WIND ENERGY HOLDING COMPANY LIMITED : INVESTMENT VALUATION ON FREE CASH FLOW TO THE FIRM (FCFF) APPROACH

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A THEMATIC PAPER SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MANAGEMENT
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ABSTRACT

This paper aims to find the intrinsic value of Wind Energy Holding Company Ltd. (WEH). The concept on valuation in this study builds on the view that the stock price of a firm should reflect the firm's fundamentals in term of cash flows, growth and risk. The fair values derived are analyzed by using the discounted cash flow valuation (DCF), focusing on free cash flow to firm (FCFF). The result of the company's intrinsic value in 2014 is 43,128.02 million baht or 409.57 baht per share. As government support for the use of renewable energy increases, WEH has the opportunity to grow in the future and has a strong possibility of further expansion throughout Asia and other continents. However, such expansion is not without risk. The direction, strength and flow of air movement by its very nature is unpredictable and can impact significantly on the company's levels of electricity production. In conclusion, the valuation within this study is only a suggestion of the company's fair value. The method must be looked at cautiously and with an awareness of its limitations. However, with a view to possible future investment, the concept on valuation and the process of estimating intrinsic value provided in this study can still give useful guidance for investors researching and analyzing renewable energy companies.

KEY WORDS: Valuation/Discount cash flow/FCFF/Renewable energy/Wind energy

53 pages

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CHAPTER I
INTRODUCTION

The purpose of this paper is to attain the intrinsic value of the company, Wind Energy Holding Company Ltd. (WEH). The intrinsic value of the chosen company is analyzed using the financial valuation tool as the discounted cash flow model (DCF) that focuses on the free cash flow to firm (FCFF). The content of this paper is organised as including information on the renewable energy and wind power industry, both at international and national level, with a particular focus on Thailand. It provides a description and profile of WEH as a business under introductory part. It provides detailed overviews and information of theories and empirical studies relevant to stock valuation within the literature review. Relevant assumptions and calculations specifically related to DCF are outlined in the Methodology and Data sections. The Empirical evidence section presents major reasons on the revenue earned from electricity sold and the growth rate in electricity charge under the DCF valuation. Finally, the paper concludes with an indication of the target value of WEH and provides recommendations on using DCF valuation.

The rationale for considering and selecting WEH as the focus company was predominantly due to the following reasons. Firstly, it was the first company to generate electricity from wind energy in Thailand and is regarded as having the most installed capacity of electricity from wind energy in the country. The company is currently a private company but is planning to become a public listed company. Secondly, there is an increasing shortage of energy supplies in the world caused by stronger demand and rising energy costs from expanding populations and worldwide economic. These global concerns can be extended to the effects of global warming and climate change, both caused by the use of fuel energy to generate electricity resulting in increased production of carbon dioxide. Heavy incentives to promote renewable energy as the alternative energy are becoming increasingly attractive to policymakers in many countries around the world. Furthermore, subsidies are increasingly being

granted from governments as an incentive to support and attract private investors to the renewable energy industry, install projects and develop new technologies for generating electricity within the sector.

It is necessary to look at the circumstances surrounding the business valuation. These circumstances include identifying and gaining an understanding of the industry from both a global and national point of view, as well as a description of the focus company.

1.1 Viewpoint of the Global Renewable Energy Industry

According to the paper "Outlook for energy 2013"[1] that examined trends in energy and supply between 2010 and 2040, it predicted an increasing shortage of energy supplies and rising energy costs due to expanding populations and increased global economic growth. Concerns relating to the impact of global warming and climate change have urged policymakers of many countries in the world to stop promoting and reduce their use of fossil fuel energies such as oil, coal or nuclear power, and take advantages of favorable schemes that promote renewable energy as an alternative resource.

Renewable energy can be defined as sources of energy based on natural resources such as sunlight, wind, hydro, or geothermal heat. They are often labeled alternative energy sources in comparison to traditional fossil fuels that have formed the basis of energy production in the past. Since natural energy sources offer a number of advantages and disadvantages. In this study, the only focus is on the advantages and disadvantages of the main renewable energy source that include hydro, solar and wind power. For hydropower, it is a flexible source of electricity due to the fact that hydro plants can be ramped up and down very quickly to adapt to changing energy demands. The cost of hydroelectricity is relatively low, making it a competitive source of renewable electricity. Hydroelectricity produces

[1]ExxonMobil. (2013). The Outlook For Energy: A View to 2014. from http://www.esso.com/Thailand-English/PA/Files/2013_eo_eng.PDF

no direct waste and has a considerably low output level of the greenhouse gas carbon dioxide than fossil fuel powered plants. However, in order to produce significant amounts of electricity, a location that can provide huge hydropower is required. For solar power, it is the conversion of sunlight into electricity, either direct using the photovoltaic method (PV) or indirectly using concentrated solar power (CSP). Solar power is a relatively inexpensive source of electrical energy. Nonetheless, it is not a continuously available source of energy, particularly at night, due to its dependence on the sun. In turn, this requires technology and cost of investment in technology storage. Solar technologies are still in their infancy due to it being complicated. Solar photovoltaic modules need to be changed during any project life span and the cost of solar modules can prove to be expensive. For wind energy, it is the kinetic energy of air in motion. When wind moves through a wind turbine's blades, a wind turbine converts kinetic energy from the wind into the mechanical energy, which is transformed into electricity. Electrical power from wind power can be produced 24 hours a day and does not produce carbon dioxide. Moreover, wind farms have relatively low operating costs as they do not have to accommodate for expenses relating to raw materials. Maintenance costs are low and wind turbines are capable of performing for the duration of the project life without the need to be replaced. However, the strength of wind is both cyclical and seasonal. Wind power can only be produced when gusts of wind pass through turbines. Wind movement increases at night and during winter season, thus, greater amounts of electricity are generated during these periods. The positioning of wind farms must be chosen carefully to find locations that are continuously windy. Wind power has now become one of the most rapidly expanding industries. It can be fairly argued that wind power has huge potential for investment. On a global scale there are over 100 countries and regions using wind power for electricity generation. In 2012, the top five wind markets by total capacity were China, USA, Germany, Spain and India.[2]

In term of sustainability, building a positive and proactive connection to communities can often translate into a boost to the bottom line of a competitive business. Businesses related to electricity generation are often an environmental

[2]World Wind Energy Association, (WWEA). (2012). Annual Report 2012. from http://www.wwindea.org/webimages/WorldWindEnergyReport2012_final.pdf

concern to local communities. Since all forms of electricity generation have some level of environmental impact, reducing the amount of corresponding emissions of pollutants and greenhouse gases is required to produce a unit of energy output. Electricity and technologies related to renewable resources do not contribute to climate change or local air pollution, as no fuels are combusted in these processes. Large–scale renewable energy technologies are subject to all the necessary environmental agreements of local communities' permits. Thus, it is important to engage shareholders and other stakeholders by collaborating with local communities effectively, managing potential risks and building credibility and trust in society.

1.2 Viewpoint of the Thai Renewable Energy Industry

From national viewpoint, interest in the development and use of renewable energy in Thailand continues to grow. The total electricity consumption from renewable energy in Thailand for the first 9 months of 2013 was 124,818 Gigawatt hours (GWh).[3] The Thai government is increasingly initiating and developing schemes based on current developments in renewable energy through its Energy Policy and Planning Office (EPPO). Although the deployment of schemes for the use of renewable energy to generate electricity has not been long introduced to the country, renewable energy has gradually become a larger part of the fuel mix in Thailand. The national government has categorized power plants' sizes into 3 types: IPP[4], SPPs[5] and VSPPs[6]. Presently, the national government has offered incentives for power developers by offering adder rates[7], which are available for SPPs and VSPPs.

[3]Information is from the Energy Policy and Planning Office (EPPO), Ministry of Energy

[4] IPPs means Independent Power Producers

[5] SPPs means Small Power Producers

[6] VSPPs means Very Small Power Producers

[7]The Adder rate is in addition to the normal price that power producers will receive when selling electricity to the national power utilities. The government initiates the adder rate pricing subsidy as an incentive for investors to put money into renewable energy. The program is valid for 7 years for general renewable resources, and 10 years for both solar and wind energy. The validation is counted from the day that the electricity is transferred into the national power utilities' system.

As a consequence of this, the trend of power plants' sizes has shifted from IPP to SPP and VSPP. In term of the adder rates offered, solar project developers would receive the highest rates, while the rates give to wind power developers are the second rank. The Thai government service provided by the Agricultural Land Reform Office (ALRO) also facilitates areas for developing electricity generated from renewable energy projects. Furthermore, there is a tax saving from Board of Investment of Thailand (BOI) on a project set.

Appendix A-1 presents an attractive of the electrical utility industry as a wind energy producer based on the overall Five Forces model. Intensity of competitive rivalry in this sector is not much strong in Thailand. However, it can be argued that it is strong with regards to the bargaining power of customers. This is because the Electricity Generating Authority of Thailand (EGAT) is the sole purchaser of electricity in Thailand. EGAT has the ability to buy electricity under the Power Development Plan (PDP) that is issued by the Ministry of Energy. This plan defines the demand for electricity for the country. The quantity of electricity bought by EGAT will follow this plan. The threat of new entrants is difficult for new competitors to enter into this industry. These include the high cost of investment, knowledge and expertise in process, development and technology for wind farms, and ability to obtain prime locations to set up wind farms. It can be argued that the bargaining power of suppliers is relatively low due to the fact that there is many wind turbine manufactures around the world. Wind turbines technology has changed rapidly, thus, wind turbine producers promptly correspond to compete with each other to meet and exceed customers' request. The threat of substitute products is at a moderate level. This is due to the fact that other renewable resources such as sunlight or hydro can also generate electricity, but also require excessive investment in research, infrastructure, and technologies.

