DISCOUNTED CASH FLOW VALUATION OF THAI SOLAR ENERGY PUBLIC COMPANY LIMITED

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A THEMATIC PAPER SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MANAGEMENT
COLLEGE OF MANAGEMENT
MAHIDOL UNIVERSITY
2020

ACKNOWLEDGEMENTS

I would like to express my special thanks of gratitude to my advisor Ph.D. Simon Zaby as well as all professors who gave me the opportunity to do this wonderful project on the topic " RELATIVE VALUATION OF THAI SOLAR ENERGY PUBLIC COMPANY LIMITED", which also helped me in doing a lot of Research and I came to know about so many new things. I am really thankful to them. Any attempt at any level can 't be satisfactorily completed without the support and guidance of my parents and friends.

I would like to thank my colleague who helped me a lot in gathering different information, collecting data and guiding me from time to time in making this project, despite of their busy schedules, they gave me different ideas in making this project unique.

Thanking you.

Praewpun Pornprapatt

RELATIVE VALUATION OF THAI SOLAR ENERGY PUBLIC COMPANY LIMITED

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M.M. (FINANCIAL MANAGEMENT)

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ABSTRACT

The objective of this thematic paper is to understand company business and its financial status as well as associated business industry in order to evaluate company's intrinsic value through relative valuation method aiming to provide appropriate investment recommendation and opportunity.

KEY WORDS: Renewable Energy / TSE / PER / PBV / Benchmark Analysis

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LIST OF ABBREVIATIONS

AEPD	Alternative Energy Development Plan
ASEAN	Association of Southeast Asian Nations
BGRIM	B.Grimm Power Public Company Limited
BPCG	BCPG Public Company Limited
CAGR	Compound annual growth rate
CAPEX	Capital Expenditures
CAPM	Capital Asset Pricing Model
CDS	Credit Default Swap
COD	Commercial Operation Date
DCF	Discounted Cash Flow
EA	Energy Absolute Public Company Limited
EBITDA	Earnings before interest, taxes, depreciation, and amortization
EPC	Engineering, procurement and construction
EV	Enterprise Value
FiT	Feed-in tariff
FCFF	Free cash flow to firm
GDP	Gross Domestic Product
GNP	Gross National Product
GW	Gigawatt
GWh	Gigawatt hours
kWh	Kilowatt hours
kWp	Kilowatt peak
MEA	Metropolitan Electricity Authority
MW	Megawatt

LIST OF ABBREVIATIONS (cont.)

NREL	National Renewable Energy Laboratory
OECD	Organisation for Economic Co-operation and Development
PBV	Price-to-book-value
PEA	Provincial Electricity Authority
PER	Price-to-earning ratio
PM	Post Meridiem
PPA	Power Purchase Agreement
PV	Photovoltaic system
RATCH	Ratch Group Public Company Limited
ROA	Return on assets
ROE	Return on equities
SET	Stock Exchange of Thailand
SPCG	SPCG Public Company Limited
SSP	Sermsang Power Public Company Limited
SUPER	Super Energy Public Company Limited
ThaiBMA	The Thai Bond Market Association
TSE	Thai Solar Energy Public Company Limited
TRIS	Thai Rating and Information Services
USD	United States Dollar
WACC	Weighted Average Cost of Capital
WHA	WHA Corporation Public Company Limited
YTM	Yield-to-maturity

CHAPTER I
VALUATION

1.1 Highlights

1.1.1 Invest in renewable energy projects oversea

As Taiwanese Government would like to support the development of new energy especially in renewable energy sector to achieve an increasing of share to 20% or increase the total solar PV capacity to reach 20GW by 2025 ("Taiwan's solar PV," 2020). By the end of 2019, the country has installed the new solar PV capacity with the cumulative total capacity of 4.3GW and aim to reach 6.5GW by end of 2020. More of which, several economic tools are out in place to promote foreign direct investment such as Feed-in tariff and Fit bonus projects. In order to support this goal, the government has encouraged the investment in the country by revising feed-in-tariff to the rate between 13 to 19 cents per kWh. Therefore, with above government support, it makes Taiwan to become the interesting destination for oversea investment which the company could expand its solar PV business into in the future.

Another investment opportunity is Vietnam due to rapid economic and population growth had driven demand of electricity which accounted over one third of the world solar energy consumption.

1.1.2 Mega-Solar Project with total selling capacity of 154.73 megawatts

The company is currently constructing Onikoube Solar Power plant, one of the largest solar power plants in the company's portfolio with the total selling capacity of 154.73 megawatts. The power plant is located in Miyagi prefecture, Japan. With the total investment of Yen 35.5 billion, the power plant would have an area of 156-hactare site which is in equivalent to one golf course. With the plant design, there would be enough to install 362,960 solar panels which would help the plant achieve high power generation ("Toshiba and TSE," 2020). The construction design also allows the power

plant to easily accommodate with the slope of the ground and any snowfall in that region. It is expected to COD by December 2022. The company has secured the PPA with the fixed tariffs at JPY 36/kWh. It is expected to contribute the additional revenue to the company around Yen 6.7 million per year which would made up almost 51% of the company's total revenue after it has operated.

1.2 Business Description

1.2.1 Business Types

Referring to the company's annual report as of 2019, the company's operation can be divided into 3 types of energy generation and distribution business which are Solar PV power plants and Biomass power plants. The Company generates and distributes renewable energy businesses for its clients in Thailand, for instance, the Provincial Electricity Authority (PEA) and Metropolitan Electricity Authority (MEA) in Thailand, and in Japan, for instance, Hokuriku Electric Power Company, Tokyo Electric Power Company and Tohoku Electric Power Company.

1) Solar PV Power Plants Projects

Production of solar energy using of Photovoltaic systems or PV panel can be categorized as follows:

1.1) Solar PV Farm Projects which can be divided according to domestic and oversea plant locations:

For Domestic: There are currently 15 solar farm PV power plant projects with a total selling capacity of 101 Megawatts which all of these projects have already started its operation or known as Commercial Operation Date (COD).

For Overseas: There are currently 8 solar power plants located in Japan with total selling production capacity of 176.72 Megawatts. Recently, 7 of these projects have already started its operation or known as Commercial Operation Date (COD) with the total selling capacity of 21.74 Megawatts.

1.2) Solar Rooftop Project

There are currently 14 Solar Commercial Rooftop projects with a total selling capacity of 14 Megawatts which all of these projects have already started its operation or known as Commercial Operation Date (COD).

2) Biomass Power Plants Project

There are currently 3 biomass power plants projects located in Thailand with the total with the total selling capacity of 22.2 Megawatts. The company has already agreed to enter the contract to sell the electricity to the Provincial Electricity Authority (PEA).

1.2.2 Competitive Strategy

Starting from carefully selecting EPC contractors for production and service delivering through strict process of selection and hiring to ensure consistent production capacity can be met according to supply contracts in which the Group has promised to its major vendors which are MEA and the PEA. Moreover, the company also pay attention to select best electricity generation process by focusing on achieving maximum efficiency in order to producing and delivering electricity supply as specified in the contract through seamless distribution channel from electricity connection points from each project to the supply stations and electricity system both domestic and overseas. In term of financial overview, company also aim to earn stable and consistent revenue from electricity generation as well as ensuring adequate financial support in form of loans for the projects from financial institutions.

1.2.3 Income Structure

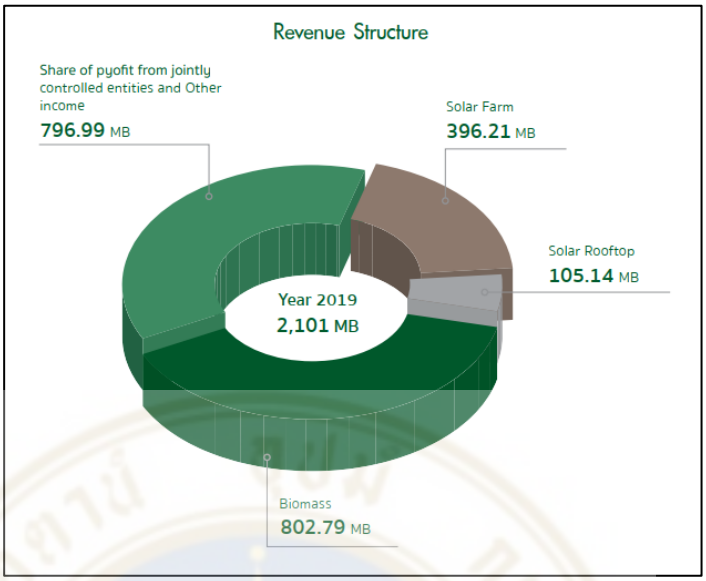


Figure 1.1 Income Structure

Source: Publication of TSE on Opportunity day2Q2019

The company has three sources of revenue which came from Solar Farm, Solar Rooftop and Biomass pertaining Figure 1.1. Majority of the earned revenue came from Solar Farm which made up 57% of the total revenue whereas 38% of the total revenue is recognized from the Biomass project and the remaining of 5% belong to the Solar rooftop.

As the company operated in project based therefore its income can be broken down as following:

- Solar Farms: TSE 60% owned and is fully operated at selling capacity accounted for 80% of its gross production at the Base tariff + FT + additional 6.5 BHT from COD. The contract tenor is 5 year on an auto renewal basis.

- Solar PV Rooftops: TSE 100% owned and is fully operated and selling at full gross production at the fixed FiT 6.16 Baht. The contract tenor is 25 years.

- Biomass: fully operated and own by TSE at the selling capacity of 80% of gross production capacity. The PPR is fixed at FiT 4.24 Baht with an additional of premium at 0.30 Baht. The contract tenor is 20 years.

1.3 Industry Overview and Competitive Positioning

1.3.1 Macro-Economic Analysis

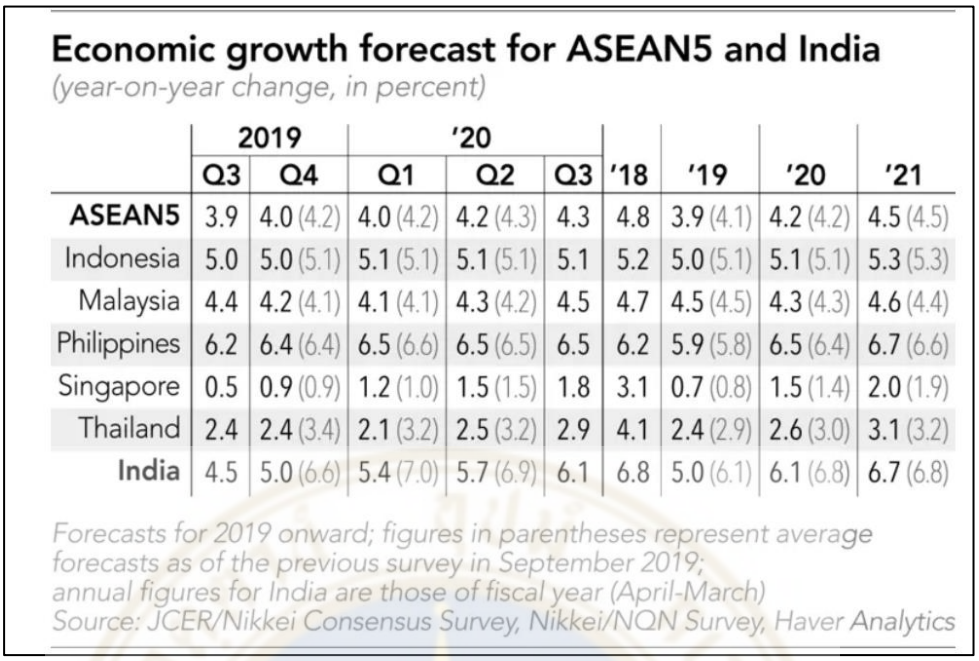
Table 1. **Real GDP Growth in Southeast Asia, China and India**
Annual percentage change

	2017	2018	2019	2019-23 (average)	2012-16 (average)
ASEAN-5 countries					
Indonesia	5.1	5.2	5.2	5.3	5.3
Malaysia	5.9	4.9	4.8	4.6	5.1
Philippines	6.7	6.4	6.5	6.6	6.6
Thailand	3.9	4.5	4.1	3.7	3.4
Viet Nam	6.8	6.9	6.7	6.5	5.9
Brunei Darussalam and Singapore					
Brunei Darussalam	1.3	2.0	2.3	2.0	-1.3
Singapore	3.6	3.5	2.9	2.7	3.5
CLM countries					
Cambodia	7.0	7.0	6.9	6.9	7.1
Lao PDR	6.9	6.6	6.8	7.0	7.6
Myanmar	6.8	6.6	6.9	7.0	7.3
China and India					
China	6.9	6.6	6.3	5.9	7.3
India	6.7	7.5	7.3	7.3	6.9
Average of ASEAN-10	5.3	5.3	5.2	5.2	5.1
Average of Emerging Asia	6.5	6.6	6.3	6.1	6.8

Note: The cut-off date for data used is 21 November 2018. ASEAN and Emerging Asia growth rates are the weighted averages of the individual economies in these groupings. Data for India and Myanmar relate to fiscal years. Myanmar's 2018 data refers to the interim 6-month period, from April 2018 to September 2018 while the 2019 data refers to the period from October 2018 to September 2019. The 2018 and 2019 projections for China, India and Indonesia are based on the OECD Economic Outlook 104 database.
Source: OECD Development Centre, *Medium-term Projection Framework* (MPF-2019).

Figure 1.2 Real GDP Growth in Southeast Asia, China and India @OECD 2019
Source: https://www.oecd.org/development/asia-pacific/01_SAEO2019_Overview_WEB.pdf

Based on the figure 1.2, the OECD Development Centre's Medium Term Projection Framework (MPF-2019) forecasted GDP of emerging countries in Asia to grow at slower pace than projected in June 2019 at 6.1% on average from 2019 to 2023 to only 5.7% for the same period because of resilience of private consumption and economic weakness in developed country fuel by ongoing U.S and China trade war and uncertainty of Brexit which play a significant role in downturn of the economy in 2020. This impact spread throughout all regions as well as Asian economies. For top five major ASEAN countries, the growth rate is expected to increase to 4.2% from year 2019.



