficult for them to be successful in Vietnam's PV solar market with direct export entry mode.

## 5.5. Conclusion

The writer would like to quote directly from Mr. Ta Van Huong – Head of Energy Department of MOIT. His conclusion when he discussed the opportunity to do business in Vietnam’s solar energy market is something the writer would like to use as the conclusion of this study:

“It can be seen that the solar energy market in Vietnam is a potential market. However, it is a narrow market within off-grid areas since the competitive power market in Vietnam, which is still only step by step being established from now until 2015”.

It means that Vietnam’s solar energy market will become a bigger potential market after the competitive power market, which will be set up in 2015. There will be more opportunities for the investors since they can widen their portfolio to invest in a solar power plant. A generating power plant is always an attractive business model since the demand for electricity is still non-stop rising in order to keep up with the emerging economic development in Vietnam. Moreover, the competitive power market will make a big change for power price in Vietnam since the government will not support the power sector anymore. EVN will not control the power market as a mono buyer anymore. The power price will be set up based on the demand and the supply within the market. Solar power will have more chances to compete with other traditional power because the price of natural resources will increase.

Finally, the study has given four different options for all the businesses interested in Vietnam’s solar energy market. However, building solar power plants in off-grid areas is considered the most potential project for foreign solar energy companies. It is demonstrated by the plan to build a combined power station at Six Senses Hide Away, 5-star resort in Ninh Van Bay, Nha Trang City. The second potential opportunity for foreign investors is setting a joint-venture company by co-operating with KIDIVINA or Redsun or Bach Khoa Solar

company. The joint – venture franchise model is one of potential business models. However, it depends on the number of potential franchisees as well as the scale of the market.

Last but not least, the investors should find out the solution to meet the demand of solar energy in Vietnam, which has been discussed in particular in section 4.3.3 of this study. Focusing on the demand, supplying what the market needs and fulfilling the “gap” is always the best strategy for any business firm.

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## **APPENDIX**

### Appendix 1

**THE NATIONAL  
ASSEMBLY**  
Law No.  
50/2005/QH11

**THE SOCIALIST REPUBLIC OF VIETNAM**  
**Independence – Freedom – Happiness**

### **THE NATIONAL ASSEMBLY OF THE SOCIALIST REPUBLIC OF VIETNAM LEGISLATURE XI, SESSION 8**

## **INTELLECTUAL PROPERTY LAW**

*Pursuant to the Constitution 1992 of the Socialist Republic of Vietnam as amended and supplemented by the Resolution No. 51, 2001, QH10 of the 10th Session of the 10th National Assembly dated 25 December, 2001;*

*This Law stipulates intellectual property rights.*

### **PART ONE**

#### **GENERAL PROVISIONS**

##### **Article 1. Scope of regulation**

This Law stipulates copyright, copyright - related rights; industrial property rights; rights in plant varieties and for the protection of these rights.

##### **Article 2. Applicable subjects**

This Law applies to Vietnamese organizations and individuals, foreign organizations and individuals that satisfy the requirements stipulated in this Law and international treaties to which the Socialist Republic of Vietnam is party.

##### **Article 3. Objects of intellectual property rights**

1. Objects of copyright include literary, artistic and scientific works; objects of copyright - related rights include performances, sound recordings, video recordings; broadcasting programs; satellite signals carrying encrypted program.
2. Objects of industrial property rights include inventions; industrial designs; layout-designs of semi-conductor integrated circuits; business secrets; trademarks; trade names and geographical indications.
3. Objects of rights to plant varieties are plant varieties and its propagating materials.

##### **Article 4. Interpretation of terminologies**

In this Law, the following terminologies shall be understood as follows:

1. *Intellectual property rights* are the rights of organizations, individuals to their intellectual property, including copyrights and copyright - related

rights, industrial property rights and rights to plant varieties.

...

## **Chapter X**

### **TRANSFER OF INDUSTRIAL PROPERTY RIGHTS**

#### **Section 1. Assignment of industrial property rights**

##### **Article 5. General provisions on assignment of industrial property rights**

1. Assignment of an industrial property right means the transfer of ownership right by the industrial property owner to another organization or individual.
2. The assignment of an industrial property right shall be conducted in the form of written contract (hereinafter referred to as contract for assignment of industrial property right).

##### **Article 6. Restrictions to assignment of industrial property rights**

1. An industrial property right owner shall only assign his or her right within the scope of protection.
2. The rights to a geographical indication shall not be assigned.
3. The rights to a trade name shall only be assigned together with the transfer of the entire business premise and business activities under the trade name.
4. The assignment of the rights to a mark shall not cause confusion as to characteristics or origin of the goods or services having the mark.
5. The rights to a mark shall only be assigned to the organizations or individuals who fulfill requirements for the person having the right to registration in respect of that mark.