1.3 Business Description

Industry's viewpoint gives high priority to government policy and acceptance from local communities during the decision making process when considering whether to invest in a business. Within Thailand, wind power offers more benefits in these areas to investors when compared to solar power and hydropower production. As a consequence of this, WEH is the first Thai private company that is focusing its business solely on developing projects on the generation of electricity from wind energy only. It is currently the only company to be also commercially trading wind-generated electricity to EGAT.

Being the first and largest wind energy project in South East Asia with an installed capacity of 207 Megawatt (MW) at the present, WEH's current position in the Thai renewable energy market gives it a significant competitive advantage within the energy sector. The company has high margins, strong and rapid sales growth with the number of projects increasing each year, and the low cost of both raw materials and maintenance. In addition to this, support from the Thai government service, according to the Alternative Energy Development Plan (AEDP) 2012-2021[8], the Thai government aims to use wind energy to generate electricity at 1200 MW over the next 10 years, representing 25 percent of all energy produced in the country. Moreover, the company enables to select highly appropriate and suitable geographical locations for wind farm projects using wind maps. The company can be perceived as more reliable than its competitors due to its commitment to developing and building financially sustainable long term projects. It actively engages local communities through the corporate social responsibility (CSR) and education programs. At the same time, it aims to build sustainability through employee engagement and external stakeholders. This is because the company is very much aware that project developments could create pressure from local communities opposing to wind energy farms, while encouraging positive impact through CSR activities that directly impact on communities and stakeholders.

[8] It is launched by Thailand's Ministry of Energy. It is identified the framework and direction for using and developing renewable energy as alternative source of energy for 25 percent of all energy used in the country for 10 years.

At present WEH is managing nine projects,seven of which have an individual installed capacity of 90 MW, and two others with an installed capacity of 60 MWin each project. If the company can produce electricity for commercial sale as planned from all nine projects, approximate growth to the company's net income would be 252.33percent in 2014.Of the proposed future projects not yet currently in commercial operation, a Power Purchase Agreement (PPA) with EGAT has already been signed for the Khor Kor project and will begin commercial operation in 2015. Three more projects, Korat 02/1; Korat 02/2; and Korat 02/3, will potentially be launched in 2016 generating an additional 400 MW of electricity, resulting in a total amount of 837.10 MW being produced. Appendix A-2 shows that by 2017 the total installed capacity of the company is estimated at 837.10 MW, 665.36 MW of which may be produced by the company. WEH has plans to contribute and develop more wind farms by 2019, allowing them to generate electricity up to 1,000 MW.

The company has considerable potential for overseas expansion with many opportunities available in other regions. The management of the company aims to be in the top five wind energy producers in the Asia-Pacific region within 5 years. This will require overseas expansion of company wind farms into surrounding countries, such as the Lao Republic, Indonesia, India and Vietnam. There are also provisional initial plans for creating 500 MW installed capacity in the European and Australian regions. However, investment in the company is not entirely without risk. Assessing the amount of electricity that will be generated is difficult as it is reliant on the movement of wind, which is inconsistent. The amount of electricity generated directly impacts on the company’s revenue. Although this could be viewed as a short-term issue, the company minimizes exposure to this risk by insuring its revenue with external insurance companies. Another potential risk is the failure to attain future PPA with EGAT. Nevertheless, to date the company has not been denied the signing of any purchasing agreements.

CHAPTER II
LITERATURE REVIEW

2.1 Theories

2.1.1 Capital Asset Pricing Model (CAPM)

The cost of equity is calculated with the help of the capital asset pricing model (CAPM). Building on the Markowitz mean-variance framework, the CAPM offers the first explicit relationship between risk and return. The CAPM suggests that high expected returns are associated with high levels of risk. However, not all risks influence return since risks can be diversified and reduced by forming a well-diversified portfolio. Therefore, it is only the non-diversifiable risk that matters. In CAPM, market risk, measured by beta coefficient, is the only non-diversifiable risk that affects returns. Mathematically, CAPM is defined by the following equation. (Sharpe, 1964)

$$E(R_i) = R_f + \beta_i(R_m - R_f) \quad (1)$$

Where, E(Ri) is an expected return of stock i, R_m is an expected return of the market portfolio, R_f is the risk-free rate, and β_i is a measure of non-diversifiable risk of stock i.

Noticeably on finding beta, according to the work of Cohen (2007), Hamada's Equation determines the levered beta and the optimal capital structure of corporate firms. The equation is the results from combining the Modigliani-Miller capital structuring theorems with the CAPM as follows:

$$\beta_L = \beta_U \left[1 + (1-T)\phi\right] \quad (2)$$

Where, β_L is the levered beta, β_U is the unlevered beta, T is the tax rate, and ϕ is the leverage which is defined here as the ratio of debt, *D*, to equity, *E*, of the firm.

The importance of Hamada equation is that it helps to separate the financial risk of a levered firm from its business risk reflected by the beta of an unlevered firm. Nevertheless, the equation is acknowledged that it has not incorporated the impact of default risk and credit spread yet.

Cohen, therefore, studied and analyzed to modify the Hamada's Equation with the outcome as follows :

$$\beta_L = \beta_U \left[1 + (1\text{-}T)\,\phi^*\right], \text{where } \phi^* \equiv \frac{R_D}{R^*_D}\,\phi = \frac{R_D}{R^*_D} \cdot \frac{D}{E} \qquad (3)$$

Where, ϕ^* is the "adjusted" leverage which accounts for default risk and credit spread, and R_D^* is the risk-free rate

This modified equation is concluded that it does not contradict itself and stays consistent with the fundamentals of finance. However, computing the beta of a firm is certainly far more complicated than what has been presented on his work and there is the remain of more work to be done to come up with a model that would please the majority of both academics and practitioners.

2.1.2 Discounted Cash Flow Model

Discounted cash flow (DCF) valuation describes the present value (PV) of expected future cash flows and the discount rate, which reflects the uncertainty of the estimated cash flows. (Damodaran, 2002)

$$\text{Value} = \sum_{t=1}^{t=n} \frac{CF_t}{(1+r)^t} \qquad (4)$$

Firm valuation: Free Cash Flow to the Firm, the Cost of Capital Approach (FCFF)

For firm valuation, it is obtained by discounting expected cash flows to the firm at the weighted average cost of capital (WACC).

$$\text{Value to firm} = \sum_{t=1}^{t=n} \frac{\text{CF to firm}_t}{(1+WACC)^t} \qquad (5)$$

Where, n is the life of the asset, CF to firm $_t$ is the expected cash flow to firm in period t which is before interest expenses and principal payments, and WACC is weighted average cost of capital

For WACC, it is the cost of the different components of financing used by the firm, weighted by their market value proportions.

$$WACC = K_d(1-t)*\text{Weight of debt} + K_e*\text{Weight of equity} \quad (6)$$

Where, K_d is the cost of debt, K_e is the cost of equity, and t is tax rate

According to Damodaran (2002), FCFF is the summation of the all claim holders' cash flows in the firm, including cash flows to equity, cash flows to lenders and cash flows to preferred stockholders. The simplicity to estimate FCFF is to estimate the cash flows prior to any of these claims. Note, FCFF is often referred as an unlevered cash flow and does not incorporate any of the tax benefits due to interest payments. Thus, it begins with the earnings before interest and taxes, deducting out taxes and reinvestment needs as follows :

$$\text{FCFF} = \text{EBIT}(1 - \text{Tax rate}) + \text{Depreciation} - \text{Capital expenditure} - \Delta\ \text{Working capital} \quad (7)$$

2.2 Empirical Studies

Damodaran (2006) explained that due to value being linked to a firm's action, the connections between corporate finance and valuation have become clearer. However, as stated by Fernández (2002) value should not be confused with price. The value of a firm is different for different buyers and it may also be different for the buyer and the seller. Damodaran (2006) also indicated that DCF and relative valuations generally yield different estimates of value for the same firm at the same point in time. The differences in value of both valuations come from different views in market inefficiency. For the DCF valuation, it is assumed that markets make mistakes and they correct these mistakes over time. These mistakes can often occur across entire sectors or even the entire market. For relative valuation, it relies more on the market which is assumed to be correct. The market prices stock on average, but it makes errors on the pricing of individual stocks.

Damodaran (2002) described that most valuations done in the real world are relative valuations. However, DCF valuation is a search for intrinsic value and therefore provides the foundation on which all other valuation approaches are built. To consider the advantages of discounted cash flow to equity, Begović, Momčilović, and Jovin (2013) explained that the model encompasses all future inflows and outflows of funds. The result of its estimation is based on projected cash flows, which contribute to a more accurate and realistic valuation of the company. By neglecting cash flows bound to debt and interest, the author argues that the models simplicity also offers firms further advantages. It also makes changes during the period of the projection redundant. Steiger (2008) pointed out the advantages of DCF valuation that it is a dynamic tool used to assess the values of a variety of assets and also to analyze the effects that different economic scenarios have on a company's value. He argues that it is useful for analyzing complicated situations such as creating feasibility plans and computing capital budgeting. In addition, Nguyen (2013) indicated that the valuation approach is less exposed to the market moods and perception. In other words, it is the suitable tool to choose, if good investors buy businesses rather than stocks.

It can be argued that the DCF valuation also bring with it some disadvantages. Nguyen (2013) suggested that the valuation method requires a higher volume of input than other valuation approaches as its output is an attempt to estimate intrinsic value. Although the input data is not quite difficult to forecast or estimate, it can be manipulated by the bias of an analyst. Steiger (2008) added that the approach could be subject to assumption bias. Even slight changes in the underlying assumptions of an analysis can shift the valuation results. Damodaran (2002) described that the approach requires a lot of assumption to predict the future business of a firm and recommended that it is very easy to manipulate the DCF analysis to result in the value that you want it to be by adjusting the inputs. Analysts or business professionals have no instruments to estimate the input factors exactly. In the case of DCF to equity's limitation, Begović et al. (2013) described that it is the difficulty of predicting the structure of financial sources, which is reflected in the definition of the outstanding debt repayment plans as well as the projection of new debt for companies.