Economic growth forecast for ASEAN5 and India

(year-on-year change, in percent)

	2019		'20						
	Q3	Q4	Q1	Q2	Q3	'18	'19	'20	'21
ASEAN5	3.9	4.0 (4.2)	4.0 (4.2)	4.2 (4.3)	4.3	4.8	3.9 (4.1)	4.2 (4.2)	4.5 (4.5)
Indonesia	5.0	5.0 (5.1)	5.1 (5.1)	5.1 (5.1)	5.1	5.2	5.0 (5.1)	5.1 (5.1)	5.3 (5.3)
Malaysia	4.4	4.2 (4.1)	4.1 (4.1)	4.3 (4.2)	4.5	4.7	4.5 (4.5)	4.3 (4.3)	4.6 (4.4)
Philippines	6.2	6.4 (6.4)	6.5 (6.6)	6.5 (6.5)	6.5	6.2	5.9 (5.8)	6.5 (6.4)	6.7 (6.6)
Singapore	0.5	0.9 (0.9)	1.2 (1.0)	1.5 (1.5)	1.8	3.1	0.7 (0.8)	1.5 (1.4)	2.0 (1.9)
Thailand	2.4	2.4 (3.4)	2.1 (3.2)	2.5 (3.2)	2.9	4.1	2.4 (2.9)	2.6 (3.0)	3.1 (3.2)
India	4.5	5.0 (6.6)	5.4 (7.0)	5.7 (6.9)	6.1	6.8	5.0 (6.1)	6.1 (6.8)	6.7 (6.8)

Forecasts for 2019 onward; figures in parentheses represent average forecasts as of the previous survey in September 2019; annual figures for India are those of fiscal year (April-March)
Source: JCER/Nikkei Consensus Survey, Nikkei/NQN Survey, Haver Analytics

Figure 1.3 Economic growth forecast for ASEAN and India

Source: https://asia.nikkei.com/Economy/Asian-economies-expected-to-pick-up-slowly-in-2020

Thailand's economy is projected to grow at a slow pace in 2020 following global economic slowdown and uncertainty over trade war and the forecast was revised down by 0.4% to 2.6%. However, there's also supportive force from changes in key legislations which help improve investment atmosphere together with the effective implementation of East Economic Corridor (EEC) infrastructure. Moreover, as of today, we are all suffering through COVID-19 pandemic which heavily impact world economic.

According to global economic slowdown especially from outbreak of covid-19 pandemic, Global GDP has dropped from 3% to 1.8% from supply chain disruption in China which considered as the biggest producer of commodity and intermediate goods. Thailand also faces the same dilemma where GDP forecast fall into negative value around -0.3%.

1.3.2 Industry Analysis

Because government expected a rise in energy demand to reach 78% by 2036 as well as currently Thailand is heavily relying on imported energy source where its price is very volatile therefore cooperation between government and private sectors is needed to improve energy efficiency by maximizing usage from domestic energy resource and diversifying energy producers. As such renewable energy industry will become substantial factor aim to contribute significant amount of benefit in the near future. Thus, government aim to increase country's production to reach 6,000 MW in 2036 and by 2015 Thailand become the biggest producer of solar energy in South East Asia. The highest output produced in north and northeast of Thailand especially in Udon Thani. Solar Energy industry market is not concentrated as we have quite a few numbers of players in the industry. Referring to the report conducted by Mordor Intelligence (2019), Thai renewable energy market is expected to grow at a CAGR of 9.14% during 2019 – 2024 fueled by strong government support for solar power development such as Feed-in tariffs under Alternative Energy Development Plan (AEDP) and lower costs of solar PV systems. However, there's still an uncertainty that restrict a growth in the industry which is the monopoly of the government has made the market overly competitive for private operators. Fortunately, due to recent released of new solar development plans by the Thai Energy Policy and Planning Office in 2017 has put an ease on this issue as it aims to increase private firms' participation.

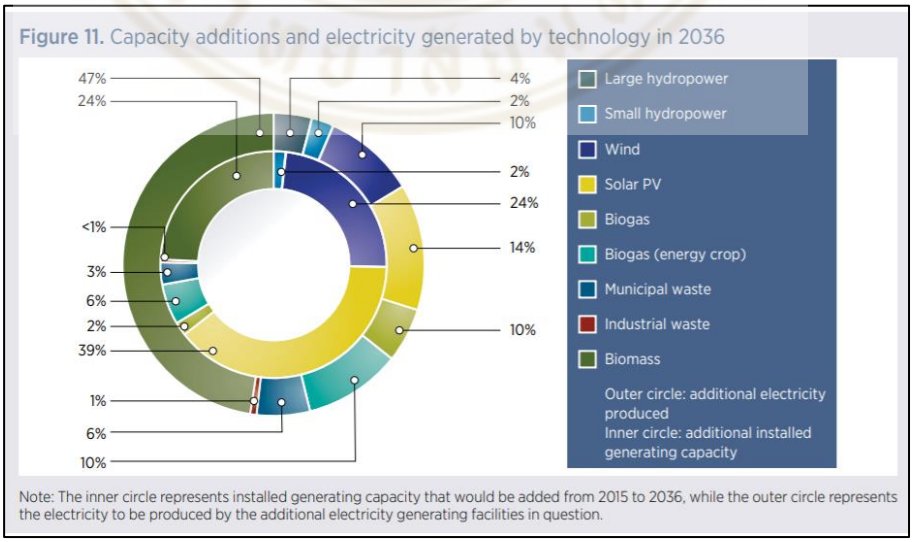


Figure 1.4 Capacity and electricity generated in 2036

Source: Renewable Energy Outlook Thailand published by IRENA in 2017

Under AEPD 2015 plan, forecast for the timeframe in 2036 indicated total additional capacity of 11,721 MW would be required and be expected to deliver 46,902 GWh annually. Thus, developing diversified portfolio of renewable energy source will become crucial in order to scale up production capacity, minimize overall costs, local material utilization and create job for local. Ultimately, be a fundamental in building up strong placement in renewable energy industry.

Figure 1.5 Thailand Solar Energy Major Players

Source: https://www.mordorintelligence.com/industry-reports/thailand-solar-energy market

Focusing on key market trend in Thailand which drive solar energy consumption recently can be briefly explain as towards Upcoming Ground Mounted Solar Power Projects. Due to the fact that more than half of the country's energy supply depends upon imported energy and is likely to increases hence Thai government is attempting to address this issue by taking several initiatives and setting target to promote renewable energy production. In 2017 Thai government has released 300MW hybrid PPA scheme which encouraged Ground Mounted Solar Power Projects. Once these plants fully setup will significantly scale up energy supply.

1.3.3 Competitor Analysis

We believe that our selected peers share the same risk characteristics with the company. Thus, using peers would also be a good representative instead of averaging it from whole industry. Firstly, we need to select the peer which share the similar business model with the company. Thus, we have selected 5 peers based on following information:

Table 1.1 The information of the 5 selected peers

Company Name	Business Description
BCPG: BCPG Public Company Limited	BCPG Group business activity and investment is consisted of energy business on renewable energy on both domestic and offshore which is divided as followed: 1. Solar Power Plant in Thailand which locate in 8 provinces. The total electricity production capacity is 138.9 megawatts including the solar farm and solar rooftops through blockchain technology 2. Wind Turbine Power Plant which locates in Thailand with total electricity production capacity of 9 megawatts 3. Solar Power Plant in in Japan which have total electricity production capacity of 131.2 megawatts
EA: Energy Absolute Public Company Limited	EA Group business activity and investment is consisted of energy business on both domestic and offshore which include: 1. Business in production and distribution of biodiesel which mainly consisted of 3 products including Biodiesel (B100), Glycerine and Phase change material 2. Business in production and distribution of renewable energy which consisted of solar power plant with total of 4 projects and 8 projects for wind turbine power plant. The total electricity production capacity for solar power plant is 278 megawatts and 386 megawatts for wind turbine power plant. 3. Business in developing and production of lithium-ion battery, polymer in Taiwan with the expansion plan on electricity battery station for electricity vehicle

Table 1.1 The information of the 5 selected peers (cont.)

Company Name	Business Description
SPCG: SPCG Public Company Limited	SPCG Group businesses consisted of: 1. Solar Farm with 36 projects in total at the total electricity production capacity at total of 260 megawatts whereas it is located in northeast and central region of Thailand 2. Business in distribution of steel roof 3. Business in distribution and installation of solar rooftop and new system of energy-saving in multiple products
SUPER: Superblock Public Company Limited	SUPER Group business consisted of: 1. Service provider in maintaining the solar power plant to many companies including the company which SUPER directly/indirectly hold shares to serve the purpose of maximizing the performance of powerplant's production 2. Business in production and distribution of renewable energy divided into solar power plant at total of 129 projects with the total electricity production capacity of 681.6 megawatts and Waste to energy plant at total of 3 projects with total electricity production capacity of 9 megawatts 3. Business in technology and development and planning of communication and public relations, equipment maintenance, human resources and management and consultant
SSP: Sermsang Power Corporation Public Company Limited	SSP serve as the holding company which hold the company that conduct its business activity or production and distribution of renewable energy business and related energy business in both domestic and offshore which is mainly consisted of 3 businesses as followed: 1. Business in investment and development of solar power plant in both domestic and offshore which is consisted of 9 projects in total with the total electricity production capacity of 123 megawatts 2. Business in investment in solar rooftop with 3 projects in total with the total electricity production capacity of 4.5 megawatts 3. Business in investment and development of other related renewable energy such as wind-turbine power plant and biogas power plant. Currently, there is no investment made in other related-renewable energy business yet

1.4 Investment Summary

Since company's establishment in 2008, company continuously focus on investing in profitable projects and expanding business scope to fill up an increasing of demand gap. The initial project was conducted in 2011 which was the construction of Solar Thermal plant.

During 2019 several projects have been launched as TSE acquired a new Solar PV Farm in Udornthani in August 2019 and Solar Co-Op project totaling capacity of 18MW as well as starting project called "Hanamizuki" in Japan totaling capacity of 13.5MW. Overall selling capacity has been increased from 131.94 MW in 2018 to 158.94 in 2019.

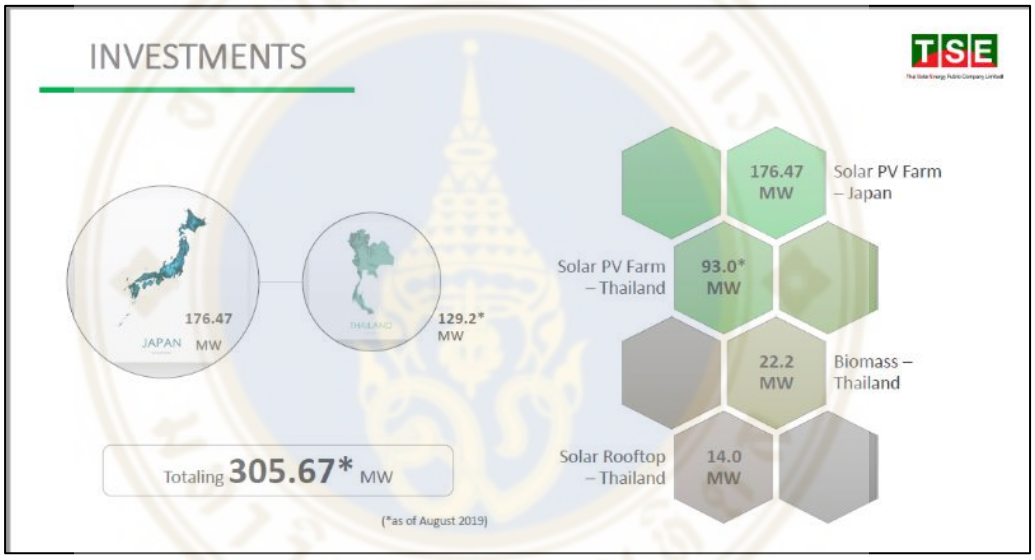


Figure 1.6 Key achievements as of 2019

Source: Publication of TSE on Opportunity day2Q2019

An investment per product class as of year 2019 can be grouped as following:

- Domestic Solar PV Farms capacity accounted for 93 MW across six provinces and with 14 ongoing projects.

- International Solar PV Farm capacity accounted for 176.47 MW

- Domestic Solar PV Rooftop capacity accounted for 14 MW across regions and with 14 ongoing projects.

- International Solar PV Rooftop capacity accounted for 176.47 MW in Japan which located in Ibaraki, Toyama, Ishikawa, Fukui and Miyagi respectively. Total number of active plants are 8 PV farms and the biggest production plant is located in Miyagi which contributed more than 70% of total capacity. The latest project planned for COD in Q4 2022 located in Onikoube will generate 154.73 MW in term of selling capacity.

- Biomass in Thailand capacity accounted for 22.2 MW from three active production plants located in Nakhon Si Thammarat which was established in 2018.

TSE milestone from 2008 to 2019 can be represented as per following diagram:

Figure 1.7 Company milestone as of 2019

Source: http://www.thaisolarenergy.com/index.php/milestone/

1.5 Valuation (Relative Method)

A relative valuation methodology is conducted to study a valuation of TSE as to compared company value to its competitors in the same industry to determine intrinsic financial worth of the company. In this essence, we are using following multiples which are price-to-earning (P/E), price-to-book-value (P/BV) and enterprise value-to-earnings before interest, tax, depreciation and amortization (EV/EBITDA) to analyses, determine and compare target price and earning per share in the forecast period 2020 (F) and 2021 (F).