##### **Article 7. Contents of contracts for assignment of industrial property rights**

A contract for assignment of industrial property right shall have the following substantial provisions:

1. Full name and address of the assignor and the assignee;
2. Bases of assignment;
3. Price for assignment;
4. Rights and obligations of the assignor and the assignee.

#### **Section 2. Licensing of industrial property objects**

##### **Article 8. General provisions on licensing of industrial property objects**

1. Licensing of an industrial property object means the permission of the industrial property owner given to another organization or individual to use the industrial property object within the scope of the owner's use right.
2. The licensing of an industrial property object shall be conducted in the form of written contract (hereinafter referred to as license contract for use of industrial property object).

##### **Article 9. Restrictions to licensing of industrial property objects**

1. The right to use a geographical indication or a trade name shall not be

licensed.

2. The right to use of a collective mark shall not be licensed to organizations or individuals other than members of the collective mark owner.
3. The licensee shall not enter into a sub-license contract with a third party without permission of the licensor.
4. A mark licensee shall have the obligation to indicate on goods and packaging thereof that the goods have been produced under a contract for use of mark.
5. An invention licensee under an exclusive contract shall have the obligation to use such invention in the same manner as the invention owner in accordance with Article 136.1 of this Law.

#### **Article 10. Types of contracts for use of industrial property objects**

License contracts for use of industrial property object may be of the following types:

1. Exclusive license contract means a contract under which, within scope and term of license, the licensee has an exclusive right to use the industrial property object while the licensor can neither conclude any license contracts for use of industrial property object with any third party nor, without permission of the licensee, use the industrial property object;
2. Non-exclusive license contract means a contract under which, within scope and term of licensing, the licensor still has the rights both to use the industrial property object and also to conclude non-exclusive contracts with others.
3. Sub-license contract for use of an industrial property object means a contract the licensor of which is a licensee of the industrial property object under another contract.

#### **Article 11. Contents of license contracts for use of industrial property objects**

1. A license contract for use of industrial property object shall have the following substantial provisions:
  - a) Full name and address of the licensor and the licensee;
  - b) Bases of the license;
  - c) Type of the contract;
  - d) Scope of the license (limitations to use; territorial limitations);
  - e) Term of license;
  - f) Price for the license;
  - g) Rights and obligations of the licensor and the licensee.
2. A license contract for use of industrial property object shall not have such provisions that unreasonably restricts the right of the licensee, particularly those provisions not deriving from the rights of the licensor as follows:
  - a) Prohibiting the licensee to improve the industrial property object other

- than marks; compelling the licensee to grant a free license or to assign to the licensor the right to industrial property registration or an industrial property right in respect of such improvements;
- b) Directly or indirectly restricting the licensee to export goods produced or services supplied under the license contract for use of industrial property object to the territories where the licensor neither hold the respective industrial property right nor has the exclusive right to import such goods;
  - c) Compelling the licensee to buy all or a given percentage of materials, components or equipments from the licensor or the persons designated by the licensor without aiming at ensuring the quality of goods produced or services supplied under the licensee;
  - d) Prohibiting the licensee from contesting validity of the industrial property right or the right to license.
3. Any terms in the contract as referred to in the cases of clause 2 of this Article shall be invalid ex-officio.

### **Section 3. Compulsory licensing of inventions**

#### **Article 12. Bases of compulsory licensing of inventions**

- 1. In the following cases, the right to use an invention shall be transferred to another organization or individual to use by a decision of a state competent authority as provided for in Article 147.1 of this Law without having to obtain permission from the holder of exclusive right to use such invention:
  - a) Where such use of the invention is for public non-commercial purposes such as for meeting needs of national defense, security, people's healthcare and nutrition or other urgent needs of the society.
  - b) Where the holder of exclusive right to use invention fails to fulfill the obligation of using such invention provided for in paragraph 1 Article 136 and paragraph 5 Article 142 of this Law upon the expiration of a 4-year period as from the date of filing of a registration application for such invention and expiration of a 3-year period as from the date of issue of an invention patent;
  - c) Where the person who wants to use the invention fails, in spite of efforts made after a reasonable time for negotiation on adequate price and commercial considerations, to reach an agreement with the holder of exclusive right to use invention upon the conclusion of a license contract for use of invention;
  - d) Where the holder of exclusive right to use invention is determined to perform an act of anti-competition prohibited under the competition legislation;
- 2. The holder of exclusive right to use invention has the right to request for termination of such right of use when the bases of compulsory licensing

provided for in clause 1 of this Article cease to exist and are unlikely to recur, provided that such termination shall not be prejudicial to the invention licensee;