For relative valuation, it is more likely to reflect market perceptions and moods than the DCF valuation and can be advantageous when the price reflects these perceptions, particularly when the objective is to sell a security at the current daily price such as in the case of an initial public offering (IPO). However, the research of Kim and Ritter (1999) valued a group of IPOs using PE and price to book ratios, and concluded that multiples only have modest predictive ability. Damodaran (2002) argues the need for caution when using relative valuation as multiples are easy to misuse and manipulate, particularly when comparable firms are used. Moreover, a biased analyst can choose a group of comparable firms to confirm his or her biases about a firm's value.

The relative valuation approach also uses some variables provided from financial analyst reports in order to estimate multiples. Bradshaw, Huang, and Tan (2012) noted that financial analysts typically provide earnings forecasts, target prices, and stock recommendations in their research reports to convey their assessment of covered firms in a sample group. To derive value of target price, the authors cited the work of Bandyopadhyay, Brown, and Richardson "Analysts' Use of Earnings Forecasts in Predicting Stock Returns: Forecast Horizon Effects" written in 1995 which found that target price forecast revisions vary to earnings forecast revisions. In accordance with the work of Da, Hong, and Lee (2010), the investment value of target price derives from earnings forecasts and the implied discount rates embedded in the forecasts of PE ratios. It is important to note that bias does exist in an analyst research but is mitigate analyst bias. The study of Bradshaw et al. (2012) pinpointed that resident analysts in a country make more precise earnings forecasts for firms in that country than non-resident analysts. For most used approaches in relative valuation, there is an evidence conducted by Fernández (2001) showing the popularity of relative multiples employed at the research of Morgan Stanley Europe. The result is that PE ratios and EV to EBITDA multiples are the most frequently employed. In order to adjust multiple on earnings, the growth rate, the PE ratio to growth (PEG ratio) is used as a measure. Easton (2004) clarified the fact that the PEG ratio is effective at ranking stocks, but one of the weaknesses of the ratio is that the multiple emphasizes on short term growth.

In summary, using DCF is a valid method to assess a firm's value if special precaution is put on the validity of the underlying assumptions, with quality and validity of the data used as input (Steiger, 2008). Relative valuation, however, in intrinsic value world can help find weak spots in DCF valuations and fix them. If we can find ways to frame multiples right, we should be able to use them better. To be effective using valuations, using the DCF method in combination with other methods is an effective way to obtain a realistic range of appropriate firm values. Also, awareness must be recognised for firms in transition that significant fundamentals such as risk, debt ratio and growth rate need to change over time.Thus, when using several valuation techniques, their individual shortfalls are eliminated and the utmost goal in the field of firm valuation can be reached as determining a fair and valid company (Damodaran, 2002).

CHAPTER III
DATA AND METHODOLOGY

3.1 Discounted Cash Flow Valuation (DCF)

3.1.1 Free Cash flow to Firm (FCFF)

The model for firm valuation is to discount expected cash flows to the firm at the weighted average cost of capital (WACC).

$$\text{Value to firm} = \sum_{t=1}^{t=n} \frac{\text{CF to firm}_t}{(1+WACC)^t}$$

Where, n is the life of the asset. CF to $firm_t$ is the expected cash flow to firm in period t, which is before interest expenses and principal payments. The Weighted average cost of capital (WACC) is the cost of the different components of financing used by the firm, weighted by their market value proportions.

$WACC = k_d(1-t)*\text{Weight of debt} + k_e*\text{Weight of equity}$

Where, k_d is the cost of debt, k_e is the cost of equity, and t is tax rate

In order to calculate the value to shareholders and the value to firm, it is necessary to obtain some industrial and economic information, along with specific information related to the company. These information form the basis of the inputs required in order to estimate the value to shareholders and to firm.

3.1.2 Assumption

3.1.2.1 Assumptions for Calculating Cash Flow

The assumptions used for calculating cash flow for FCFF valuation are based on project revenue, growth rate in revenue, cost & operating expense, capital expenditure and depreciation.

- Project Revenue

The revenue from the sale of electricity is derived only from the company's nine projects that EGAT have already agreed to purchase electricity from. This is shown in Table 3.1.

Table 3.1 Project Revenue

No.	Project	Capacity (MW)	Scheduled Commercial Operation Date (SCOD)	Project Status	Year
1	KR2	90	Feb-13	Producing electricity that is being sold commercially	
2	FKW	90	Nov-12		
3	Watabak	60	Sep-14	Agreement to purchase future electricity accepted	2014
4	Korat02/1	90	Jan-16		2016
5	Korat02/2	90	Jun-16		2016
6	Korat02/3	90	Jun-16		2016
7	North Kirssana	90	Apr-17		2017
8	Korat02/4	90	Aug-16		2016
9	Khor Kor	60	Jun-15	Power Purchase Agreement signed	2015

Source: Company information

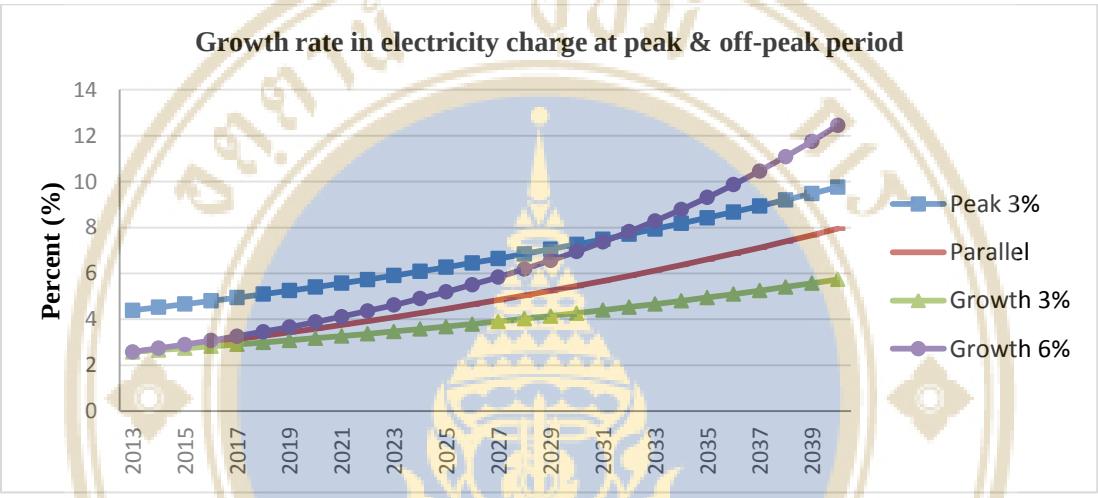
- Growth Rate in Revenue

The Growth rate in revenue is derived from the growth rate of price from purchasing electricity. This, in turn, is determined from the growth rate in electricity charge. Comprising of both 'Peak' and 'Off-peak' periods[9], the continuous growth rate in electricity charge is calculated from the summation of the Base tariff (Base) and the Float Time (FT). The growth rate in electricity charge for the Peak period is 3 percent per year. This rate will be used to calculate electricity charge for the peak-rate. The Peak and Off-peak rates always grow in parallel with each other. The difference between the Peak and Off-Peak rate is consistent at 1.81 baht per unit. The Off-peak rate will always be calculated as being 1.81 BHT per unit less than the Peak rate. In this study, the growth rate in revenue is used to calculate revenue for next 20 years starting from 2014. This is presented in Table 3.2.

[9] Peak period is 09.00-22.00 on Monday to Friday. Off-peak period is 22.00-09.00 on Monday to Friday and inclusive of the whole day on Saturday, Sunday and public holidays.

Table 3.2 Growth Rate in Revenue

Type	Growth Rate (pa.)	Estimate Price (Baht)
Peak	3.00%	4.3948
off-Peak	Peak rate - 1.8124	2.5824
Adder		3.5
Assumption growth rate	**3.00%**	



Source: EGAT & From estimation

- Cost and Operating Expense

The wind energy business is unique in that when creating electricity, there are no raw material costs. Operating expenses for each of the 9 individual projects are calculated at 1.54 million baht per installed-megawatt. The figure is based on the operating expenses of two current wind energy projects - West Huaybong 2 and 3 - that are already in operation producing and selling electricity. Based on this, the growth rate of the operating expense is estimated to be at 3 percent in this study.

- Capital Expenditure (CAPEX)

The CAPEX for each project is approximately 60 to 70 million baht per installed-megawatt. For a complete installation, a project's investment will totally be between 4,000 to 7,000 million baht. The calculation of CAPEX comes from the number of wind turbines multiply by the cost of investment per installed-

megawatt. Appendix B-1 is summarized the estimated invested capital for each project.

- Depreciation

WEH determines its depreciation under the straight-line method, and is calculated by dividing the project's assets by the life of the project, which is approximately 20 years. This mostly equals the life of a wind turbine. There is no salvage value counted.

3.1.2.2 Assumptions for calculating discount rates

Cost of Equity to Shareholders

The assumptions for calculating cost of equity to shareholders is using CAPM theory, by following the equation $E(R_i) = R_f + \beta_i(R_m-R_f)$ when $E(R_i)$ is an expected return of stock i, R_m is an expected return of the market portfolio, R_f is the risk-free rate, and β_i is a measure of non-diversifiable risk of stock i. The Illustration 3.1 shows the value of cost of equity to shareholder.