1.5.1 Main components of projection

Table 1.2 Projected information for multiple valuation

		TSE			
(THB)	**Ref.**	**2018A**	**2019A**	**2020(F)**	**2021(F)**
(Profit and Loss)					
Revenue (Service Income)		**1,171,556,507.00**	**2,008,408,786.00**	2,020,815,802.64	**2,014,038,268.03**
	%growth	*n.a.*	*n.a.*	*-0.33%*	*-0.34%*
Cost of services		(228,530,165.00)	(613,057,955.00)	(616,845,142.30)	(614,776,329.65)
Gross Profit		**943,026,342.00**	**1,395,350,831.00**	**1,403,970,660.34**	**1,399,261,938.38**
	%gpm	*80.49%*	*69.48%*	*69.48%*	*69.48%*
Administrative expenses		(206,642,688.00)	(233,345,785.00)	(234,787,286.88)	*(233,999,843.03)*
Operating Income		**736,383,654.00**	**1,162,005,046.00**	**1,169,183,373.46**	**1,165,262,095.35**
Dividend Income		53.00	56.00	54.50	55.25
(Loss) gain on exchange rate		(47,475.00)	(5,414,481.00)	(2,730,978.00)	(4,072,729.50)
Other Income		156,191,219.00	92,716,644.00	-	-
Depreciation expenses		(145,968,764.00)	(298,300,124.00)	(298,300,124.00)	(298,300,124.00)
Other expenses		(296,000,000.00)	-	-	-
EBIT		**450,558,687.00**	**951,007,141.00**	**868,152,325.96**	**862,889,297.10**
Finance cost		(123,240,033.00)	(147,191,521.00)	(188,268,958.94)	(180,688,038.87)
EBT		**327,318,654.00**	**803,815,620.00**	**679,883,367.02**	**682,201,258.23**
Income tax expenses		(83,576,890.00)	(5,073,121.00)	(135,976,673.40)	(136,440,251.65)
Net Profit		**243,741,764.00**	**798,742,499.00**	**543,906,693.62**	**545,761,006.58**
	%npm	*20.80%*	*39.77%*	*26.92%*	*27.10%*
Depreciation and amortisation		(145,968,764.00)	(298,300,124.00)	(298,300,124.00)	(298,300,124.00)
EBITDA		**596,527,451.00**	**1,249,307,265.00**	**1,166,452,449.96**	**1,161,189,421.10**
No. of Share		1,905,749,580.00	2,117,716,281.00	2,117,716,281.00	2,117,716,281.00
EPS		**0.313**	**0.590**	**0.551**	**0.548**
(Balance Sheet)					
Total Assets		**14,689,235,197.00**	**15,869,990,957.00**	**18,059,573,861.62**	**20,255,334,869.20**
Cash and cash equivalents		561,020,761.00	643,594,118.00	1,180,369,771.73	1,727,664,284.76
Total Liabilities		**9,774,613,889.00**	**10,237,666,599.00**	**11,887,666,599.00**	**13,537,666,600.00**
Total Shareholder's Equity		**4,914,621,307.64**	**5,632,324,358.00**	**11,887,666,599.00**	**13,537,666,600.00**

Source: Team's estimate

Similar approach to projection in DCF method where we calculated revenue and expense for 25 years period based on solar PV panel useful life after its COD date, selecting two-year projection of TSE is appraised to obtain relevant information for multiple valuation as shown in Table 1.2.

1.5.2 Price/Earnings Ratio (PER)

Based on 4 years observation, TSE's trailing PER has shown its historical pattern within the range of 10x to 15x, reflecting consistent performance throughout the period. TSE's PER indicated 4.98 times as of 30-Dec-19, which lower than average 5-year PER of 15.62 times and even lower than -2SD band of 9.51 times. While, the forward-2020 and 2021 PER suggests slightly higher ratio at 5.3 time indicating that in relation to itself, the firm is undervalued as the decrease in revenue during projection period in 2020 and 2021.

	2019A	2020(Forward)	2021(Forward)
Stock price 30 Dec 2019 (Baht)	2.94		
P/E	4.98	5.34	5.36

Figure 1.8 Price/Earnings Ratio (PER)'s estimate

Source: Team's estimate

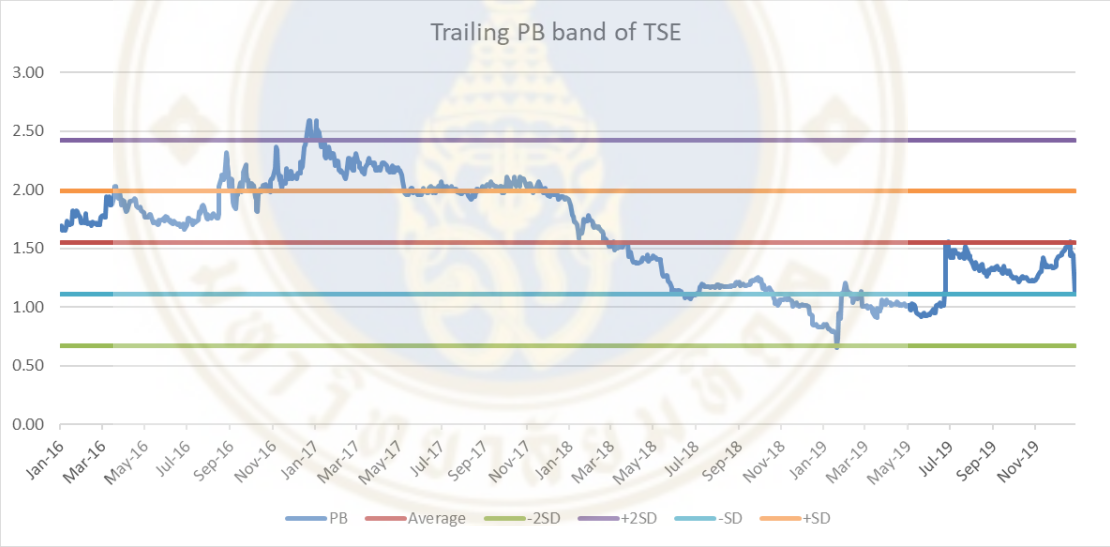


Figure 1.9 Trailing P/E band of TSE

Source: Team's estimate

1.5.3 Price to book value (PBV)

Taking an analysis on the same period as of 30-Dec-19, TSE's PBV suggested 1.11 times which is slightly lower than an average of past five years of 1.55 times but still above -1SD band of 1.10 times. Unfortunately, forward looking PBV as of 2020 and 2021 indicated even lower ratio of around 1 time close to -1SD range. In conclusion, in relation to itself, the firm will be undervalued due to higher cash and cash

equivalent and the recognition of a new assets COD of investing project in year 2020 which increase unappropriated retained earnings in result.

	2019A	2020(Forward)	2021(Forward)
Stock price 30 Dec 2019 (Baht)	2.94		
P/BV	1.11	1.01	0.93

Figure 1.10 Price to book value (PBV)'s estimate

Source: Team's estimate

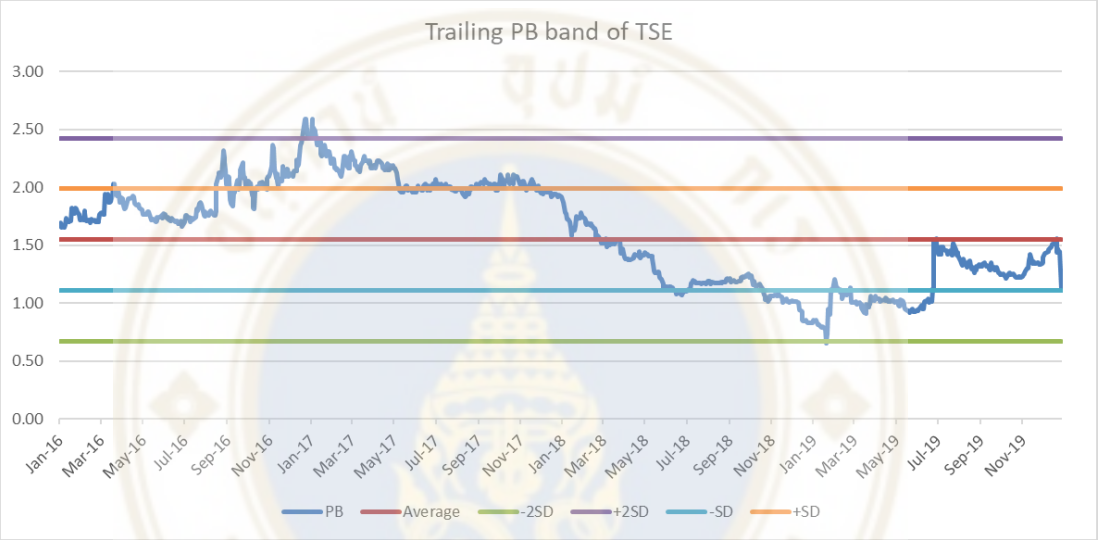


Figure 1.11 Trailing P/BV band of TSE

Source: Team's estimate

1.5.4 Benchmark Analysis

It is true to say that TSE is considered as the middle contributor in green renewable industry based on their market capitalization. Hence, we need to select the peer which share similar business model with the company i.e. production and distribution of renewable energy from solar power plant, solar farm. solar rooftop and Biomass both domestic and international. However, each company differs in term of market size, revenue structure and business activities thus we select peers based on its market capitalization for more accuracy which result in three comparable companies for this approach. The appropriate peer companies in our consideration are BCPG Public Company Limited, SPCG Public Company Limited and Sermsang Power Public Company Limited. Apart from similar market capitalization, all of three comparable

peers also share similar capital structure as same as TSE's capital structure with high proportion in long-term borrowing and debenture (above 60% of its total capital structure) and the remaining funding by company equity. The highlight determination for appropriate peers is majority of its total revenue must generate from production and generation of renewable energy from Solar farm, solar rooftop and Biomass in both domestic and offshore.

					Last Twelve Months (LTM)		
Company Name	Ticker	Current Price (3/4/2020)	M. Cap	EV	EPS	BV	EBITDA
Thai Solar Energy	TSE	1.84	3,896,597,957.04	15,820,158,347.14	0.55	6,171,907,262.62	1,166,452,449.96
BCPG Public Company Limited	BCPG	12.80	25,586,885,376.00	45,723,116,989.00	1.30	15,555,147,199.00	2,594,400,000.00
Energy Absolute Public Company Limited	EA	33.25	124,022,500,000.00	159,346,783,072.00	2.61	24,866,459,451.00	9,724,100,000.00
SPCG Public Company Limited	SPCG	14.10	13,733,259,000.00	19,572,330,000.00	4.14	15,604,163,000.00	4,027,800,000.00
Super Energy Corporation Public Company Limited	SUPER	0.35	9,572,325,000.00	44,299,265,000.00	0.18	18,858,161,000.00	5,014,200,000.00
Sermsang Power Public Company Limited	SSP	6.00	5,532,000,000.00	13,664,683,291.00	1.18	3,996,986,113.00	1,083,500,000.00

Figure 1.12 Peer analysis before removed unequaled company

Source: Team's estimate

Company Name	Ticker	P/E	P/BV	EV/EBITDA
Thai Solar Energy	TSE	4.98	1.11	8.57
BCPG Public Company Limited	BCPG	9.86	1.64	17.62
Energy Absolute Public Company Limited	EA	12.75	4.99	16.39
SPCG Public Company Limited	SPCG	3.41	0.88	4.86
Super Energy Corporation Public Company Limited	SUPER	1.91	0.51	8.83
Sermsang Power Public Company Limited	SSP	5.11	1.38	12.61
Adjusted EA and SUPER	High	9.86	1.64	17.62
	Low	3.41	0.88	4.86
	Median	5.11	1.38	12.61
	Mean	6.13	1.30	11.70

Figure 1.13 Peer analysis

Source: Team's estimate

1.5.5 Target price

We are using EV/EBITDA multiple to estimate target price for company value measurement. We calculate peer multiples to arrive at peer median for each multiple as basis for target price determination as illustrated in figure 1.14, peer median multiples for price determination in Year 2020 are PER, PBV and EV/EBITDA are 5.11, 1.38 and 12.61 respectively.

With the forecasted EBITDA, EPS and Shareholder's equity of TSE for the period of 2020 and 2021 servs as a proxy for evaluating target price. As illustrated in figure 1.14, we determine forecasted target price from lowest to highest value for an interested interval.

In summary, since TSE maintain high proportion of tangible assets from power plant investment hence the most appropriate multiple as to well reflected target price would be PBV and P/E which indicates relatively similar price close to traded

stock price. Still, smaller variation of price can be seen in PBV and P/E multiple when compare to other method whereas P/E multiple seems to give the lower target price due low EPS from reduction in revenue in 2020 and 2021. The higher target price in EV/EBITDA multiples come from high median of the peers as the company characters in renewable energy industry tends to maintain small cash and cash equivalent which then results in higher enterprise value and it might be risky for investor as if the company exposes to loan/credit default risk. Based on our analysis, using P/E multiple approach we recommend investor to "HOLD/SELL" TSE's stock even though target price, if the company stock was traded on P/E industry average, suggested slightly lower value but per other approaches indicated higher value which reflect expectation of the market and more realistic.

Target Price

			2020(F)		2021(F)	
Relative Multiple		**Peer**	**Basis**	**Target Price**	**Basis**	**Target Price**
P/E	High	9.86	0.551	5.43	0.548	5.41
	Median	5.11	EPS	2.81	EPS	2.80
	Low	3.41		1.88		1.87
P/BV	High	1.64	6,171,907,262.62	4.79	6,717,668,269.20	5.22
	Median	1.38	BV of Equity	4.03	BV of Equity	4.39
	Low	0.88		2.56		2.79
EV/ EBITDA	High	17.62	1,166,452,449.96	9.71	1,161,189,421.10	9.66
	Median	12.61	EBITDA	6.95	EBITDA	6.92
	Low	4.86		2.68		2.66

Figure 1.14 Target price

Source: Team's estimate

1.5.6 The most appropriated price: Football field analysis

To have a visualize view on final price, football field valuation is conducted to summarize all the valuation analysis. Referring to football filed diagram as shown in figure 1.16, the DCF valuation methodology suggested the most appropriate price of 2.44 Baht with least deviation and target price in 2020 is 2.80 Baht. The expected price gap where target price shall be moved within is from 2.56. to 3.49 Baht.