**Article 13. Conditions of limitation to the right to use inventions transferred under compulsory decisions**

1. The transfer under a decision of a state competent authority shall be in compliance with the following conditions:
  - a) Such right of use is non-exclusive;
  - b) Such right of use shall only be limited to such a scope and period sufficient to attain the aim of the compulsory licensing, and predominantly for the supply of the domestic market, except for the cases referred to in Article 145.1(d) of this Law. With regard to an invention in semi-conductor technology, compulsory licensing shall only aim at the public non-commercial purposes or for the purpose of dealing with an anti-competitive act under competition law;
  - c) The licensee shall not assign such right of use, except with the assignment of his or her business premise, or not grant a sub-license to others;
  - d) The licensee shall pay the holder of exclusive right to use invention adequate remuneration in circumstances of each specific case, taking into account the economic value of such right of use, in compliance with the remuneration frame provided for by the Government;
2. In addition to those conditions provided for in paragraph 1 of this Article, the right to use an invention as transferred in any of the cases referred to in Article 137.2 of this Law shall also have to meet the following conditions:
  - a) The holder of exclusive right to use the principal invention shall also be entitled to transfer to right to use independent invention on reasonable terms; and
  - c) The transferee of the right to use the principal invention shall not assign such right, except with the assignment of the whole right pertaining to the independent invention.

**Article 14. Competency and procedures for licensing of inventions under compulsory decision**

1. The Minister of Science and Technology shall make a decision on compulsory licensing for use of invention based on the consideration of a request for such a license in cases provided for in subparagraph b, c and d paragraph 1 Article 145 of this Law.

Ministries, ministerial-level authorities shall, based on the consultation with the Minister of Science and Technology, make such a decision on transfer of the right to use inventions in the field under their respective management in the occurrence of circumstances provided for in

subparagraph d paragraph 1 of Article 145 of this Law.

2. A decision on compulsory licensing of inventions shall provide for appropriate scope and conditions of use in accordance with Article 146 of this Law.
3. The state authority having decided on compulsory licensing shall promptly inform the holder of exclusive right to use invention about the decision.
4. A decision on compulsory licensing and a decision on refusal of compulsory licensing shall be subject to an administrative appeal or a judicial litigation in accordance with the laws.
5. The Government shall make specific provisions for on procedures of compulsory licensing of inventions as referred to in this Article.

#### **Section 4. Registration of contracts for transfer of industrial property rights**

##### **Article 15. Effect of contracts for transfer of industrial property right**

1. For the industrial property rights established on the basis of registration as referred to in Article 6.3(a) of this Law, a contract for assignment of industrial property right shall only be effective upon registration with the state administration authority of industrial property rights.
2. For the industrial property rights established on the basis of registration as referred to in Article 6.3(a) of this Law, a contract for use of industrial property object shall be effective as agreed by the parties but shall only be effective to a third party upon registration with the state administration authority of industrial property rights.
3. Validity of a licensing contract for use of industrial property object shall be terminated ex-officio upon the termination of licensor's industrial property right.

Appendix 2

Selco Vietnam's Sales Achievement Award 2008 issued by Morning Star Corporation (in USA), which is the world's leading solar controllers and inverters. (<http://www.morningstarcorp.com/en/home>)



January 25, 2009

Mr. Danh Thanh Tran  
SELCO-Vietnam Co. Ltd.  
164 De Tham St., District 1  
Ho Chi Minh City, VIETNAM

Dear Danh:

Morningstar Corporation is pleased to present SELCO-Vietnam Co. Ltd. with the enclosed 2008 Sales Achievement Award. We want to recognize your outstanding performance in selling Morningstar products during this past year.

Please extend our congratulations and thanks to your entire staff. We look forward to continued success together this year.

Best Regards,

A handwritten signature in blue ink, appearing to read "Lee S. Gordon".

Lee S. Gordon  
Chairman

Enc. (1)

Appendix 3

**QUESTIONNAIRES FOR THE CONSUMER IN ISLAND**

Name of respondent: Godfrey Vas – General Manager of Six Senses Hideaway

Time and place: 5<sup>th</sup> of July 2009 at Ninh Van island, Ninh Hoa, Khanh Hoa, Nha Trang City.

Duration: 1:30 hours (10 am – 11:30 am)

- 1/ How much it costs for your company monthly electricity bill?
- 2/ What is your company total capacity of power demand per month?
- 3/ What kind of power generation used to supply electricity for this island?
- 4/ Why solar energy has been chosen to supplement for thermal power?
- 5/ Could you list some problems that have often occurred during the solar water heater system works? Broken down/ bad quality/ extra facility equipment/maintenance service/...
- 6/ How long the solar water system has been installed in this island? How was it cost for the whole system? Total expense including installation cost (in detailed)
- 7/ Who is your supplier for solar water heater system?
- 8/ Have your company got any plan to install a solar power station to generate electricity for the whole island?
- 9/ How much it costs for 1 KW of electricity generated by local own power station?