- Risk-free rate (R_f)

One approach that can be used for measuring the risk free rate is to match the period of a wind project with the government bond yield. The 20 year yield to maturity of Government bonds is referred in this study at 4.32 percent.[10]

- Market Risk premium ($R_m - R_f$)

The market risk premium is an excess return of the market portfolio over a risk-free rate. In this paper, the market risk premium is based on the combined approach with the country risk premium incorporating both the country bond spread and the equity market volatility. This premium is then added to the mature market (U.S.) premium of 5 percent yielding a total equity risk premium of 7.40 percent based on the following equation:

[10] This information is based on the Thai Bond Market Association on Feb 18th, 2014

Adjusted country risk premium = Country default spread * $\sigma_{\text{Country Equity}} / \sigma_{\text{Country bond}}$

= 1.60 * 1.50 = 2.40 %

adding Equity risk premium US 5.00 %

= 2.40 + 5.00 = 7.40 %

- Beta

In order to calculate the risk of a company, the leverage beta of WEH is calculated using 2 equations as the Hamada equation and the adjusted beta formula. The formulas are defined below:

- The Hamada equation is $\beta_U = \beta_L / [1 + (D/E)]$

- The adjusted beta formula is

Adjusted beta = (0.67) * Raw beta + (.33) * 1.0

Necessary information to be collected includes the weekly return of the Stock Exchange of Thailand (SET index), and the return of individual stock taken from the Energy Absolute PCL (EA) and SPCG PCL (SPCG). This information is gathered over the course of one year from February, 1st 2013 to February, 18th 2014.

Following the Hamada equation, firstly the industry unleveraged beta, which represents as the unleveraged beta of WEH, must be calculated by averaging the unleveraged beta of EA and SPCG stock. To find unleveraged beta of each stock, there are 3 factors involved which are leveraged beta of EA and SPCG, D/E ratio of EA and SPCG and tax rate.

The leverage beta of each stock is found by using the regression formula $Y = a + \beta X$. This is the relationship between the return of the SET index (X) as the independent variable, and the return of a stock (Y) as dependent variable. In this instance, the leveraged beta of EA results from the relationship between the return of the SET index and the return of EA, and the leveraged beta of SPCG does likewise. Appendix B-2 shows the estimated returns on SET index, EA and SPCG. Excel spreadsheet software is used in this study to find the regression slope which represents as leveraged beta of stock. For the D/E ratio of each stock, it is the median values found from interest bearing debt as the debt proportion (D), and the total equity's stockholder excluding non-controlling as the equity proportion (E). The information

for finding the D/E ratio of EA and SPCG is taken from the last 2 years, 2012 and 2013, of statement of financial position on SETSMART information. For tax rate, it is 20 percent, as defined by the Department of Tax. However, it is important to note that this tax rate is susceptible to possible change in the future. All these factors outlined above are used to find the unleveraged beta of EA and SPCG, which have been established to be the average unleveraged beta of industry or the unleveraged beta of WEH. By continuing to use the Hamada equation and the same tax rate with WEH's target debt to equity at 60:40, which is 1.5, used for the D/E ratio, therefore this will give leveraged beta of WEH.

According to beta theory, the beta figure should be close to 1 in the long term. The beta can be adjusted to get close to this figure by using the beta adjustment formula. Hence, the result of the adjusted beta will be used not only for calculating cost of equity to shareholders but also for calculating weight average cost of capital (WACC) later. The value of WEH's beta is summarized in the Table 3.3.

Table 3.3 WEH's BETA

Beta Unlevered	**EA**	**SPCG**
Beta Levered	1.2089	1.7398
Debt / Equity	0.4308	4.4540
Tax rate	20%	20%
Beta Unlevered	0.8991	0.3813
Beta Industry	**0.6402**	

Beta levered	**WEH**
Beta Unlevered	0.6402
Debt / Equity	1.5
Tax rate	20%
Beta levered	1.600

Adjust Beta Unlevered	**1.4023**

Source: From estimation

Illustration 3.1 Cost of Equity to Shareholders

WEH's discount rate value under the assumption:

$$k_e \text{ or } E(R_i) = R_f + B\,(R_m - R_f)$$

$$= 4.32\% + 1.4023(7.40\%)$$

$$= 14.70\ \%$$

Assumptions for Calculating Cost of Capital

The assumptions for calculating cost of capital is under the equation WACC = $k_d(1-t)$ * Weight of debt + k_e* Weight of equity, when k_d is the cost of debt, k_e is the cost of equity, and t is tax rate. The Table 3.4 shows WACC of WEH. It is important to note that the assumption and measurement values of the cost of equity in the FCFE approach are applied here.

- Cost of Debt (k_d)

The pretax cost of debt in the study is based on a loan contract with the floating rate from a financial institution upon which WEH has agreement. Estimation comprises of two major periods.

Estimation on the first period occurs when a project is less or equal to 10 years. With a short-term project, the approach for estimation is to use the yield to maturity on a government bond which is similar to the time of a project's period, and then adding it to the premium of WEH's short term bank loan. The premium of WEH's short term loan is at 2.20%, and the yield of Thailand ten-year zero coupon bond is taken at 4.08%,[11] therefore, yielding the cost of debt of the first period at 6.28%.

Estimation on the second period occurs when a project is over 10 years, but not more than 20 years. The approach for estimation is based on the forward rate calculation, and then adding its result to the premium of WEH's short term bank loan. The formula is as following.

Forward rate $_{10,20}$: $(1+r_{20})^{\wedge 20} = (1+r_{10})(1+f_{20})$

Where, r_{10} is the zero-coupon yield for 10 years, r_{20} is the zero coupon yield for 20 years, and f_{20} is the forward rate $_{10,20}$

[11] This information is based on the Thai Bond Market Association on Feb 18th, 2014

The forward rate between 10 years and 20 years is found at 5%, and then added to the premium of 2.20%, yielding the cost of debt of the second period at 7.20%.

- Tax Rate (t)

The Board of Investment (BOI) of Thailand bases the Tax rate upon the investment promotion. The following criteria are applied in the corporate sector:

Year	**Criteria**
0 - 8	Exemption of import duties on machinery and corporate income tax 100% Tax rate is at 0%
9 - 13	Exemption of import duties on machinery and corporate income tax 50% Tax rate is at 10%
≥ 14	No exemption Tax rate is at 20%

- Weight of Debt (D) and Weight of Equity (E)

This study uses the target debt to equity of WEH as 60 for the weight of debt, and at 40 for the weight of equity.

Table 3.4 WEH's Weighted Average Cost of Capital (WACC)

Project	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Cost of equity	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%
Cost of debt	6.28%	6.28%	6.28%	6.28%	6.28%	6.28%	6.28%	6.28%	6.28%	6.28%
Weight of equity	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Weight of debt	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
Tax rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%
WACC	**9.65%**	**9.65%**	**9.65%**	**9.65%**	**9.65%**	**9.65%**	**9.65%**	**9.65%**	**9.27%**	**9.27%**

Project	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Cost of equity	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%	14.70%
Cost of debt	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%
Weight of equity	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Weight of debt	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%	60.00%
Tax rate	10.00%	10.00%	10.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
WACC	**9.77%**	**9.77%**	**9.77%**	**9.34%**	**9.34%**	**9.34%**	**9.34%**	**9.34%**	**9.34%**	**9.34%**

Source: From estimation

3.1.3 Testing

To get the target value to shareholders and to firm, some industrial and specific information related to the company are obtained and created as assumptions. Following the FCFF valuation, as the company has stable leverage, it is therefore possible to estimate the expected cash flow to firm or FCFF as follows:

The estimation of FCFF:

Cash inflow

NOPAT

+ Salvage (after tax)

+ Depreciation

+ WC Recovery

Cash out flow

- Fixed investment

- Changed in working capital

= *Free cash flow to Firm or FCFF*

The value to shareholders and to firm is calculated under the sum of the part method, which is the summation of the present value for each project. To determine the present value of each project, it is first necessary to find the expected cash flow of each project using the pro forma statement which is the forecasting of financial statements of WEH's nine project individually for the next 20 years, using 2013 as the base year. Appendix B-3 shows the free cash flow to equity and the free cash flow to firm in each project of WEH.

The FCFF found in each project will be individually divided by the cost of capital, which then results in the present value of each of WEH's individual projects. Table 3.5 shows the target value to firm at 409.57 baht per share.

Table 3.5 WEH's Target Value to Firm

No.	Project	FCFF
1	KR2	3,540.29
2	FKW	3,844.55
3	Watabak	4,657.77
4	Korat02/1	7,048.64
5	Korat02/2	7,140.67
6	Korat02/3	6,772.58
7	North Kirssana	4,197.99
8	Korat02/4	5,725.46
9	Khor Kor	200.07
Total Value of Equity		**43,128.02**
#Share		105.30
Par		10.00
Price		**409.57**

Source: From estimation

3.2 DATA

Discounted Cash Flow Valuation (DCF) : Free Cash Flow to Firm (FCFF)

The dataset and calculation of the FCFF are taken from two major sources. The first source of information is the variables and assumptions surrounding their valuation formula. The second source is the financial statements of each WEH project with the financial year 2013 as the base year. The dataset and calculation of the FCFF are categorized as follow.

Data 1: Cash flow to Firm

WEH's expected cash flow to firm depends on factors surrounding FCFF valuation which is a measure of financial performance that expresses the net amount of cash that is generated for the firm, consisting of expenses, taxes and changes in net

working capital and investments. Hence, the data to derive for WEH's target value is collected from the pro forma financial statements and its forecast of WEH's nine projects individually over a 20-year period, using 2013 as the based year. Data collected from the company's capital structure policy is used to find the level of debt and equity in the company which is also represented as weight of debt and equity to use for computing the weighted average of cost of capital (WACC).

Data 2: Tax Effects

The tax effects are incorporated into the formula. For WEH, the tax rate is based on the investment promotion by the Board of Investment of Thailand (BOI). The period of a project determines the corporate payment on tax. When the time period is less than or equal to eight years, the rate is 0%. Between nine and thirteen years the rate is 10%, while anything over than or equal to fourteen years has a rate of 20%.