Football Field Valuation

Method	Low	Diff	High
DCF Value at 3.74% - 4.74% Perpetuity range	1.73	1.76	3.49
Multiple Valuation at 3.41x - 9.86x P/E Multiple range	1.88	3.55	5.43
Multiple Valuation at 0.88x - 1.64x P/BV Multiple range	2.56	2.23	4.79
Multiple Valuation at 4.86x - 17.62x EV/EBITDA Multiple range	2.68	7.03	9.71
52 Week Market High - Low	1.61	1.55	3.16

Figure 1.15 Football Field Valuation

Source: Team's estimate

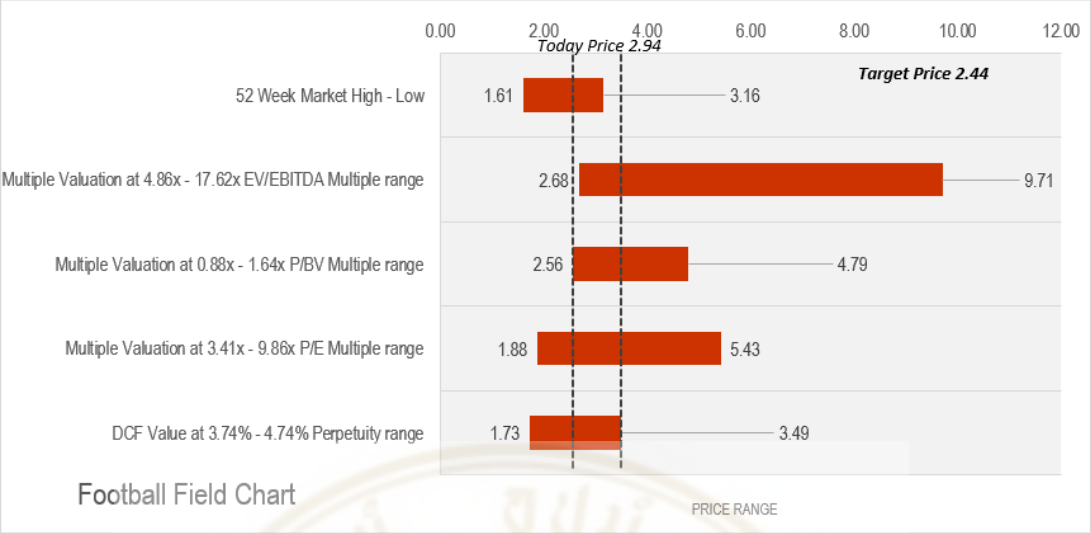


Figure 1.16 Target Price based on Football Field Valuation

Source: Team's estimate

1.6 Financial Performance Analysis

1.6.1 Methodology

To conduct the financial performance analysis on the company, we shall separate the analysis into mainly 4 groups which consisted of profitability ratio, leverage ratio, liquidity ratio and activity ratio. The profitability ratio would help us determine how well has the company efficiently and effectively generate the profit to the investor. As for the leverage ratio, it would help us determine how well has the company manage its capital structure and its likelihood for being exposed to default risk. As for liquidity ratio, it indicates how well the company has managed its cash flow in the company to maintain the high liquidity to meet its upcoming obligations. As for activity ratio, it indicates how well has the company manage its asset to generate the revenue to the company. In order to avoid the strange or supernormal changes in the financial ratio, we shall conduct the analysis in the past 5 years which shall be on the period of 2015 to 2019.

1.6.2 Financial Ratio Analysis

a) Profitability Ratios

Table 1.3 TSE Profitability Ratio from Year 2015 to 2019

Year	2015	2016	2017	2018	2019
Company	TSE	TSE	TSE	TSE	TSE
Profitability Ratio (%)					
Return on Equity	13.99	14.36	9.06	3.71	14.90
Return on Asset	9.52	10.70	5.14	2.90	6.22
Net Profit Margin	72.90	69.79	61.89	29.36	45.26

Source: Team's estimate

In order to conduct the analysis on profitability ratios, we have listed three main key profitability ratios which include return on equity, return on asset and net profit. Firstly, based from the return on equity, we can observe that from the year 2015, the company has ROE at 13.99% which implies that the company has managed its asset very well to generate profit back to its shareholders. Also, by the year 2016, the ROE has increased to 14.36% which was explained by the increase in net profit from Baht 526.6 million to Baht 617.1 million in year 2016 due to two new solar farms project (SLC and BSS) which has just recently COD in that year. This reflects a very positive signal to investors since the main ROE driver was primarily driven by return on asset instead of equity multiplier. This can be observed in the table a) above and b) below where return on asset has increased to 10.70% and equity multiplier has decreased to 1.34 times in year 2016. The increased from ROE driver by ROA is more preferable compared to equity multiplier itself since an increased in ROA truly reflect the improvement in company's financial performance which is the net profit itself compared to the equity multiplier which is primary driven by the company's leverage. The higher equity multiplier may not reflect improvement in company's financial performance as higher ROE from equity multiplier was driven by company's leverage. The company with higher leverage is subjected to higher default risk which is a bad signal to investors. However, by year 2017, company's ROE has shrunken to 9.06% and even worsened to 3.71% in year 2017 and 2018, respectively. This was mainly caused by the sharp drop in net profit from Baht 617.1 million to 413.8 million and 183.1 million in year 2017 and 2018, respectively. The sharp drop in net profit in year 2017 was primarily caused

by the higher finance costs which was driven by debenture issuance to finance for the investment in biomass power plant project in Japan and the whereas the decrease of net profit in year 2018 was caused by an increased in cost of sale services from the new three biomass project (BSW and OSW) and 6 solar farm projects in Japan which has recently COD in that year and decreased from non-cash item of impairment loss of asset from Thermal project at the amount of Baht 296 million as the project fail to efficiently generate the revenue. However, ROE has significantly improved to 14.90% in year 2019 from the increased in net profit to Baht 798.7 million due to the fully recognized of revenue from 3 biomass project and 7 solar farm plant projects in Japan which has COD in 2018 resulted in increase in revenue by Baht 787.52 million. However, it also must be duly noted that the significant increase in ROE is also driven by the significant increase in equity multiplier which is 2.39 in year 2019 due to the higher leverage which was financed for newly acquired project of solar farm over 18 MW. In term of return on assets, it indicates how effectively the company has generated the profit using its assets. The ROA in year 2015 is 9.52% whereas it increased to 10.70% in year 2016 which was resulted from the increased in net profit as explained above. However, ROA significantly decreased to 5.14% and 2.90% in year 2017 and 2018, respectively from the decrease in net profit and the significant upturn of net profit in year 2019 which improve ROA to 6.22% which is explained above. In term of net profit margin ratio, it indicates how well the company has managed to effectively earn profit from the total generated revenue. For a period between year 2015 and 2016, the company manage to maintain a very high net profit margin around 60% to 70% which reflects a very strong financial performance to the company in term of how well the company has managed its expenses. However, the net profit margin decreases to 61.89% in 2017 and 29.36% in 2018 due to the new projects which has recently being COD and newly acquired project from these periods which has led to higher cost of goods sold, impairment of assets as explained above and higher financing costs from debenture issuance. However, the net profit margin in 2019 has improved to 45.26% due to the significant increase in company's revenue from new projects such as biomass power plant and solar farm in japan which has just started to fully recognize its revenue for full year.

b) Leverage Ratios

Table 1.4 TSE Leverage Ratio from Year 2015 to 2019

Year	2015	2016	2017	2018	2019
Company	TSE	TSE	TSE	TSE	TSE
Leverage Ratio					
Equity multiplier	1.47	1.34	1.76	1.28	2.39
D/E Ratio	0.20	0.83	1.61	2.05	1.82
Interest Coverage	20.04	11.80	4.71	3.16	6.46

Source: Team's estimate

In order to conduct an analysis on leverage ratios, we have listed three main key ratios which include equity multiplier, debt-to-equity ratio and interest coverage. Firstly, for the equity multiplier, it indicates the amount of company's assets which is financed by shareholders. The higher the equity multiplier reflects higher debt which is used to finance in the investment of company's asset which reflects higher default risk. From year 2015 to 2018, we can observe that the company's seek to maintain an equity multiplier around 1 times whereas the equity multiplier in year 2019 swing up above 2 times due to the additional debenture issuances to finance the expansion for new solar farm project in Japan. However, what is the most crucial key for determining company's financial strength is debt-to-equity and interest coverage. From the table above, we can observe that the company's debt to equity ratio from year 2015 to 2016 is 0.20 and 0.83, respectively. This reflects a very strong financial health for the company as the company's capital structure have very low leverage which reflects low likelihood for defaulting its debt. In addition, if we observe the interest coverage ratio, we can observe that the company has a very high ratio over 20.04 and 11.80 times in year 2015 and 2016, respectively. This indicates that company strong ability to repay its interest expense back to its debtors when it is due. If we compare it to the world industry's average in energy sector, according to the data from csimarket, the company's interest coverage has outperformed the world average itself over 3 to 4 times during that period where as the average industry interest coverage in year 2015 and 2016 is 5.02 and 4.05 times, respectively. However, from year 2017 onwards, the company has started to aggressively seek its financing through financial institution, offering share to the public and issue the debenture in order to support its expansion for its investment on new solar

farms project in Japan and 3 new biomass power plant in Thailand which lead to higher leverage as the result. This explained why the interest coverage ratio has constantly decreased over time from 11.80 in year 2016 to 4.71 and 3.16 in year 2017 and 2018, respectively while the debt-to-equity ratio has increased from 0.83 in year 2016 to 1.61 and 2.05 in year 2017 and 2018, respectively. Comparing to the industry average, the company ratio has performed very worse which may reflect a very bad signal to investors and debtors as the company become more burden and exposed with default risks. However, due to many projects become COD and fully recognize its revenue for full year in 2019, the interest coverage increases up to 6.46 times while the company has more cash flow to repay its debt which led to lower debt to equity ratio at 1.82 times in year 2019.

Table 1.5 World Energy Sector Industry Average of D/E and Interest Coverage

World Energy Sector Industry Average					
Year	2019	2018	2017	2016	2015
Debt-to-Equity	0.17	0.44	0.06	0.07	0.06
Interest Coverage	15.13	20.77	9.09	4.05	5.02
Source: csimarket					

Source: Team's estimate

c) Liquidity Ratio

Table 1.6 TSE Liquidity Ratio from Year 2015 to 2019

Year	2015	2016	2017	2018	2019
Company	TSE	TSE	TSE	TSE	TSE
Liquidity Ratio					
Current Ratio	3.60	3.20	0.35	0.51	0.81
Quick Ratio	3.35	3.06	0.27	0.36	0.64

Source: Team's estimate

In order to conduct an analysis on liquidity ratios, we have listed two main key ratios which include current ratio and quick ratio. Firstly, current ratio indicates the company's management effectiveness control over its cash flow to generate liquidity

and its ability to meet short term obligations. From year 2015 to 2016, the company manage to maintain its current ratio over 1 time which reflect the very high liquidity and its strong ability to meet its short-term obligations which will be due within one year. However, with its current ratio at 3 times which are 3.60 and 3.20 in year 2015 and 2016, respectively may reflects that the company has too much cash and they did not use these excess cash to invest in assets efficiently enough. However, from year 2017 onwards, the company's current ratio has fall below 1 time which reflect the lack of liquidity and ability to meet any of its short-term obligations due within 1 year. The company's current ratio is 0.35, 0.51 and 0.81 in year 2017, 2018 and 2019, respectively. Given this however, the reason for huge decline of current ratio from year 2017 to 2019 is due to the cash acquisition of the multiple solar PV farm and Biomass powerplant in Thailand such as project BSS, BSE and OSW. Still, if the company cannot improve its current ratio to be above one, the company may find it difficult to negotiate with their suppliers to extend the credit term due to the lack of liquidity. In order to conservative test the company's liquidity even further, we use quick ratio as it includes only current asset which can be convert to cash quickly such as excluding the inventory which may take times to sell. Based from company's quick ratio, it shares a similar trend with quick ratio. From year 2015 to 2016, the company manage to maintain the quick ratio around 3 which exceed 1 time whereas the quick ratio is 3.35 and 3.06, respectively which reflects a very high liquidity and strong financial health as they have ability to pay down its short-term obligation easily. However, if we observe the quick ratio from year 2017 to 2019, with the quick ratio below 1 time whereas the quick ratio is 0.27, 0.36 and 0.64, respectively where we can analyze that the company is running into an issue over its lack of liquidity and poor financial health which may reflect its inability to pay down its short-term obligation especially its short-term debt. The company need to improve its liquidity soon as they may find it difficult to secure the short-term financing to help support its investment in the future.

d) Activity Ratio

Table 1.7 TSE Activity Ratio from Year 2015 to 2019

Year	2015	2016	2017	2018	2019
Company	TSE	TSE	TSE	TSE	TSE
Activity Ratio					
Fixed Asset Turnover	0.23	0.42	0.21	0.22	0.29
Total Asset Turnover	0.13	0.15	0.08	0.10	0.14

Source: Team's estimate

In order to conduct an analysis of activity ratio, we have picked 2 main key ratio which include fixed asset turnover and total asset turnover. Firstly, the fixed asset turnover indicate how effectively can the company used its fixed asset to generate sales for them. This is the key ratio for the company since the company's sale is heavily relied on its power plants which is accounted as company's fixed asset. The company's fixed asset turnover is 0.23 and 0.42 in year 2015 and 2016, respectively. The company shows a steady improvement over its turnover implying that the company is using its asset effectively to generate higher sales. However, the company has a significant drop in fixed asset turnover in year 2017 to 0.21 due to the additional business investment in japan in Onikoube project which is considered as a significant investment which lead to a significant increase in property, plant and equipment from Baht 2,850 million to 5,153 million. Thus, this explained the sharp drop in fixed asset turnover in year 2017. However, the fixed asset turnover seems to steadily improved years afterward from 0.21 to 0.22 and 0.29 in year 2018 and 2019, respectively. This represents that the company is managing its fixed asset very well to increase the sales for the company and the newly acquired solar farm and biomass power plant in year 2019 is paying off very well in order to help contribute the increase in revenue. In term of total asset turnover, the total asset turnover for year 2015 to 2019 is 0.13, 0.15, 0.08, 0.10 and 0.14, respectively. Given that the fixed asset turnover is much higher than total asset turnover, this imply that the company has a large portion of asset (excluding fixed assets) which does not help contribute much to sales and these assets may not be really worth to invest in.