## **QUESTIONNAIRES FOR THE TOP FIVE DOMESTIC SOLAR ENERGY COMPANIES IN VIETNAM**

Name of respondents:

Mr. Tran Thanh Danh – General Director of Selco Vietnam Company.

Time and place: 26<sup>th</sup> June 2009, 164 De Tham District 1 HCM city

Duration: 4 hours (2pm – 6pm)

Mr. Nguyen Minh Quang – General Director of KIDIVINA Vietnam

Time and place: 17<sup>th</sup> June 2009, Lang Hoa Lac Hi - Tech Park, Hanoi  
(Manufactory) and 6 Au Co Street, Tay Ho District, Hanoi (Head office)

Duration: 4 hours (10 am – 2pm)

Mrs. Duong Thi Thanh Luong – President of Bach Khoa Solar Co., Ltd

Mr. Nguyen Huy Phuong – Deputy of Sale Director of Bach Khoa Solar.

Time and place: 28<sup>th</sup> June 2009, 11 Tan Thoi Nhat Street, Dist 12, HCM city.

Duration: 2:30 hours (10 am – 12:30 am)

Ms. Le Thuy Hang – General Ledger Accountant of Redsun Energy JS. Co.

Time and place: 10<sup>th</sup> July 2009, 17 Phan Phu Tien Dist 5 HCM city.

Duration: 3 hours (9am - 11am)

Mr. Nguyen Van Trong – Sale and Marketing staff of VNsolar JS Co.

Time and place: 16<sup>th</sup> June 2009, 6/35 Cat Linh Dong Da , Hanoi.

Duration: 1 hour (1pm – 2pm)

Questions:

1/ What are your advantages of your company? (capital, technology, market share, trademark, human resource)

2/ What are your disadvantages of your company? (capital, technology, market share, trademark, human resource)

3/ Who are your strongest competitors?

4/ What are your main suppliers?

5/ What are the demands of solar energy in Vietnam? What are your target customer groups?

6/ What is your company future plan? Which is the potential market your company focusing on?

7/ Could you list some remarkable achievements or implemented projects of your company?

8/ What are the main reasons of your company's success or failure?

9/ What is the best business model for your company to cooperate with foreign partner? Join venture, franchising, direct import, technology transfer, turnkey solution?

10/ What is your conclusion about solar energy market in Vietnam?

**QUESTIONNAIRES FOR THE ENERGY DEPARTMENT OF  
MINISTRY OF INDUSTRY AND TRADE (MOIT)  
OF VIETNAM**

Name of respondents:

Mr. Ta Van Huong – Head of Energy Department of MOIT of Vietnam

Time and place: 25<sup>th</sup> of June 2009 at Energy Department 54 Hai Ba Trung Hanoi, Vietnam.

Duration: 01 hour (3pm – 4pm)

Mr. Mai Dinh Trung – Deputy Director of Project Management Board on Rural Electrification and Renewable Energy, Energy Department, MOIT.

Time and place: 25<sup>th</sup> of June 2009 at Energy Department 54 Hai Ba Trung Hanoi, Vietnam.

Duration: 2:30 hours (from 4pm -6:30pm)

Mr. Duong Manh Cuong – Assistant of Head of Electricity Regulatory Authority of Vietnam (ERAV), worked and exchanged information and data via email and mobile.

Questions:

- 1/ Is it possible for one power plant can sell electricity directly to the end-users?
- 2/ How is the role of EVN changed in the near future?
- 3/ What is the specific policy for renewable energy projects, which are invested by foreign investors?
- 4/ What is the plan for renewable energy in Vietnam in the next 5 and 10 years?
- 5/ How many solar energy projects are waiting for approval from MOIT?
- 6/ What are plans for solar energy in Vietnam within next 2, 5,10 years?
- 7/ Why does solar energy remain a new concept in Vietnam?
- 8/ At which price can EVN purchase electricity from solar power plants?
- 9/ How many IPPs will be built within next 2, 5, 10 years? List of them.

- 10/ Which are criteria for IPPs to become EVN suppliers?
- 11/ What problems does EVN encounter in purchasing electricity from IPPs?
- 12/ How much should electricity capacity be fulfilled to solve the shortage of energy in Vietnam from now until 2015?
- 13/ Are there differences between domestic suppliers and foreign suppliers in selling electricity to EVN?
- 14/ Are there priorities for IPPs located out of national electricity grid areas?
- 15/ Are there priorities for solar IPPs in Vietnam?

Name of other respondents:

Dr. Bui Tuyen – Head of Technology Transfer Research Center of University of Technical Education Hochiminh City.

Mrs. Mai To Nga – Vice Director of Energy Conservation Center of HCM city.