Data 3: The Discount Rate

The dataset for WEH's discount rate is established under WACC. Data of the company's cost of equity is under CAPM model. The risk-free rate is based on matching the period of a wind project with the government bond yield. Since the projected life span of a WEH wind project is approximately 20 years, the risk-free rate can be collected from the 20-year government bond yield, which is reported on the Thai Bond Market Association (Thai BMA) on February 18th, 2014. The market risk premium is based on the combined equity market volatility approach which is added to the mature market (U.S) premium of 5 percent in order to yield a total equity risk premium. For WEH's leverage beta, it is taken from the weekly return of the SET index and the return of the individual stock from EA and SPCG. This information is taken over the course of one year between February, 1st 2013 to February, 18th 2014. Data for estimating WEH's cost of debt is comprised of two major periods. The premium on WEH's short term loan of 2.20%, the yield of the 10-year Thailand zero coupon bond, and the 20-year Thailand zero coupon bond are all collected based on figures from the Thai BMA on February 18th, 2014.

CHAPTER IV
RESULTS

4. Discounted Cash Flow Valuation (DCF): FCFF

4.1 Descriptive Statistics: Factors

There are two major factors influencing WEH's finance and cash flow. These are the revenue earned from generated and sold electricity, and the growth rate in electricity charge.

Table 4.1 presents the revenue earned, the number of power installation per year and the accumulation of electrical production per year. The greater the amount of electricity produced, the more revenue is earned for the company. Electrical production is increased through the launch of additional projects. In 2013, EGAT and WEH reached an agreement to buy electricity from the company's additional projects. This leads to increasing on growth with regard to WEH's electricity installed capacity. By 2016 four additional wind-farm projects will have been launched; Korat 02/1; Korat 02/2; Korat 02/3 and Korat 02/4. This will increase the installed capacity to 400 MW. By 2017, it is expected that the total installed capacity will be at 837.10 MW.

For the growth rate in electricity charge, according to Table 3.2 this growth rate determines the growth rate of price from purchasing electricity. In turn, this determines the growth rate in revenue. In this study, the growth rate in electricity charge is estimated as 3 percent. This is calculated using data taken from the summation of the Base tariff and the FT, between the year 2000 and the middle of 2014. The continuous growth rate comprises of 'Peak' and 'Off-peak' periods. These are 3.22 and 6.71 percent per year respectively. The Peak and Off-peak rates consistently grow in parallel with each other. The price at the Peak period is calculated from the continuous growth of the Peak period. The difference in the electricity charge between Peak and Off-Peak rate is 1.81 baht per unit.

Table 4.2 shows the probable revenue that the company is able to earn annually from energy production. In Thailand, there are 2 major wind periods that impact on wind speed. These are referred to as the summer monsoon and the winter monsoon, with wind speeds high during June to August and December to February respectively. The revenue of the company varies according to wind speed approaching the wind turbines. The stronger the wind is blowing, the more revenue that is earned for the company. However it is difficult to estimate wind speed at any given time and therefore it is necessary for the company to apply sensitivity analysis. This is performed using probability to measure the revenue being apportioned to the difference of the annual energy production. This is referred to as "Probability" or "P"[12]. Generally, the company sets scenarios with a probability of P50, P75 and P90. Each is examined to see which one gives the best outcome of revenue[13]. From the Table 4.2, the outcome of revenue earned at P50 displays the best scenario, which gives the highest target value of stock price at 316.50 baht. If the company chooses to set at other levels of annual energy production, revenue earned to the company will be less, also resulting in a lower stock price.

12 "P" is the annual energy production (AEP). It is the installed capital that a turbine can produce and is already considered amount to purchase electricity under an agreement contract.

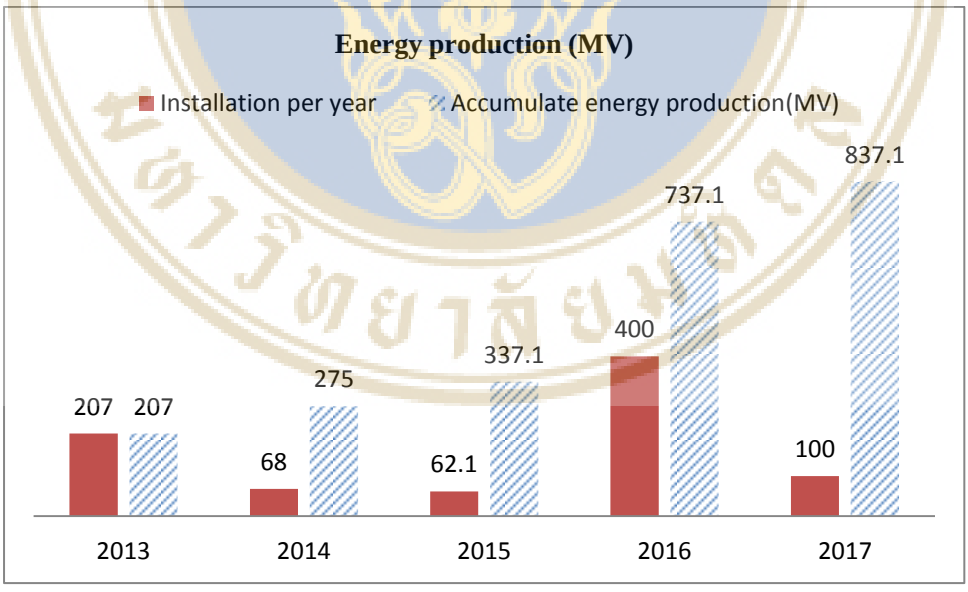
13 For example, using the P90 probability at its annual energy production (AEP) is equal to 180 MWh. This value states that there is 90 percent chance to produce electricity more than 180 MWh, and 10 percent chance that the amount of produce electricity will be less than 180 MWh.

Table 4.1 Number of Power Installation per year

No	Project	Capacity (MW)	Scheduled Commercial Operation Date (SCOD)	Project Status	Year	Estimate Invested capital	Number of Turbine	Turbine	Install (MW)
1	KR2	90	Feb-13	Producing electricity that is being sold commercially		6,087.00	45	Siemens	**103.5**
2	FKW	90	Nov-12			6,553.00	45	Siemens	**103.5**
3	Watabak	60	Sep-14	Agreement to purchase future electricity accepted	2014	4,760.00	34	Vestas	**68**
4	Korat02/1	90	Jan-16		2016	7,000.00	40	GE	**100**
5	Korat02/2	90	Jun-16		2016	7,000.00	40	GE	**100**
6	Korat02/3	90	Jun-16		2016	7,000.00	40	GE	**100**
7	North Kirssana	90	Apr-17		2017	7,000.00	40	GE	**100**
8	Korat02/4	90	Aug-16		2016	7,000.00	40	GE	**100**
9	Khor Kor	60	Jun-15	Power Purchase Agreement signed	2015	4,036.50	27	Siemens	**62.1**

Source: Company information

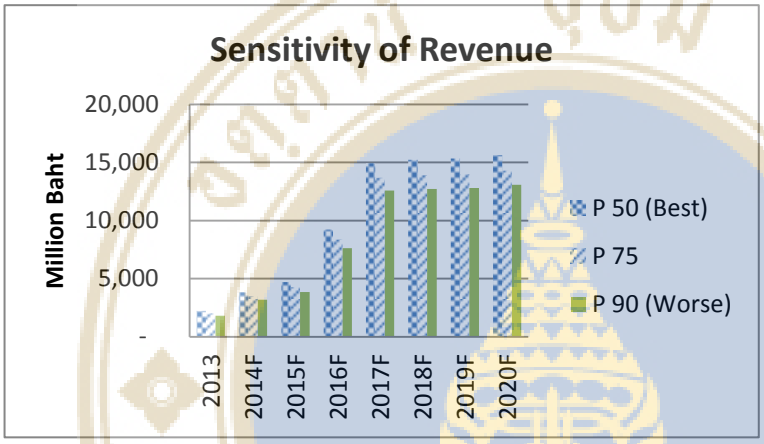
Figure 4.1 Accumulation of Electrical Production per year



Source: From estimation

Table 4.2 WEH's Probable Revenue Earned Annually from Energy Production by using Sensitivity Analysis

Case	(In M THB)	2013	2014F	2015F	2016F	2017F	2018F	2019F	2020F
P 50 (Best)	Total Revenue	2,225.82	3,833.14	4,703.27	9,209.31	14,928.13	15,225.44	15,333.96	15,657.02
P 75	Total Revenue	2,008.51	3,495.67	4,250.12	8,379.84	13,689.99	13,909.21	13,994.19	14,293.13
P 90 (Worse)	Total Revenue	1,815.30	3,195.15	3,845.09	7,637.08	12,586.49	12,733.33	12,797.33	13,073.22



Sensitivity	Price/Share
P50	316.05
P75	260.91
P90	211.63

Source: From estimation

4.2 Empirical Results

Table 4.3 reports results from generated electricity for sale, alongside the growth rate in electricity charge. For revenue, from 2014 onwards, total revenue increases every year. The expected revenue in 2014 is anticipated at 3,833 million baht. This rises to 4,703 million baht in 2015, an increase of 22.7 percent. The average for total growth of revenue over the defined period is approximately 36.80 percent. The increases in revenue are dependent on the growth rate of price for purchasing electricity. This, in turn, is determined from the growth rate in electricity charge which is inconsistent. This inconsistency is due to the introduction of additional projects, which causes an increase. In turn this causes the growth rate in revenue to also increase.

For net income, in 2014 it influence is from 54 percent of sale, with an average of sale at 55.47 percent. The average of the total growth of net income is 64.81 percent, which could be perceived as high. However, this can be attributed to the

company not being required to spend on raw materials, and the low operating costs. The growths on net income figures are not constant and are dependent on additional projects. Earnings per share are high and increasing annually. This is due to the net income increase, while the number of shares remains constant.

The return on asset (ROA) is not very high when compared to the industry average on ROA of approximately 14.94 percent, with an increase of only approximately 5 percent above the industry figure. This is because the invested assets are quite high. The return on equity (ROE) increases annually. With an average ROE of approximately 29.01 percent, it suggests that shareholders will receive relatively high returns. The reason for this is due to the annual increases in net income, while the number of shares remains the same.