1.6.3 Dupont Analysis for ROE

Table 1.8 TSE ROE Breakdown from Year 2015 to 2019

Year	2015	2016	2017	2018	2019
Company	TSE	TSE	TSE	TSE	TSE
Dupont Analysis					
Equity Multiplier	1.47	1.34	1.76	1.28	2.39
Total Asset Turnover	0.13	0.15	0.08	0.10	0.14
Net Profit Margin	72.90%	69.79%	61.89%	29.36%	45.26%
Return on Equity	**13.99%**	**14.36%**	**9.07%**	**3.71%**	**14.90%**

Source: Team's estimate

In order to elaborate the further analysis on the key driver of company's ROE, we decided to conduct the Dupont analysis. The Dupont analysis help investors analyze the ROE into further details by decomposing the components of ROE into three dimensions which include equity multiplier, total asset turnover and net profit margin. For avoidance of doubt, as briefly describe above regarding ROA, it can be breakdown into two components which composed of the total asset turnover and net profit margin. Thus, ultimately, ROE can be decomposed as ROA and equity multiplier or known as financial leverage. Referring to the figure above, we can observe that the company's ROE in year 2015 is 13.99%. In year 2015, we can breakdown the company's ROE into the equity multiplier at 1.47 times, total asset turnover at 0.13 times and net profit margin at 72.90%. Based from the decomposition, we can determine that in year 2015, the key driver of company's ROE primarily came from the net profit margin which remain very high around 70%. This indicates that the company's ROE has been driven so high primarily from the net profit which they made from operations which is a very positive sign toward investors as it reflects an improvement in company's operating performance. In year 2016, the company's ROE has slightly improved to 14.36%. Based from the decomposition, we can observe that the slightly increase in company's ROE has been driven from the increase in total asset turn over from 0.13 times to 0.15 times while the company's equity multiplier has shrunk from 1.47 times to 1.34 times and net profit margin which decrease slightly from 72.90% to 69.79%. The increase in ROE from the increase in total asset turnover also indicate another positive sign toward

investors as it reflects that the company has been utilizing their assets more efficiently to help generate higher sales. Also, the company still manage to maintain the net profit margin around 70% which remain as the positive sign. In addition, the lower equity multiplier also reflects a lower level of default risk being exposed to investors as the company has lower leverage. Thus, overall, the increase in ROE in year 2016 truly reflects the company's strength in maintaining and improving its operating performance. However, given in year 2017, the company's ROE has declined to 9.07%. The decline in ROE can be primarily explained by the huge decrease in asset turnover ratio from 0.15 times to 0.08 times while the net profit margin decreases from 69.79% to 61.89%. This indicates a very negative signal towards investors as the company's operating performance has decline significantly due to a significant drop in sales and ultimately the net profit margin itself. In addition, the equity multiplier has increased from 1.34 to 1.76 which reflects the higher leverage toward the company's capital structure. With lower sales being generated and decline in net profit margin due to higher interest expenses as company has more debts, it may prompt existing investors to sell their shares as the company become more vulnerable to the default risk. The company's ability to repay its debt has been weakened while the company's leverage also has increased at the same time. In year 2018, the company has taken it worst turn as the company's ROE has significantly decreased to 3.71%. The significant drop in ROE can be explained by the decreased in company's net profit margin from 61.89% to 29.36% while the equity multiplier has also decreased from 1.76 to 1.28 times. The decrease in net profit margin was primarily caused by the high interest expenses and the impairment loss on assets as one of their biomass power plant projects has not generated the electricity efficiently enough as per expected. This sends another negative signal to investors to sell their shares as the company's investment on one of the assets has become waste while the returned profit to investors has also significantly declined at the same time. Consequently, the investors may lose a lot of confidence to the company while raising a lot of doubts over management's ability to determine the feasibility study over the investment of any project and operating performance in the future. Given the impairment loss on assets, however, the company's asset turnover has increased from 0.08 to 0.10 times. Still, an increase in company's asset turnover is not enough to sustain the decline in the company's ROE. With the company facing its worst turn, in year 2019,

the company has taken a significant improvement in ROE from 3.71% to 14.90%. The increase in ROE can be explained by the increase in equity multiplier from 1.28 to 2.39, increase in company's asset turnover from 0.10 times to 0.14 times and increase in net profit margin from 29.36% to 45.26%. With its full year recognition of the revenue over many of its project especially the biomass powerplant project (OSW) which has just recently COD in the Q4/2018, it has significantly increased the company's sales which lead to higher asset turnover and net profit margin at the same time. This help boost back investor's confidence over the company's operating performance and positive signal towards higher return to investors in the future. Still, the significant jump in company's ROE was also driven by higher leverage which investors will be more vulnerable to the default risk. Investors may demand higher equity required return which as the result increase company's cost of capital. Thus, the increase in company's ROE by equity multiplier may not help contribute a positive signal to investors at the same time.

1.6.4 Peer-to-Peer Analysis

In order to evaluate the company's performance in depth details, we shall compare the company's financial ratios with its closest peers. The purpose of the peer analysis is to give investors an evaluation on how effectively the company has operate compares to other peers in the same industry and giving investors with the initial thought to value the company in relative to the selected peers. Using the peers which share a similar business portfolio of renewable energy with the company, by applying the same methodology as mentioned in part 1.7.1, we shall compare four group of financial ratios of the company with the selection peers. For avoidance of doubt, we shall compare the financial ratio with selected peers only for the year 2019 as it reflects the latest information which the market can access to.

Table 1.9 Peers-to-peers Analysis from Year 2015 to 2019

Year	2019					
Company	**TSE**	**EA**	**BCPG**	**SPCG**	**SUPER**	**SSP**
Profitability Ratio						
Return on Equity	14.90	29.31	11.76	20.49	14.62	14.93
Return on Asset	6.22	11.44	6.87	15.25	7.88	6.18
Net Profit Margin	45.26	49.50	46.23	50.15	53.53	36.73
Leverage Ratio						
Equity Multiplier	2.39	2.56	2.31	1.70	1.86	3.39
D/E Ratio	1.82	1.94	1.39	0.46	2.38	2.40
Interest Coverage	6.46	5.34	4.16	9.46	2.78	3.82
Liquidity Ratio						
Current Ratio	0.81	2.31	0.49	2.30	0.60	1.16
Quick Ratio	0.64	2.18	0.29	0.68	0.37	0.93
Activity Ratio						
Total Asset Turnover	0.14	0.23	0.11	0.24	0.15	0.12

Source: Team's estimate

Firstly, in term of profitability ratio, overall, by using the Dupont analysis to breakdown ROE to compare and analyze the company's performance against peers, we can observe that the key driver of company's ROE and its peer comes from the equity multiplier. From the table 1.9 above, we can observe that the company and its peer are most likely to maintain the equity multiplier around 1.7 to 2.5 times. This implies that the capital structure for energy industry is most likely to be financed with debts. This makes sense as this type of business would most likely finance their construction and acquisition of fixed assets with long-term debt to relax its debt obligation and maintain its liquidity in company to avoid mismatch of funding. Thus, the higher equity multiplier these company have, the higher ROE becomes. This explained why the company's ROE has outperformed most of its peers except for EA who has higher equity multiplier at 2.56 times with ROE at 29.31% and SPCG who has equity multiplier at 1.70 times with ROE at 20.49% compare to the company who has equity multiplier at 2.39 times with ROE at 14.90%. On another perspective of the key driver of ROE, if we observed from the ROA, we could observe that the company's ROA at 6.22% are very inferior compare to most of its peers who has higher ROA than the company except from SSP. Based from the table 1.9, we can observe that the company has very high net profit margin at 45.26% which is around the average of its peers who has net profit margin around 40% to 50% except for SSP who has the net profit margin around 36%. SSP has lower net profit margin and lowest ROA among its peers due to the additional debt financing cost

on investment in additional projects which cause their assets size to increase from Baht 11,892.7 million to Baht 13,045.1 million but theses invested assets are still under the construction and has not generated the revenue yet. Thus, this explained why SSP has lower net profit margin and ROA in relative to other peers and the company itself. Given the high net profit margin, however, the reason for the company's ROA to be inferior compared to its peer primarily come from the total asset turnover. From the table 1.9, we can observe that the company's total asset turnover is 0.14 times which is the very low turnover compare to EA and SPCG who manage to maintain the total asset turnover around 0.28 times and ROA above 11%. Excluding these two companies, the remaining of peers and the company itself share a very similar total asset turnover around 0.10 to 0.15 times and ROA around 6%. This indicates that these group of companies have done very poorly in term of utilizing its asset to generate higher sales and may has a lot of inferior assets which are unproductive and does not help contribute much to company's sale. The company can improve its management strategy over the utilization of assets or write-off any assets which are unproductive to help improve company's total asset turnover. Thus, this explained why the company has inferior ROA compared to EA and SPCG even though it has very high net profit margin as they owned too much of unproductive assets. Overall, we can say that the company ROE has outperformed other peers due to the high equity multiplier but not in term of profitability from the operation itself which may have not been very well favorable to investors compared to other peers who may has lower ROE but has done better in term of the operating performance such as BCPG and SUPER who has lower ROE than the company but better off in term of net profit margin where they had net profit margin around 50% while the company's net profit margin itself is 45%. Secondly, in term of the leverage ratio, as explained above, the energy sector industry business tends to have high leverage due to its necessity to finance the assets with long-term debt to maintain company's liquidity. The peers have equity multiplier at the average of 2.36 times compared to the company itself who has the equity multiplier at 2.39 times which is higher than the average of its peer. Based from the table 1.9, the average debt-to-equity of the peers is 1.71 times where the company itself is 1.82 times. The company's debt to equity is above the average which is a poor signal to investors and creditors as it implies that the company has higher default risks compared to most of its peers. Given that, however, due to the high net

profit margin, it drives the company interest coverage to be higher than most of it peers except for SPCG where the company interest coverage is 6.46 times. With high interest coverage ratio, it gives company more incentive to bargain with its creditors to extend the credit term which would allow the company to have higher liquidity. Also, the company would also be able to access the capital market at lower costs especially debts at lower interest rate compared to most of its peers. Thus, it would help the company to lower its cost of debts and equity premium demanded by investors which ultimately lower the cost of capital as the result. Thirdly, in term of liquidity ratios, based from table 1.9, we can observe that most of its peers except for EA, SPCG and SSP who manage to maintain its current ratio above 1 time whereas the company current ratio and quick ratio itself is below 1 time. This imply that the company has poor liquidity and may not be able to meet its short-term obligation due within 1 year. Given the current ratio below 1, however, the main reason why most of these peers and the company itself to have current ratio lower than 1 is due to the ongoing investment and cash acquisition to expand their company's portfolio size. This is a positive sign for investors as the cash in their companies is properly utilised in order to earned additional revenue and ultimately higher return back to investors. Compared to EA and SPCG, however, their current ratio above 2 times which may imply that the company has too much cash in the company and did not utilize it efficiently enough. Lastly, in term of activity ratios, as mentioned earlier, the company has a lot of unproductive assets which lead to the company's asset turnover to be inferior compared to EA and SPCG. Based from the table 1.9, as explained earlier, the company has the total asset turnover at 0.14 times compared to EA and SPCG who has the total asset turnover around 0.23 times. We can interpret that the company may has a lot of unproductive assets especially its power plants production which may have been operated well below the average performance leading to the lower amount of sales. The company can improve its operation plan over the management of the power plant to increase sales and able to drive their total asset turnover to the same level as EA and SPCG in the future. Without any further improvement, there would not be any credible positive signals which would help drive investors to value the company's share to be higher in relative to its peer.

1.7 Investment Risk

1.7.1 Risks

1.7.1.1 Foreign exchange rate risk

Cause: As the company has the total of 8 Solar power plant projects located in Japan, the company would need to collect its revenue in the Japanese Yen currency as per agreed in the Power Purchase Agreement. In addition, the company has disclosed that they have entered into the power plant construction agreement with foreign contractors. The company would be expose to the translation exposure since the company's account receivable and account payable is denominated in the foreign currency with the primary currency being US Dollars and Japanese Yen. The fluctuation in currency exchange rate would directly impact the financial statements.

Risk Level: Medium

Mitigations: It is possible for the company to migrate this risk through the hedging accounting. There are many financial instruments available in the capital market for the company either in Thailand and Japan such as forward contract and cross currency swap which could be used to hedge against the currency translation risk. By adopting the hedge accounting as introduced in IFRS9, the company could avoid such fluctuation on profit and loss statements. However, the management must be able to evaluate and quantify pros and cons for using hedge accounting beforehand whether this accounting should be adopted or not.

1.7.1.2 Interest rate risk

Cause: The company has entered into the credit facilities agreement with the commercial bank. The interest rate is based on the floating rate and is also subjected to changes based on the company's credit rating. Thus, the company is exposed to the cash flow risk due to the uncertainty of interest expense in the future period.

Risk Level: Medium

Mitigations: The company could avoid the uncertainty of the future cash flow in the future by entering into the interest rate swap where the company could swap its float interest rate with fixed interest rate to lock into the future cash outflow which could be determined ahead. Such financial instrument is available in the

capital market. Most commonly, the commercial bank is the ideal counterparty for entering into interest rate swap with due to its credibility. The company should also do well to maintain its credit rating with TRIS agency at BBB rating to avoid material changes in the interest rate such as maintaining the leverage in the company to be at the same or lower level.

1.7.1.3 Major customer reliance risk

Cause: As the company relies heavily on Provincial Electricity Authority (PEA) and Metropolitan Electricity Authority (MEA) to purchase the generated electricity based on the agreed Power Purchase Agreement, the company must avoid any Power Purchase Agreement termination to prevent losses in the credibility with PEA and MEA which would heavily impact the company's operation. Credibility lost would results in the difficult negotiation of the commercial terms for any potential new PPA with PEA and MEA in the future and potentially, PEA and MEA may decide not to enter into the PPA with the company again.

Risks: Low Level

Mitigations: As for the historical record up until present, the company has yet to default any PPA. As the majority of the company's solar power plant has already COD, there is less likely chances that any default from PPA could arises as the electricity has already been distributed as per agreed with PEA and MEA. The potential event which could lead to the default of PPA is the halt of electricity generation which could arises from the damages of the solar powerplant by war or terrorist. However, one of those case is rare since these power plants are located in the safe region of Thailand.

1.7.1.4 Risk from generated electricity lower than forecasted

Cause: The energy production level could be lower than it is forecasted due to the uncontrollable factors such as natural disaster and climate changes. For example, the incorrected weather forecast such as the raining season lasting longer than anticipated would most likely affect the energy production to be low since it is cloudy all day long. Such incident is unavoidable and would directly affect the company's operation performance.

Risk: Medium Level

Mitigation: Since the climate changes are external factor, the company would not be able to easily mitigate this risk as it is impossible to control the weather. Although, any incidents arise from the natural disaster such as flooding could lead to the damages of the power plant and eventually the loss of electricity generation. Such risk can be mitigated through the purchase of insurance to protect the damages of the property and specified events which lead to the interruption of business's operation and loss of revenue as the result.

1.7.1.5 Construction Delay from COVID-19 outbreak

Cause: Currently, the project Onikoube, one of the biggest solar PV farm powerplant in the company's portfolio with the selling capacity of 154.73 MW. It is under the construction and planned to COD by December 2022. However, due to COVID-19 outbreak, Japanese government has declared the state of emergency in April-20 to let people stay in door and closure of businesses or temporary prohibit foreigners to travel to Japan to contain the outbreak (Mark, 2020). Thus, the EPC contractor would have high difficulty to travel to the site or has less time to continue the construction activities on the site per day. This could result in the delay of the construction and delayed of the revenue recognition by year 2022.

Risk: High level

Mitigation: The company has awarded the EPC services contract to the local contractor, Toshiba Group located in Japan to engaged in the construction of this powerplant. This would help the company to keep its construction timeline from being delayed any further. In case of foreign EPC contractor, they would require to self-quarantine whenever they travel from or to Japan. Although, the state of emergency of declared in Japan, Toshiba has made the official declaration that they would still operate its business as usual in domestic region except for oversea operations which will be temporary halted ("Reduction of Business Days," 2020). However, their number of business day per week is limited to minimize the risk of infection. Toshiba has informed that the normal business days will return as usual in May. However, it would still be subjected to the extension depending on the situation in Japan whether the number of confirmed COVID-19 cases has declined or not.