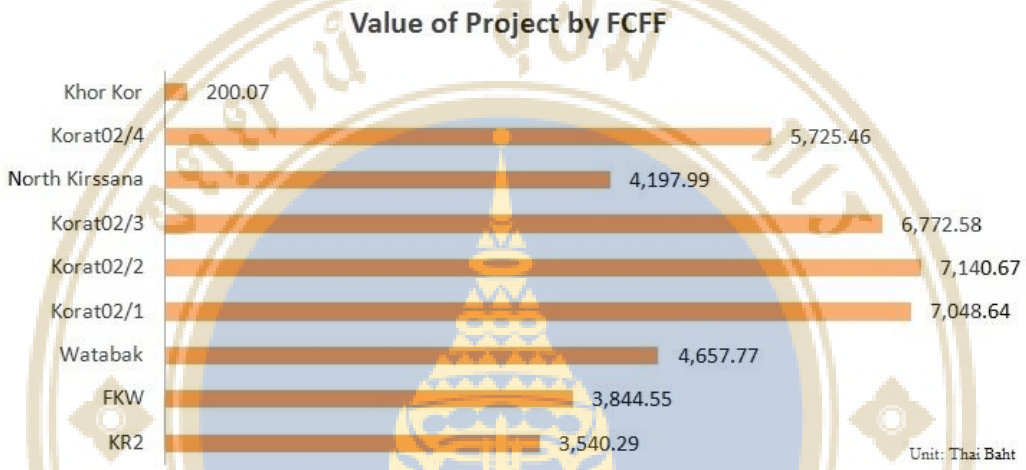
Table 4.3 Results from Generated Electricity for Sale & from the Growth Rate in Electricity Charge

(In M THB)	**2013**	**2014F**	**2015F**	**2016F**	**2017F**	**2018F**	**2019F**	**2020F**
Total Revenue	2,225.82	3,833.14	4,703.27	9,209.31	14,928.13	15,225.44	15,333.96	15,657.02
EBITDA	1,823.09	3,365.77	4,141.25	8,264.10	13,549.29	13,747.65	13,811.84	14,089.24
Net Income (THB/Share)	582.17	2,051.14	2,472.87	4,694.39	8,361.72	8,588.20	8,930.17	9,478.21
Earning Per Share	1.38	10.46	12.53	33.01	67.18	68.65	71.19	75.76
Book Value Per Share	19.66	34.37	46.90	79.91	147.09	215.75	286.94	362.69
(Percentage)								
Return on Assets (%)	9.19%	16.12%	9.82%	12.76%	19.06%	18.20%	17.43%	16.96%
Return on Equity (%)	10.86%	39.58%	26.44%	43.18%	46.97%	28.07%	20.41%	16.55%
								Average
Growth Revenue	72.21%	22.70%	95.81%	62.10%	1.99%	0.71%	2.11%	**36.80%**
Growth Net Income	252.33%	20.56%	89.84%	78.12%	2.71%	3.98%	6.14%	**64.81%**

Source: From estimation

Table 4.4 shows the FCFF valuation. The value to shareholders and firm is calculated under the summation of the present value for each project or called as the sum of the part method. The major drive on cash flow under the present value is revenue of each project which depends on power install capacity. For FCFF, total value is about 43,128.02 million baht. The target value to firm is 409.57 baht per share.

Table 4.4 Results of Discounted Cash flow Valuation based on FCFF method



	FCFF
Total Value of Equity	**43,128.02**
#Share	105.3
Par	10
Price	**409.57**

Source: From estimation

CHAPTER V
CONCLUSION

This paper aims to be a guideline to find an intrinsic value using the DCF valuation focusing on the FCFF approach. The valuation focuses on Wind Energy Holding Company Ltd. (WEH) as the case study because it is the first company to generate electricity from wind energy in Thailand and is regarded as the most installed capacity from wind energy in the country. Furthermore, there is an increasing shortage of energy supplies in the world and fuel energy to generate electricity can be extended to the effects of global warming and climate change. These global concerns for policymakers in many countries around the world have incentives to promote renewable energy as the alternative energy. Wind power is one of the renewable energies that have huge potential for investment within the energy sector. Currently, there are nine-comprehensive projects managed by WEH, who commercially sells its electricity only to EGAT.

With the case of DCF addressing on FCFF approach, the derived target value results from the company's fundamental, as well as its market value compared with similar firms. The fundamental of the company is contributed, alongside some required data for valuation. The data coverage comprises of both internal and external information. Internal information is the financial statement in 2013 of each WEH's project and its financial policies since the company establishment in 2009. External information is the financial statement from 2011 to 2013 of EA and SPCG; the weekly return of SET index, EA and SPCG which are taken over the course from Feb 1st, 2013 to Feb 18th, 2014; and the 20-year-yield to maturity of Government bond from Thai Bond Market Association which is reported on Feb 18th, 2014.

There are a number of assumptions related to the DCF valuation approaches. Firstly, this study only uses nine projects for calculation that have been accepted for purchase by EGAT. Secondly, the study uses 3 percent of growth rate of price from purchasing electricity for calculating the company's revenue. Third, invested capital of a project is approximately 60 to 70 million baht per installed-megawatt according to the company's financial information. Fourth, WEH determines its depreciation under straight-line method, which divides the project's assets by the life of the project that equals to life of a wind turbine, is approximately 20 years. There is no salvage value counted. The final assumption relates to the discount factor. In terms of the FCFF approach, the discount factor is the cost of capital, which balances the company's fund on debt with equity proportionately. The cost of capital is measured using the weighted average cost of capital (WACC). WACC shows the sources from which the firm can raise money. The weights for each source reflect the company's market value proportions. To calculate WACC, information from the CAPM model, tax rate, cost of debt, weight of debt and weight of equity are required. For the CAPM model, the risk-free rate is collected from 20-year-government bond rate in local currency terms. Market risk premium is based on the combined approach, which the country risk premium incorporates both the country bond spread and equity market volatility. Then adding this premium to the mature market (U.S.) premium of 5 percent would yield a total equity risk premium. Beta is found by using the data from the weekly return of SET Index, EA and SPCG for calculation. The calculated value of cost of equity to shareholder in the study is 14.70%. The effects of tax are incorporated into the WACC formula. For WEH, the tax rate is based on the investment promotion by the BOI. When the time period is equal or less than eight years, nine to thirteen years, and equal or over than 14 years, the rates are at 0%, 10%, and 20% respectively. The cost of debt, with regards to the premium of WEH's short-term loan at 2.20%, is comprised of two major periods. Estimation on the first period refers to projects less than or equal to 10 years, yielding the cost of debt at 6.28%. Estimation for the second period is based on the forward rate calculation, yielding the cost of debt at 7.20%. For the weight of debt and the weight of equity, the study refers to WEH's debt to equity that has the target debt to equity at 60 and 40. In summary,

the assumptions contribute to finding the intrinsic value in 2014 of WEH being under the sum of the part method for FCFF. This results in 409.57 baht per share.

The FCFF valuation tool, which resides under the DCF valuation, is favoured when a company's project is of a longer duration, which is the case with WEH's projects. Despite being useful method for valuation over the long term, it is not without some limitations. It cannot measure the company's corporate governance. Furthermore, the derived figure of the method is the expected intrinsic value at the time of calculation. On the contrary, circumstances may change in time that may adjust the valuation figure. These changing circumstances may include economic, political or technological changes and developments, all of which may impact on the company. Therefore, it is very difficult to accurately anticipate growth and identify future risks with great certainty using the FCFF method.

For future work on FCFF valuation, it could be argued that there is a need for a reduction in possible bias within the study. Caution with regards to overly optimistic, higher estimations should be taken due to the fact that WEH is a cyclical business. The monsoons can impact on the amount of electricity that WEH can produce, and in turn affect the company's earnings. Thus, future cash flow estimations should continue to base predictions on wind directions and strength, but also give greater emphasis to factoring in periods when the wind is not strong.

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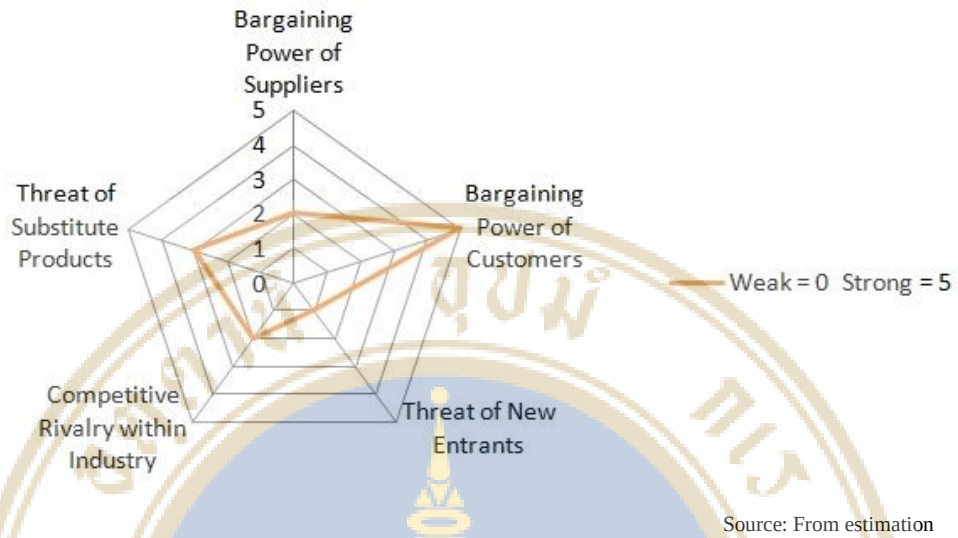
APPENDICES

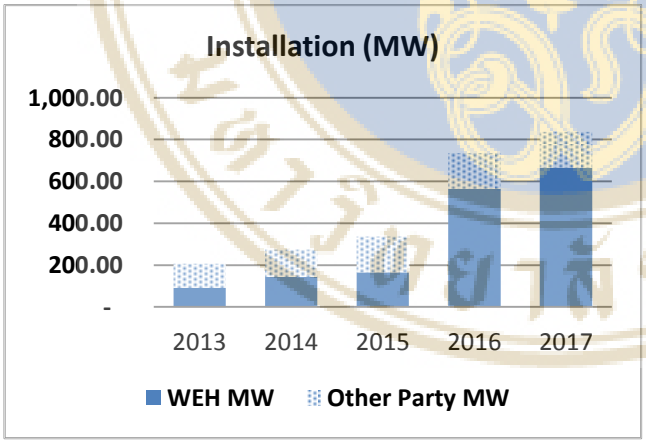
Appendix A

Appendix A-1 : Five Force Model



Source: From estimation

Appendix A-2 : Installation (MW)



Source: Company information &From estimation

Appendix B

Appendix B-1 : Capital Expenditure (CAPEX)

No.	Project	Capacity (MW)	Estimate Invested capital	Number of Turbine	Install (MW)
1	KR2	90	6,087.00	45	103.50
2	FKW	90	6,553.00	45	103.50
3	Watabak	60	4,760.00	34	68.00
4	Korat02/1	90	7,000.00	40	100.00
5	Korat02/2	90	7,000.00	40	100.00
6	Korat02/3	90	7,000.00	40	100.00
7	North Kirssana	90	7,000.00	40	100.00
8	Korat02/4	90	7,000.00	40	100.00
9	Khor Kor	60	4,037.00	27	62.10

Source: Company information

Appendix B-2 : Estimating a Beta for WEH

Beta Unlevered	**EA**	**SPCG**
Beta Levered	1.2089	1.7398
Debt / Equity	0.4308	4.4540
Tax rate	20%	20%
Beta Unlevered	0.8991	0.3813

Beta Instustry **0.6402**

Beta levered	**WEH**
Beta Unlevered	0.6402
Debt / Equity	1.5
Tax rate	20%
Beta levered	1.600

Adjust Beta Unlevered	**1.4023**

Source: From estimation

Appendix B-2 : Estimating a Beta for WEH (Cont)

Date	SET		EA		SPCG	
	Close Price	Return	Close Price	Return	Close Price	Return
10/2/2014	1,290.66	-0.17%	8.45	-1.17%	18.90	-1.56%
3/2/2014	1,292.81	0.33%	8.55	3.64%	19.20	0.00%
27/1/2014	1,288.59	-0.11%	8.25	7.14%	19.20	3.23%
20/1/2014	1,289.99	0.50%	7.70	0.00%	18.60	7.51%
13/1/2014	1,283.56	4.28%	7.70	5.48%	17.30	2.98%
6/1/2014	1,230.84	0.01%	7.30	-2.01%	16.80	-5.62%
2/1/2014	1,230.77	-7.19%	7.45	-2.61%	17.80	-9.64%
23/12/2013	1,326.14	-0.17%	7.65	2.68%	19.70	-0.51%
16/12/2013	1,328.40	-2.85%	7.45	-6.88%	19.80	-2.46%
9/12/2013	1,367.42	-0.50%	8.00	1.91%	20.30	-0.49%
2/12/2013	1,374.26	1.58%	7.85	3.29%	20.40	0.99%
25/11/2013	1,352.86	-4.99%	7.60	-1.30%	20.20	-2.42%
18/11/2013	1,423.96	1.28%	7.70	4.76%	20.70	-7.17%
11/11/2013	1,405.91	1.26%	7.35	2.80%	22.30	2.29%
4/11/2013	1,388.40	-4.22%	7.15	-7.74%	21.80	-9.17%
28/10/2013	1,449.62	0.07%	7.75	0.00%	24.00	-1.23%
21/10/2013	1,448.54	-0.77%	7.75	8.39%	24.30	-0.41%
14/10/2013	1,459.84	3.20%	7.15	-1.38%	24.40	1.67%
7/10/2013	1,414.62	2.27%	7.25	8.21%	24.00	0.84%
30/9/2013	1,383.16	-3.73%	6.70	-1.47%	23.80	-4.42%
23/9/2013	1,436.68	-0.58%	6.80	0.74%	24.90	1.22%
16/9/2013	1,445.11	4.39%	6.75	8.00%	24.60	12.33%
9/9/2013	1,384.31	4.58%	6.25	4.17%	21.90	2.82%
2/9/2013	1,323.70	-0.41%	6.00	-7.69%	21.30	-2.29%
26/8/2013	1,329.18	-4.96%	6.50	-5.11%	21.80	-4.80%

Source: SETSMART & From estimation

Appendix B-2 : Estimating a Beta for WEH (Cont)

Date	SET		EA		SPCG	
	Close Price	Return	Close Price	Return	Close Price	Return
19/8/2013	1,398.48	-4.15%	6.85	0.74%	22.90	-0.43%
13/8/2013	1,459.08	2.44%	6.80	3.82%	23.00	9.52%
5/8/2013	1,424.31	-2.06%	6.55	-4.38%	21.00	-9.48%
29/7/2013	1,454.28	-3.90%	6.85	-4.86%	23.20	-9.02%
23/7/2013	1,513.31	3.98%	7.20	5.88%	25.50	-1.92%
15/7/2013	1,455.40	3.61%	6.80	1.49%	26.00	14.04%
8/7/2013	1,404.64	-4.05%	6.70	-1.47%	22.80	-1.30%
2/7/2013	1,463.98	7.32%	6.80	3.82%	23.10	19.07%
24/6/2013	1,364.09	-7.27%	6.55	-12.67%	19.40	-21.77%
17/6/2013	1,471.04	-3.76%	7.50	-0.66%	24.80	-12.98%
10/6/2013	1,528.55	-0.70%	7.55	-3.21%	28.50	-12.31%
3/6/2013	1,539.26	-3.38%	7.80	-3.11%	32.50	-3.70%
27/5/2013	1,593.10	-3.06%	8.05	0.63%	33.75	-1.46%
20/5/2013	1,643.40	1.59%	8.00	-2.44%	34.25	5.38%
13/5/2013	1,617.73	1.04%	8.20	-1.20%	32.50	4.00%
7/5/2013	1,601.15	1.02%	8.30	1.84%	31.25	-2.34%
29/4/2013	1,584.93	1.66%	8.15	-0.61%	32.00	4.07%
22/4/2013	1,559.10	2.47%	8.20	7.89%	30.75	0.00%
17/4/2013	1,521.53	3.45%	7.60	4.83%	30.75	10.81%
9/4/2013	1,470.72	-5.09%	7.25	-7.64%	27.75	-11.20%
1/4/2013	1,549.55	1.68%	7.85	3.97%	31.25	-1.57%
25/3/2013	1,523.95	-4.25%	7.55	-20.11%	31.75	-6.62%
18/3/2013	1,591.65	0.89%	9.45	27.70%	34.00	-2.86%
11/3/2013	1,577.65	2.40%	7.40	6.47%	35.00	11.11%
4/3/2013	1,540.72	0.68%	6.95	-2.11%	31.50	16.67%
26/2/2013	1,530.32	0.46%	7.10	11.81%	27.00	3.85%
18/2/2013	1,523.29	2.30%	6.35	0.79%	26.00	8.33%
11/2/2013	1,489.11	-1.15%	6.30	-16.56%	24.00	14.29%
4/2/2013	1,506.37	0.48%	7.55	2.03%	21.00	-0.47%
1/2/2013	1,499.22		7.40		21.10	

Source: SETSMART & Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation

KR2 (M.Bath)

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash in flow										
NOPAT	580.95	1,011.38	1,036.11	1,061.58	1,087.82	1,114.85	1,142.69	1,171.36	1,100.82	1,108.18
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-
+ Depreciation	253.63	304.35	304.35	304.35	304.35	304.35	304.35	304.35	304.35	304.35
+ WC Recovery	-	-	-	-	-	-	-	-	-	-
Cash out flow										
- Fixed investment	-	-	-	-	-	-	-	-	-	-
- Change in working capital	193.48	53.17	4.94	5.09	5.24	5.40	5.56	5.73	5.90	6.08
FCFF	641.10	1,262.56	1,335.52	1,360.84	1,386.93	1,413.80	1,441.48	1,469.98	1,399.27	1,406.45

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cash in flow											
NOPAT	563.08	477.47	507.38	488.36	506.61	535.66	565.59	596.42	628.17	660.88	115.76
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Depreciation	304.35	304.35	304.35	304.35	304.35	304.35	304.35	304.35	304.35	304.35	50.73
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	243.40
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	99.90	14.78	6.64	6.84	7.05	7.26	7.48	7.70	7.93	8.17	8.42
FCFF	967.34	796.60	805.09	785.87	803.91	832.75	862.47	893.07	924.59	957.06	401.47

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

FKW (M.Bath)

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash in flow										
NOPAT	768.63	1,109.66	1,136.89	1,164.93	1,193.81	1,223.56	1,254.21	1,264.34	1,186.45	1,092.29
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-
+ Depreciation	330.40	330.40	330.40	330.40	330.40	330.40	330.40	330.40	330.40	330.40
+ WC Recovery	-	-	-	-	-	-	-	-	-	-
Cash out flow										
- Fixed investment	-	-	-	-	-	-	-	-	-	-
- Change in working capital	(209.74)	(57.64)	(5.36)	(5.52)	(5.68)	(5.86)	(6.03)	(6.21)	(6.40)	16.43
FCFF	889.29	1,382.43	1,461.93	1,489.82	1,518.53	1,548.11	1,578.58	1,588.53	1,510.45	1,439.12