1.7.2 Sensitivity Analysis

We have conducted the sensitivity analysis based on the following case scenarios to observe the possible changes in the company's value. For the first case, we shall conduct the analysis based on the construction timeline of Onikoube project as it shares the highest risk. Due to the COVID-19 as aforementioned above, we expected the construction timeline to be delayed. However, according to the PPA, it will be expired by year 2047. In case that the company has not renegotiate the PPA term with the buyer to extend the COD date, the electricity selling duration would be shortened and less than 25 years as per anticipated which would eventually lead to the decline in total revenue of the project. However, the company would be able to keep its tariff fixed at JPY36/kWh. Thus, we shall conduct the sensitivity analysis between the COD date of Onikoube project and the company's cost of capital to reflect the changes in the intrinsic value of the company's share.

On another case, the company may renegotiate with the buyer to extend the COD date in PPA to reflect their actual construction timeline. With such renegotiation, the company would be able to sell the electricity to buyers for 25 years as per anticipated. However, the company would be exposed to the risk of getting their tariffs decreased from the original rate as per originally agreed in the PPA due to the renegotiation. The reason for such decreased in tariffs is due to the oversupply of solar energy in the market. Japan planned to follow the footstep of European countries with the reduction in feed-in tariffs by around mid-2020s (Jiji, 2018). Comparing to the original fixed tariff as per already agreed in the PPA which is at JPY36/kWh, the lowering of tariffs would deliver a massive blow to the company's revenue. Thus, we shall conduct the sensitivity analysis between the tariff changes and the company's cost of capital to reflect the changes in the intrinsic value of the company's share. For avoidance of doubt, we shall safely assume that the company will delay its construction timeline and COD by December 2023 and the PPA shall expire 25 years later after new COD date.

On last case, we would conduct the sensitivity analysis between the changes in the company's cost of capital and the terminal growth rate which was used in the financial model to observe the impact to the intrinsic value of the company's share

which could be caused by the changes in business direction, policy or the economy condition in the future.

Sensitivity Analysis Results

Case 1 – Construction Delay

Table 1.10 Sensitivity Analysis on TSE Share Price – Case Construction Delay

Net Present Value Sensitivity					
Project Onikoube COD Date	WACC				
	8.49%	8.24%	7.99%	7.74%	7.49%
Dec-22	1.84	2.13	2.44	2.78	3.17
Jun-23	1.70	1.98	2.29	2.64	3.03
Dec-23	1.56	1.84	2.15	2.50	2.88
Jun-24	1.43	1.71	2.02	2.36	2.75
Dec-24	1.30	1.58	1.89	2.23	2.62

Source: Team's estimate

Given that the cost of capital (WACC) may increase or decrease by 0.25% per year, we have conducted a sensitivity analysis to analyze the impact to the value of share when the COD date as per originally planned on December 2022 has been delayed. On this case, we have assumed that COD date will be delay by six months apart from each other and the slowest COD date which this project could have achieved is on December 2024. For avoidance of doubt, we believe that two years would be the most reasonable delay which the company could extend to. Otherwise, the company will be subjected to the termination of the PPA. Based from the sensitivity analysis, we have found that while the company's cost of capital is 7.99%, the minimum share price which it could drop to is Baht 2.29 per share given that the company manage to achieve COD date by June 2023. However, at worst case, if the company manage to achieve COD date by December 2024, the maximum share price which it could have drop to is Baht 1.89 per share. Given that, however, the company's cost of capital could have changes based on the new company's direction, policy or economic condition in the future. In case that the company's cost of capital increased by 0.50%, we believe that the lowest share price which it could drop to is Baht 1.30 per and the highest price it could achieved it Baht 1.84 per share. On vice versa, if the cost of capital decrease by 0.50%, we believe the lowest share price which it could drop to is Baht 2.62 while the highest share price

it could achieve is Baht 3.17 per share. Thus, in conclusion, the share price could vary between Baht 1.89 to Baht 2.44 per share in case that the COD date has been delayed by 2 years. For each 6 months delay from the original COD date, the share price is expected to decline by Baht 0.14 per share.

Case 2 – Tariff Reduction

Table 1.11 Sensitivity Analysis on TSE Share Price – Case Tariff Reduction

Net Present Value Sensitivity					
Project Onikoube Tariffs (JPY/kWh)	WACC				
	8.49%	8.24%	7.99%	7.74%	7.49%
36.00	1.84	2.13	2.44	2.78	3.17
32.00	1.38	1.64	1.92	2.24	2.59
28.00	0.92	1.15	1.41	1.69	2.01
24.00	0.46	0.67	0.90	1.15	1.43
20.00	N/A	0.18	0.38	0.61	0.85

Source: Team's estimate

Given that the cost of capital (WACC) may increase or decrease by 0.25% per year, we have conducted a sensitivity analysis to analyze the impact to the value of share when the project Onikoube is expecting to get its fixed tariff reduction from the PPA negotiation to extend the maturity of the PPA to remain as 25 years from the new COD date. On this case, we have assumed that the fixed tariff will decline by 4 JPY/kWh at each step. Based from the sensitivity analysis, we have found that while the company's cost of capital is 7.99%, the minimum share price which it could drop to is Baht 1.92 per share given that the fixed tariffs has been renegotiated to 32 JPY/kWh. However, at worst case, if the project's fixed tariff declined to 20 JPY/kWh, the maximum share price which it could have drop to is Baht 0.38 per share. Given that, however, the company's cost of capital could have changes based on the new company's direction, policy or economic condition in the future. In case that the company's cost of capital increased by 0.50%, we believe that the lowest share price which it could drop to is Baht 0.18 per share and the highest price it could achieved it Baht 1.84 per share. On vice versa, if the cost of capital decrease by 0.50%, we believe the lowest share price which it could drop to is Baht 0.85 while the highest share price it could achieve is Baht 3.17 per share. Thus, in conclusion, the share price could vary between Baht 0.38 to

2.44 per share in case that the project Onikuobe's fixed tariff has declined not lower than 20 JPY/kWh. The decreased in fixed tariff by 4 JPY/kWh would result in the decrease of the share price around Baht 0.50 per share.

Case 3 – Changes in Terminal Growth

Table 1.12 Sensitivity Analysis on TSE Share Price – Case Change in Terminal Growth

Net Present Value Sensitivity					
Terminal Growth	WACC				
	8.49%	8.24%	7.99%	7.74%	7.49%
4.74%	1.99	2.30	2.65	3.04	3.49
4.49%	1.91	2.21	2.53	2.90	3.32
4.24%	1.84	2.13	2.44	2.78	3.17
3.99%	1.79	2.06	2.35	2.68	3.04
3.74%	1.73	1.99	2.28	2.59	2.93

Source: Team's estimate

Given that the cost of capital (WACC) may increase or decrease by 0.25% per year, we have conducted a sensitivity analysis to analyze the impact which could cause to the value of share to change based on the terminal growth in the future. The terminal growth may change in the future depending on the economy condition. Based from the sensitivity analysis, we have found that while the company's cost of capital is 7.99%, the highest share price which the company could reach is Baht 2.65 per share given the terminal growth increased to 4.74%. On vice versa, if the terminal growth decreased to 3.74%, the lowest share price which the company could reach is Baht 2.28 per share. Given that, however, the company's cost of capital could have changes based on the new company's direction, policy or economic condition in the future. In case that the company's cost of capital increased by 0.50%, the highest share price which the company could reach is Baht 1.99 per share while the lowest share price is Baht 1.73 per share given the terminal growth range between 3.74% to 4.74%. On vice versa, if the cost of capital decrease by 0.50%, we believe the highest share price which the company could reach is Baht 3.49 per share and the lowest share price which it could reach is Baht 2.93 per share. Thus, in conclusion, the share price could vary between

Baht 2.28 to Baht 2.65 per share subjected to the terminal growth which the country could achieve in the future.

Based from our analysis, we have come into the conclusion that the share price could range between Baht 2.28 to Baht 2.65 per share. However, the company would expect the decline in share price in case of the construction delay or decreased in tariffs for project Onikoube. We believe that the discount cash flow method is deemed as the best method to evaluate the intrinsic value. The discount cash flow model is a proper valuation tool to analyze all past performance and key factors in operating the business and generating profit by the company in the future in ongoing basis which reflects the value of the firm better than other methods. Thus, we share the opinion that the discount cash flow method is the most appropriate way to estimate the share's price.

CHAPTER II
APPENDIX

2.1 Organization Structure

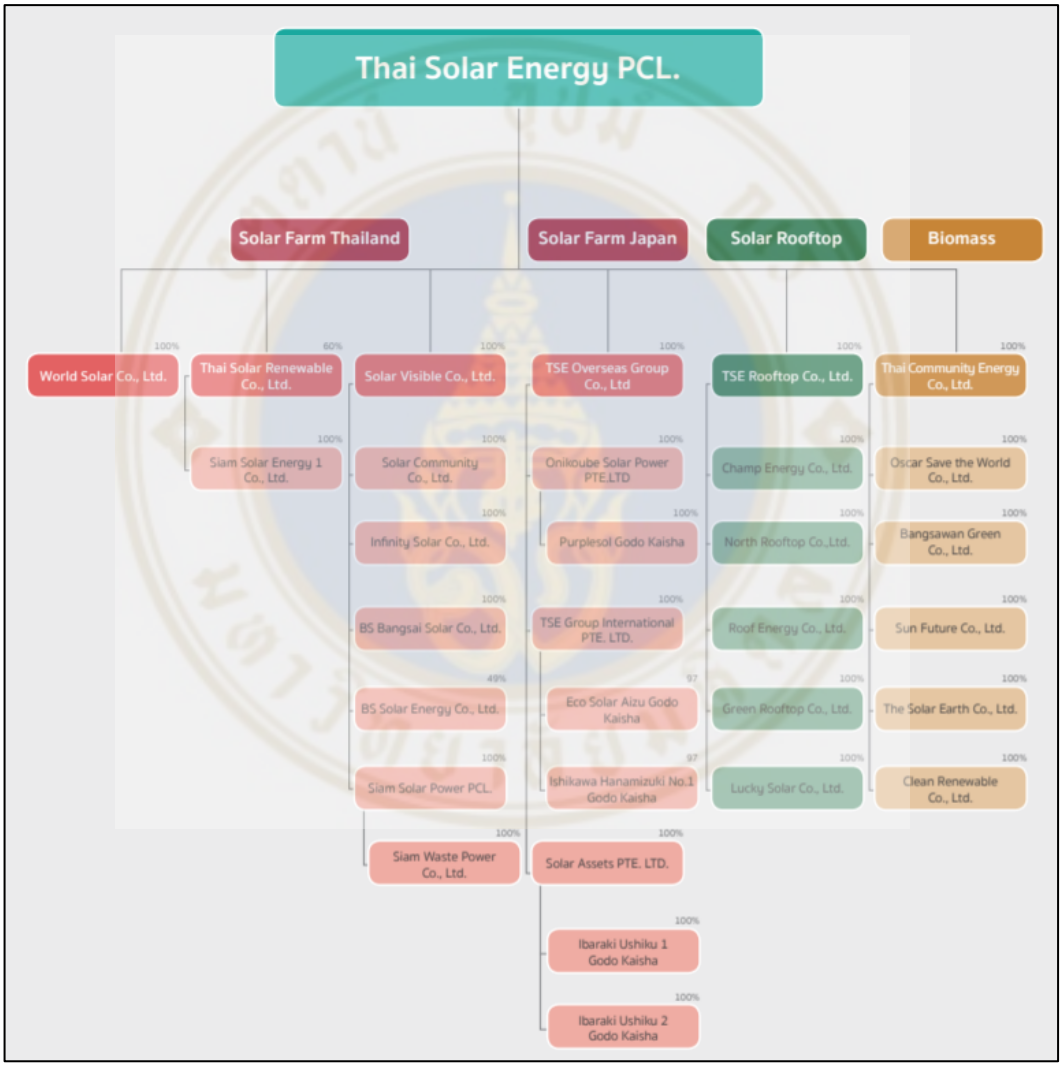


Figure 2.1 TSE Organization Structure as of 30 December 2019

Source: Publication of TSE on Opportunity day2Q2019

2.2 Shareholders' Structure

Rank	Major Shareholders	# Shares	% Shares
1.	บริษัท พี.เอ็ม. เอ็นเนอร์ยี่ จำกัด	783,034,150	36.98
2.	บริษัท เวฟ เอ็นเตอร์เทนเมนท์ จำกัด (มหาชน)	190,837,500	9.01
3.	บริษัท ซีโน-ไทย เอ็นจีเนียริ่ง แอนด์ คอนสตรัคชั่น จำกัด (มหาชน)	190,575,000	9.00
4.	น.ส. แคทลีน มาลีนนท์	184,620,000	8.72
5.	CREDIT SUISSE AG, SINGAPORE BRANCH	76,247,946	3.60
6.	CITI (NOMINEES) LIMITED-S.A PBG CLIENTS SG	39,900,000	1.88
7.	กองทุนเปิด บัวหลวงหุ้นระยะยาว	32,852,400	1.55
8.	บริษัท Thai NVDR Company Limited	24,247,817	1.15
9.	MISS NATTAWAN PIYAMAHACHOT	19,829,000	0.94
10.	กองทุนเปิด บัวหลวงโครงสร้างพื้นฐานเพื่อการเลี้ยงชีพ	13,080,100	0.62
11.	กองทุนเปิด บัวหลวงหุ้นระยะยาว 75/25	12,834,900	0.61
12.	นาย สนิท ดุษฎีโหนด	11,705,715	0.55

Figure 2.2 TSE Major Shareholders as of 30 December 2019

Source: https://market.sec.or.th/public/idisc/en/CompanyProfile/Listed/TSE

2.3 Board of Directors

Name - Surname	Position	Date First Appointed
1. Cathleen Maleenont,Ed.D	Chairman of the Board of Directors Chairman of the Executive Committee Member of Nomination and Remuneration Committee	18 February 2014
2. Mr. Prommin Lertsuridej	Independent Director Vice Chairman of the 3oard of Directors	18 February 2014
3. Mr. Pala Sookawesh	Independent Director Member of the Audit Committee	18 February 2014 22 April 2019
4. Mrs. Siripen Sitasuwan	Independent Director Chairman of the Audit Committee	18 February 2014
5. Mr. Prasan Chuaphanich	Independent Director Member of the Audit Committee Chairman of Nomination and Remuneration Committee	18 February 2014
6. Mr. Somphop Prompanapitak	Director Member of the Executive Committee Member of Nomination and Remuneration Committee	18 February 2014
7. Mrs. Angkanee Rerksirisuk	Director	23 May 2017
8. Mr. Masthawin Charnvirakul	Director	27 February 2019
9. Mr. Aran Apichari	Independent Director	22 April 2019