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Cash in flow										
NOPAT	501.86	533.83	556.27	533.94	564.99	596.98	629.92	663.85	698.80	816.12
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-
+ Depreciation	330.40	330.40	330.40	330.40	330.40	330.40	330.40	330.40	330.40	275.34
+ WC Recovery	-	-	-	-	-	-	-	-	-	305.68
Cash out flow										
- Fixed investment	-	-	-	-	-	-	-	-	-	-
- Change in working capital	108.30	(6.99)	(7.20)	(7.42)	(7.64)	(7.87)	(8.11)	(8.35)	(8.60)	(59.80)
FCFF	940.56	857.24	879.47	856.92	887.75	919.51	952.22	985.91	1,020.61	1,337.34

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

Watabak (M.Bath)

Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Cash in flow										
NOPAT	262.54	1,074.89	1,100.37	1,126.62	1,153.66	1,181.50	1,210.19	1,239.73	1,238.40	1,171.35
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-
+ Dep.	59.50	238.00	238.00	238.00	238.00	238.00	238.00	238.00	238.00	238.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-
Cash out flow										
- Fixed investment	(4,760.00)	-	-	-	-	-	-	-	-	-
- Change in working capital	(232.67)	(4.66)	(4.80)	(4.95)	(5.10)	(5.25)	(5.41)	(5.57)	(5.73)	(5.91)
FCFF	(4,670.63)	1,308.23	1,333.57	1,359.67	1,386.56	1,414.26	1,442.78	1,472.16	1,470.67	1,403.44

Year	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Cash in flow											
NOPAT	1,038.16	581.37	612.19	626.05	601.46	631.39	662.23	693.99	726.71	760.41	596.34
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	238.00	238.00	238.00	238.00	238.00	238.00	238.00	238.00	238.00	238.00	178.50
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	237.78
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	23.96	83.87	(6.45)	(6.65)	(6.85)	(7.05)	(7.26)	(7.48)	(7.71)	(7.94)	(8.18)
FCFF	1,300.12	903.23	843.73	857.40	832.61	862.34	892.97	924.51	957.00	990.47	1,004.44

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

Korat02/1 (M.Bath)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cash in flow											
NOPAT	-	1,364.60	1,524.60	1,561.64	1,599.78	1,639.07	1,679.53	1,721.21	1,764.15	1,642.60	1,668.52
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	-	320.83	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	-
Cash out flow											
- Fixed investment	(7,000.00)	0.00	-	-	-	-	-	-	-	-	-
- Change in working capital	-	(334.49)	(6.83)	(7.04)	(7.25)	(7.47)	(7.69)	(7.92)	(8.16)	(8.40)	(8.66)
FCFF	(7,000.00)	1,350.94	1,867.77	1,904.60	1,942.53	1,981.60	2,021.84	2,063.29	2,105.99	1,984.19	2,009.86

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Cash in flow											
NOPAT	888.96	857.74	902.53	852.04	885.50	929.00	973.81	1,019.97	1,067.51	1,116.48	97.24
+ Salvage(after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	29.17
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	352.10
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	143.27	4.65	(9.46)	(9.74)	(10.04)	(10.34)	(10.65)	(10.97)	(11.30)	(11.63)	(11.98)
FCFF	1,382.22	1,212.39	1,243.07	1,192.30	1,225.46	1,268.67	1,313.17	1,359.00	1,406.22	1,454.84	466.52

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

Korat02/2 (M.Bath)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cash in flow											
NOPAT	-	778.53	1,594.40	1,632.88	1,672.50	1,713.32	1,755.36	1,798.66	1,843.26	1,794.73	1,742.86
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	-	175.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	-
Cash out flow											
- Fixed investment	(7,000.00)	0.00	-	-	-	-	-	-	-	-	-
- Change in working capital	-	(345.89)	(7.07)	(7.28)	(7.50)	(7.72)	(7.95)	(8.19)	(8.44)	(8.69)	(8.95)
FCFF	(7,000.00)	607.64	1,937.34	1,975.60	2,015.01	2,055.60	2,097.40	2,140.46	2,184.82	2,136.04	2,083.91

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Cash in flow											
NOPAT	1,323.20	904.85	951.38	943.80	932.16	977.36	1,023.91	1,071.86	1,121.25	1,172.12	612.26
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	175.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	364.10
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	76.62	76.34	(9.78)	(10.08)	(10.38)	(10.69)	(11.01)	(11.34)	(11.68)	(12.03)	(12.39)
FCFF	1,749.81	1,331.19	1,291.60	1,283.72	1,271.78	1,316.67	1,362.90	1,410.52	1,459.57	1,510.09	1,194.89

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

Korat02/3 (M.Bath)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cash in flow											
NOPAT	-	751.73	1,539.72	1,577.06	1,615.52	1,655.14	1,695.95	1,737.98	1,781.27	1,734.57	1,684.61
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	-	175.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	-
Cash out flow											
- Fixed investment	(7,000.00)	0.00	-	-	-	-	-	-	-	-	-
- Change in working capital	-	(336.96)	(6.88)	(7.09)	(7.30)	(7.52)	(7.75)	(7.98)	(8.22)	(8.47)	(8.72)
FCFF	(7,000.00)	589.77	1,882.83	1,919.97	1,958.22	1,997.62	2,038.20	2,080.00	2,123.05	2,076.10	2,025.89

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Cash in flow											
NOPAT	1,275.64	867.94	913.10	906.32	895.60	939.47	984.66	1,031.20	1,079.14	1,128.52	589.69
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	175.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	354.69
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	74.64	74.37	(9.53)	(9.82)	(10.11)	(10.41)	(10.73)	(11.05)	(11.38)	(11.72)	(12.07)
FCFF	1,700.27	1,292.31	1,253.58	1,246.50	1,235.49	1,279.06	1,323.93	1,370.16	1,417.77	1,466.80	1,107.31

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

North Krissana

(M.Bath)

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Cash in flow											
NOPAT	-	800.05	1,230.41	1,261.66	1,293.85	1,327.00	1,361.15	1,396.32	1,432.55	1,371.87	1,357.47
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	-	233.33	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	-
Cash out flow											
- Fixed investment	(7,000.00)	0.00	-	-	-	-	-	-	-	-	-
- Change in working capital	-	(287.23)	(5.92)	(6.10)	(6.28)	(6.47)	(6.67)	(6.87)	(7.07)	(7.28)	(7.50)
FCFF	(7,000.00)	746.15	1,574.49	1,605.56	1,637.57	1,670.53	1,704.49	1,739.46	1,775.48	1,714.59	1,699.97

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Cash in flow											
NOPAT	890.15	675.37	713.17	696.39	704.18	740.89	778.71	817.65	857.77	899.09	313.88
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	116.67
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	306.69
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	85.41	38.61	(8.20)	(8.45)	(8.70)	(8.96)	(9.23)	(9.51)	(9.79)	(10.08)	(10.39)
FCFF	1,325.56	1,063.98	1,054.97	1,037.94	1,045.48	1,081.93	1,119.48	1,158.15	1,197.98	1,239.01	726.85

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

Korat02/4 (M.Bath)

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cash in flow											
NOPAT	-	455.55	1,400.12	1,434.58	1,470.08	1,506.65	1,544.31	1,583.10	1,623.05	1,664.21	1,592.82
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	-	116.67	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	-
Cash out flow											
- Fixed investment	(7,000.00)	0.00	-	-	-	-	-	-	-	-	-
- Change in working capital	-	(314.16)	(6.42)	(6.61)	(6.81)	(7.01)	(7.22)	(7.44)	(7.66)	(7.89)	(8.13)
FCFF	(7,000.00)	258.06	1,743.70	1,777.97	1,813.27	1,849.63	1,887.08	1,925.66	1,965.39	2,006.31	1,934.69

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Cash in flow											
NOPAT	1,294.56	773.70	815.39	858.33	835.70	842.76	884.47	927.42	971.67	1,017.24	709.45
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	233.33
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	330.69
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	43.60	95.32	(8.88)	(9.15)	(9.43)	(9.71)	(10.00)	(10.30)	(10.61)	(10.93)	(11.25)
FCFF	1,688.16	1,219.03	1,156.51	1,199.18	1,176.27	1,183.05	1,224.47	1,267.12	1,311.06	1,356.31	1,262.23

Source: From estimation

Appendix B-3 : WEH's Each Project FCFF Valuation (Cont.)

Khor Kor (M.Bath)

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cash in flow											
NOPAT	-	190.84	392.50	403.64	415.12	426.94	439.12	451.66	464.58	477.88	491.58
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	-	100.91	201.83	201.83	201.83	201.83	201.83	201.83	201.83	201.83	201.83
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	-
Cash out flow											
- Fixed investment	(4,036.50)	0.00	-	-	-	-	-	-	-	-	-
- Change in working capital	-	(114.16)	(2.31)	(2.38)	(2.45)	(2.52)	(2.60)	(2.68)	(2.76)	(2.84)	(2.93)
FCFF	(4,036.50)	177.59	592.02	603.09	614.50	626.24	638.34	650.81	663.64	676.86	690.48

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Cash in flow											
NOPAT	310.12	156.05	169.52	183.41	197.70	196.69	202.31	216.20	230.50	245.23	130.20
+ Salvage (after tax)	-	-	-	-	-	-	-	-	-	-	-
+ Dep.	201.83	201.83	201.83	201.83	201.83	201.83	201.83	201.83	201.83	201.83	100.91
+ WC Recovery	-	-	-	-	-	-	-	-	-	-	118.43
Cash out flow											
- Fixed investment	-	-	-	-	-	-	-	-	-	-	-
- Change in working capital	25.89	25.80	(3.20)	(3.29)	(3.39)	(3.49)	(3.60)	(3.71)	(3.82)	(3.93)	(4.05)
FCFF	537.84	383.67	368.15	381.94	396.14	395.02	400.53	414.31	428.51	443.13	345.50

Source: From estimation

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