Figure 2.3 TSE Board of Directors as of 30 December 2019

2.4 Management and Organization Chart

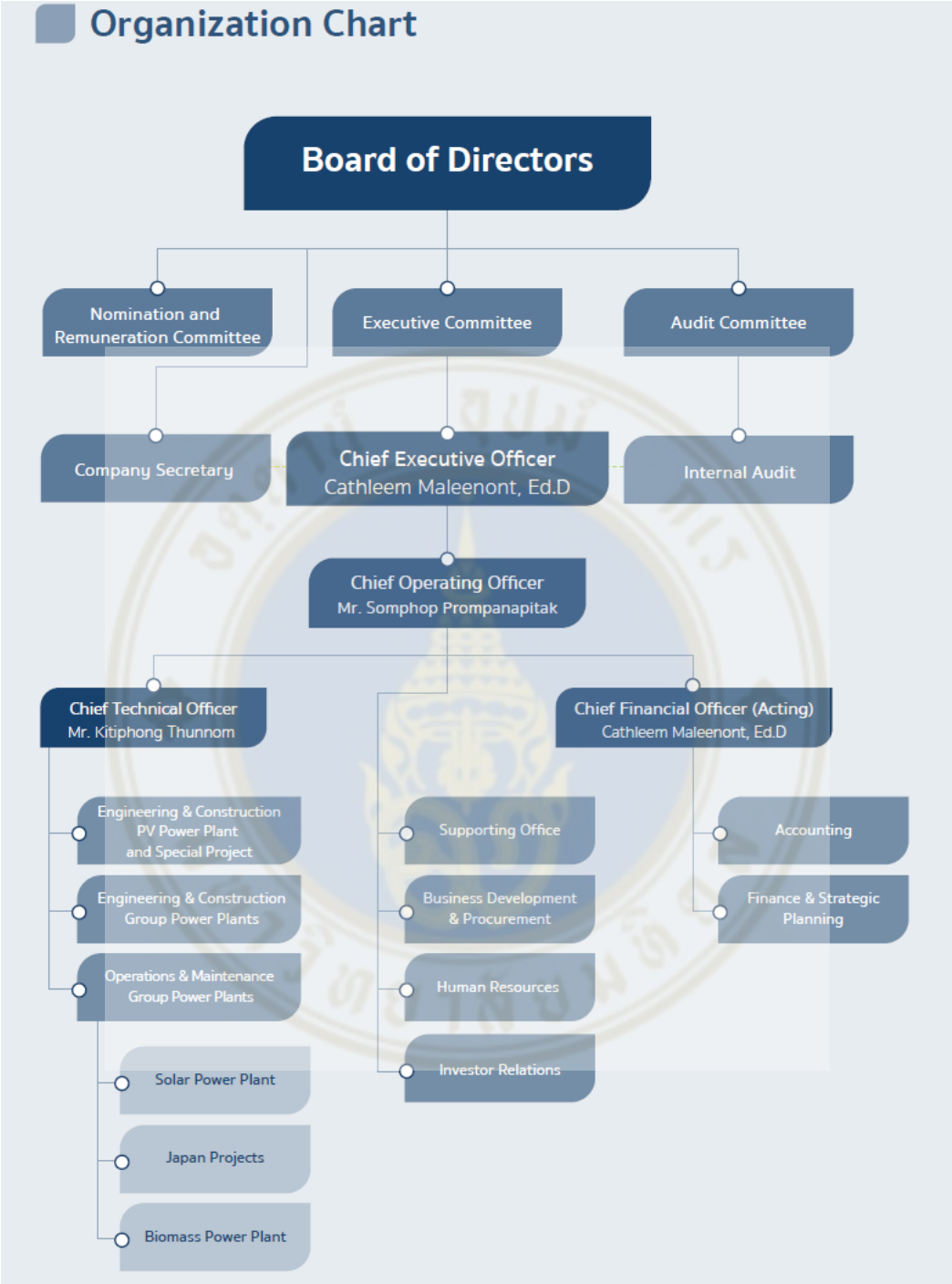


Figure 2.4 TSE Organization Chart as of 30 December 2019

Source: Publication of TSE on Opportunity day2Q2019

2.5 SWOT analysis

Figure 2.5 SWOT Analysis

Source: Team's analysis

2.6 Five Forces Analysis

Figure 2.6 Porter Fiver Force Model

Source: Team's analysis

2.6.1 Bargaining Power of Buyer (Moderate)

It isn't wrong to say that TSE is one of the big players in the industry considering market size of the company hence the company can achieve economy of scale in term of raw material utilization. This provides company with a higher bargaining power over supply cost as supplier revenue also depends largely on company performance as well. Unfortunately, specialize orders for parts is also a key hence switching suppliers back and forth is not an ideal. This allows suppliers to have stronger bargaining force. Furthermore, these is a difficulty for company to integrate backward as it requires expertise and skill workforce to produce specialized solar parts hence this creates weaker force for bargaining power of buyers.

2.6.2 Bargaining Power of Supplier (Moderate)

As in the process of solar power production require specific part and equipment which there's no substitute products. From this rationale, making bargaining power of supplier a stronger force. In contrary, there is quite number of suppliers in the

industry compared to its buyers which increase bargaining power of suppliers as they have control over material prices.

2.6.3 Threat of New Entrance (Low)

Due to its nature of business that require intensive capital make it difficult for new entrants to set up a business. High cost of expenditure for building up power plant is a good prevention of newcomers. Moreover, deep assessment from government and complexity of regulation also scares new investors away.

2.6.4 Threat of Substitute Product or Service (Low)

Because company require unique equipment and parts in order to produce and distribute solar energy hence there is very few substitute available products available in the markets which make threat of substitute weaker.

2.6.5 Rivalry among Existing Competitors (Moderate)

Major competitor in this industry is EGAT which is state-run corporate however recently government aims to increase private firm participation so lesser barrier of entry allow equal foot competition.

2.7 Common Size Analysis

Table 2.1 Common Size Analysis of Statement of Financial Position

Thai Solar Energy Public Company Limited				
Statement of Financial Position				
As at 31 December 2019				
	Consolidated financial statements		Common Size BS	
	2018	2019	2018	2019
	Baht	Baht	%	%
Assets				
Current assets				
Cash and cash equivalents	561,020,761	643,594,118	3.8%	4.1%
Short-term restricted bank deposits	74,399,234	18,864,046	0.5%	0.1%
Short-term investments	459,753	221,114,307	0.0%	1.4%
Trade and other receivables	478,067,350	430,399,966	3.3%	2.7%
Short-term loans to subsidiaries	-	-	0.0%	0.0%
Current portion of long-term loans to subsidiaries	-	-	0.0%	0.0%
Inventories	14,452,830	24,028,968	0.1%	0.2%
Refundable Value Added Tax	181,178,565	273,156,145	1.2%	1.7%
Other current assets	152,581,949	30,316,921	1.0%	0.2%
Total current assets	1,462,160,442	1,641,474,471	10.0%	10.3%
Non-current assets			0.0%	0.0%
Long-term restricted bank deposits	12,008,535	34,239,939	0.1%	0.2%
Long-term loans to subsidiaries	-	-	0.0%	0.0%
Receivables from disposal of investments	-	-	0.0%	0.0%
Investments in subsidiaries	-	-	0.0%	0.0%
Investments in joint ventures	1,787,086,887	1,840,054,520	12.2%	11.6%
Investment properties	89,977,885	103,857,149	0.6%	0.7%
Property, plant and equipment	6,928,083,195	7,549,859,170	47.2%	47.6%
Goodwill	17,726,430	17,112,763	0.1%	0.1%
Intangible assets	4,376,580,242	4,669,898,201	29.8%	29.4%
Deferred tax assets	2,409,825	1,623,005	0.0%	0.0%
Other non-current assets	13,201,756	11,871,739	0.1%	0.1%
Total non-current assets	13,227,074,755	14,228,516,486	90.0%	89.7%
Total assets	14,689,235,197	15,869,990,957	100%	100%
Liabilities and equity				
Current liabilities				
Short-term borrowings from financial institutions	98,794,277	98,470,171	0.7%	0.6%
Construction and other payables	278,445,782	199,267,433	1.9%	1.3%
Current portion of right in power purchase			0.0%	0.0%
agreement payables	-	2,056,215	0.0%	0.0%
Current portion of finance lease liabilities	2,619,884	7,195,003	0.0%	0.0%
Current portion of long-term borrowings	437,241,304	737,755,685	3.0%	4.6%
Short-term loan from subsidiary	-	-	0.0%	0.0%
Current portion of debentures	2,048,530,153	949,800,983	13.9%	6.0%
Income tax payable	1,349,856	4,404,066	0.0%	0.0%
Other current liabilities	15,484,548	26,403,034	0.1%	0.2%
Total current liabilities	2,882,465,804	2,025,352,590	19.6%	12.8%
Non-current liabilities				
Right in power purchase agreement payables	-	73,328,549	0.0%	0.5%
Finance lease liabilities	7,979,672	13,280,673	0.1%	0.1%
Long-term borrowings from financial institutions	5,922,634,037	5,736,434,390	40.3%	36.1%
Debentures	949,065,843	2,345,024,775	6.5%	14.8%
Employee benefit obligations	8,606,509	13,521,825	0.1%	0.1%
Provision for decommissioning costs	2,454,578	2,584,824	0.0%	0.0%
Deferred tax liabilities	1,335,446	28,066,973	0.0%	0.2%
Other non-current liabilities	72,000	72,000	0.0%	0.0%
Total non-current liabilities	6,892,148,085	8,212,314,009	46.9%	51.7%
Total liabilities	9,774,613,889	10,237,666,599	66.5%	64.5%
Equity				
Share capital				
Authorised share capital				
	2,450,250,000	2,477,474,454	16.7%	15.6%
Issued and paid-up share capital				
	1,905,749,580	2,117,716,281	13.0%	13.3%
Premium on ordinary shares	727,554,273	1,045,504,325	5.0%	6.6%
Retained earnings				
Appropriated-legal reserve	63,972,012	81,303,726	0.4%	0.5%
Unappropriated retained earnings	2,207,230,671	2,856,783,618	15.0%	18.0%
Other components of equity	(134,119,095)	(473,307,381)	-0.9%	-3.0%
Equity attributable to owners of the parent	4,770,387,441	5,628,000,569	32.5%	35.5%
Non-controlling interests	144,233,867	4,323,789	1.0%	0.0%
Total equity	4,914,621,308	5,632,324,358	33.5%	35.5%
Total liabilities and equity	14,689,235,197	15,869,990,957	100.0%	100.0%

Source Team's estimate

Table 2.2 Common Size Analysis of Income Statement

Thai Solar Energy Public Company Limited				
P&L				
Income Statement				
	Consolidated financial statements		Common Size P&L	
	2019	2018	2019	2018
	Baht	Baht	%	%
Revenue from sales	1,235,447,207	496,417,874	100%	100%
Subsidy for adders	68,702,780	22,339,621	6%	5%
Management service fee income	44,741,114	42,610,585	4%	9%
Cost of sales and services	(613,057,955)	(228,530,165)	50%	46%
Gross profit (loss)	735,833,146	332,837,915	60%	67%
Dividends income	56	53	0%	0%
Other income	92,716,644	156,191,219	8%	31%
Administrative expenses	(233,345,785)	(206,642,688)	19%	42%
Depreciation expenses	(298,300,124)	(145,968,764)	24%	29%
(Loss) gain on exchange rate	(5,414,481)	(47,475)	-0.4%	0%
Other expenses	-	(296,000,000)	0.0%	60%
Finance costs	(147,191,521)	(123,240,033)	12%	25%
Share of profit from joint ventures	659,517,685	610,188,427	53%	123%
Profit (loss) before income tax	803,815,620	327,318,654	65%	66%
Income tax	(5,073,121)	(83,576,890)	0.4%	17%
Profit (loss) for the year	798,742,499	243,741,764	65%	49%

Remarks:

- Green highlight is amount that materiality.

- Orange highlight is amount that immateriality

Source Team's estimate

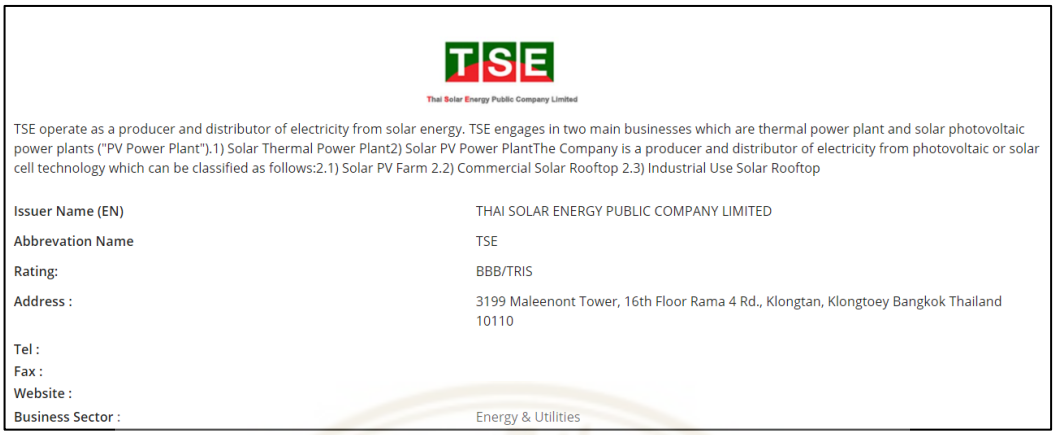
Common size Analysis

Common size is adopted for financial statements and income statement of TSE for the period of 2018 and 2019. Following points are the conclusion from our observation;

- The company's total asset is consolidated in non-current asset which consists of massive portion of Property, plant and equipment which accounted for 47% of total asset. This is common in this industry as company possess huge amount of investment for plant construction and solar equipment.

- Intangible Asset is also significant component which is accounted for almost 30% of total asset as the company own several patens for its initiative and technology used in renewable energy production.
- Major source of fund of the company arrived from Long term borrowing which represented almost 40% of total assets. Company borrowing behavior in line with its operation and investment as construction for each production site requires times and output can be seen in a long run.
- Company also raised fund through Debenture which considered as long-term borrowing as well. However, only slight portion took place in 2018 and 2019.
- Main company's cost structure is from costs of sale and services which is steady between 2018 and 2019 which give the company a plus side as it shows the effort of well managing in term of production cost. As a result, the firm can generate gross profit accounted for more than 60% of revenue.
- Fortunately, company's administrative expense has been decreased significantly from 2018. This is strong support for effective cost management of the company.
- Other expense in 2018 is one-time off adjustment for impairment charged on Property, plant, and equipment especially high portion in power plants.
- As company possess the right of each power plants through subsidiaries and joint ventures so more than 50% of its revenue come from profit sharing based on selling capacity of each power plant.
- Due to huge amount of investment in Property, plant and equipment thus high percentage of depreciation shall be expected. The company depreciation percentage to sale stay the same at 25-29% in both 2018 and 2019.
- Significant increase in revenue from sale in 2019 when compare to 2018. Company's revenue is doubling due to an increase in FIT.

2.8 TRIS Credit Rating



Thai Solar Energy Public Company Limited

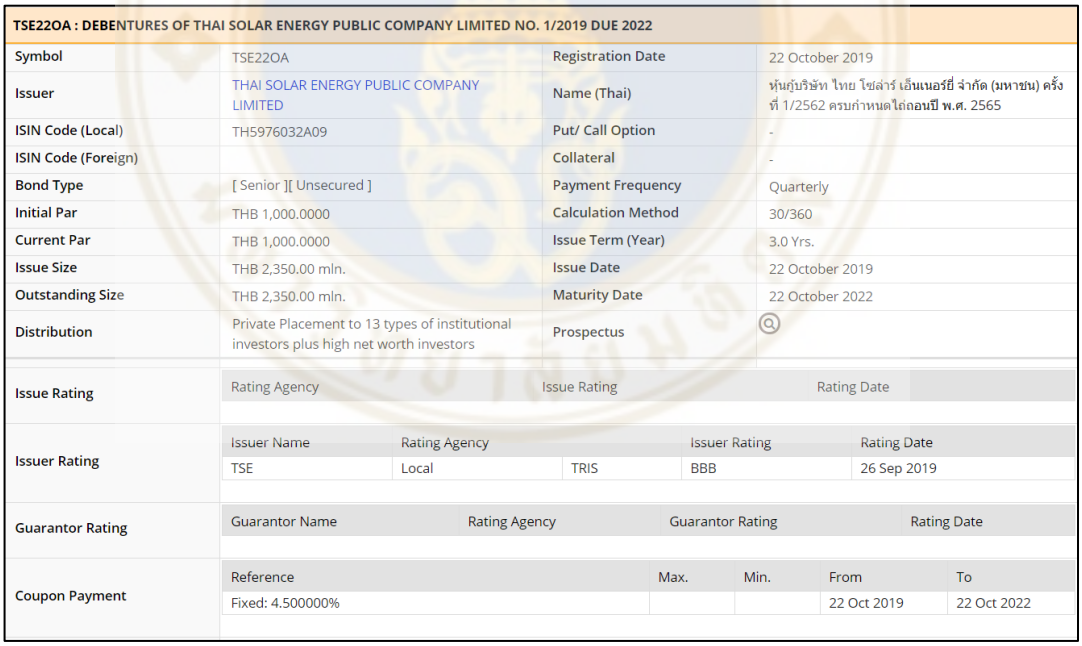
TSE operate as a producer and distributor of electricity from solar energy. TSE engages in two main businesses which are thermal power plant and solar photovoltaic power plants ("PV Power Plant").1) Solar Thermal Power Plant2) Solar PV Power PlantThe Company is a producer and distributor of electricity from photovoltaic or solar cell technology which can be classified as follows:2.1) Solar PV Farm 2.2) Commercial Solar Rooftop 2.3) Industrial Use Solar Rooftop

Issuer Name (EN)	THAI SOLAR ENERGY PUBLIC COMPANY LIMITED
Abbrevation Name	TSE
Rating:	BBB/TRIS
Address :	3199 Maleenont Tower, 16th Floor Rama 4 Rd., Klongtan, Klongtoey Bangkok Thailand 10110
Tel :	
Fax :	
Website :	
Business Sector :	Energy & Utilities

Figure 2.7 TSE company's credit rating rated by TRIS

Source: http://www.thaibma.or.th/EN/Issuer/IssuerDetail.aspx?issuer=tse

2.9 Bond Data



TSE22OA : DEBENTURES OF THAI SOLAR ENERGY PUBLIC COMPANY LIMITED NO. 1/2019 DUE 2022

Symbol	TSE22OA	Registration Date	22 October 2019
Issuer	THAI SOLAR ENERGY PUBLIC COMPANY LIMITED	Name (Thai)	หุ้นกู้บริษัท ไทย โซล่าร์ เอ็นเนอร์ยี่ จำกัด (มหาชน) ครั้งที่ 1/2562 ครบกำหนดไถ่ถอนปี พ.ศ. 2565
ISIN Code (Local)	TH5976032A09	Put/ Call Option	-
ISIN Code (Foreign)		Collateral	-
Bond Type	[Senior][Unsecured]	Payment Frequency	Quarterly
Initial Par	THB 1,000.0000	Calculation Method	30/360
Current Par	THB 1,000.0000	Issue Term (Year)	3.0 Yrs.
Issue Size	THB 2,350.00 mln.	Issue Date	22 October 2019
Outstanding Size	THB 2,350.00 mln.	Maturity Date	22 October 2022
Distribution	Private Placement to 13 types of institutional investors plus high net worth investors	Prospectus	

Issue Rating

Rating Agency	Issue Rating	Rating Date

Issuer Rating

Issuer Name	Rating Agency		Issuer Rating	Rating Date
TSE	Local	TRIS	BBB	26 Sep 2019

Guarantor Rating

Guarantor Name	Rating Agency	Guarantor Rating	Rating Date

Coupon Payment

Reference	Max.	Min.	From	To
Fixed: 4.500000%			22 Oct 2019	22 Oct 2022

Figure 2.8 TSE Bond Details (TSE220A)

Source: http://www.thaibma.or.th/EN/Issuer/IssuerDetail.aspx?issuer=tse

TSE204A : DEBENTURES OF THAI SOLAR ENERGY PUBLIC COMPANY LIMITED NO. 1/2017 DUE 2020

Symbol	TSE204A	**Registration Date**	5 April 2017
Issuer	THAI SOLAR ENERGY PUBLIC COMPANY LIMITED	**Name (Thai)**	หุ้นกู้บริษัท ไทย โซล่าร์ เอ็นเนอร์ยี่ จำกัด (มหาชน) ครั้งที่ 1/2560 ครบกำหนดไถ่ถอนปี พ.ศ. 2563
ISIN Code (Local)	TH597603U406	**Put/ Call Option**	-
ISIN Code (Foreign)		**Collateral**	-
Bond Type	[Senior][Unsecured]	**Payment Frequency**	
Initial Par	THB 1,000.0000	**Calculation Method**	30/360
Current Par	THB 0.0000	**Issue Term (Year)**	3.0 Yrs.
Issue Size	THB 950.00 mln.	**Issue Date**	5 April 2017
Outstanding Size	THB 0.00 mln.	**Maturity Date**	5 April 2020
Distribution	Private Placement to 13 types of institutional investors plus high net worth investors	**Prospectus**	

Issue Rating

Rating Agency	Issue Rating	Rating Date

Issuer Rating

Issuer Name	Rating Agency		Issuer Rating	Rating Date
TSE	Local	TRIS	BBB	26 Sep 2019

Guarantor Rating

Guarantor Name	Rating Agency	Guarantor Rating	Rating Date

Coupon Payment

Reference	Max.	Min.	From	To
Fixed: 4.500000%			5 Apr 2017	5 Apr 2020

Figure 2.9 TSE Bond Details (TSE204A)

Source: http://www.thaibma.or.th/EN/Issuer/IssuerDetail.aspx?issuer=tse

TSE204A : DEBENTURES OF THAI SOLAR ENERGY PUBLIC COMPANY LIMITED NO. 1/2017 DUE 2020

Date	Executed			Weighted Average Executed			Spread (bp)	Remark
	Price(%)	Yield(%)	Value (THB)	Price(%)	Yield(%)	Value (THB)		
03-Dec-2019	100.138005	4.050000	1,008,777.31	100.088112	4.199926	2,016,556.26	278	SL
20-Sep-2019	100.313200	3.900000	1,001,775.84	100.183467	4.149675	2,000,953.64	248	SL
31-May-2018	100.163096	4.400000	5,045,141.10	100.119402	4.424989	10,085,910.90	266	
17-May-2018	100.346041	4.300000	2,018,263.28	100.256797	4.349956	4,032,953.64	265	SL
27-Jul-2017	100.489654	4.300000	3,057,963.60	100.426848	4.324985	6,112,156.53	275	SL
11-May-2017	100.258466	4.400000	2,015,032.34	100.137813	4.444946	12,074,218.66	270	SL
09-May-2017	100.259419	4.400000	2,014,311.66	100.138235	4.444946	8,047,540.20	270	SL

Remark: The coupon (%) of Inflation Linked Bond is real coupon (%). Interest, par value, principal and total payment values are unadjusted by inflation.

Figure 2.10 TSE Bond Pricing (TSE204A)

Source: http://www.thaibma.or.th/EN/Issuer/IssuerDetail.aspx?issuer=tse

2.10 Beta

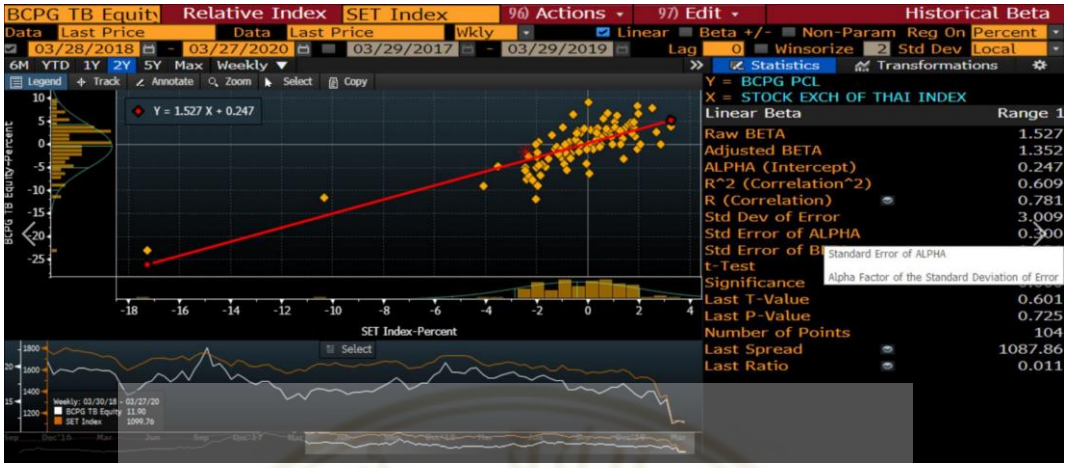


Figure 2.11 BCPG 2-Year Adjusted Beta

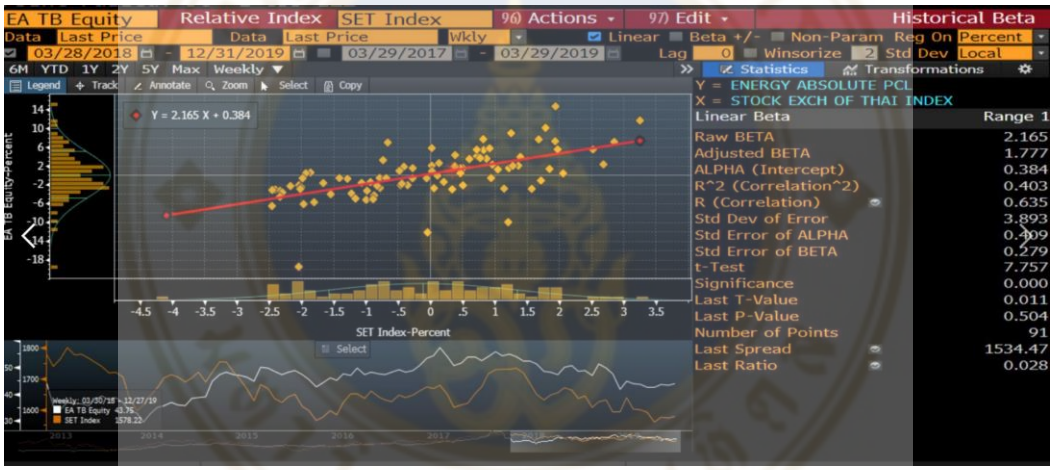


Figure 2.12 EA 2-Year Adjusted Beta

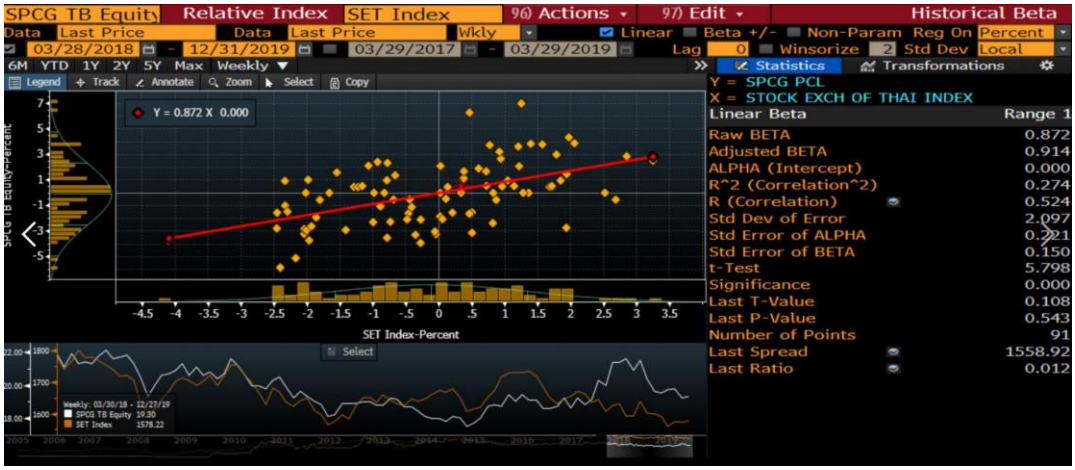


Figure 2.13 SPCG 2-Year Adjusted Beta

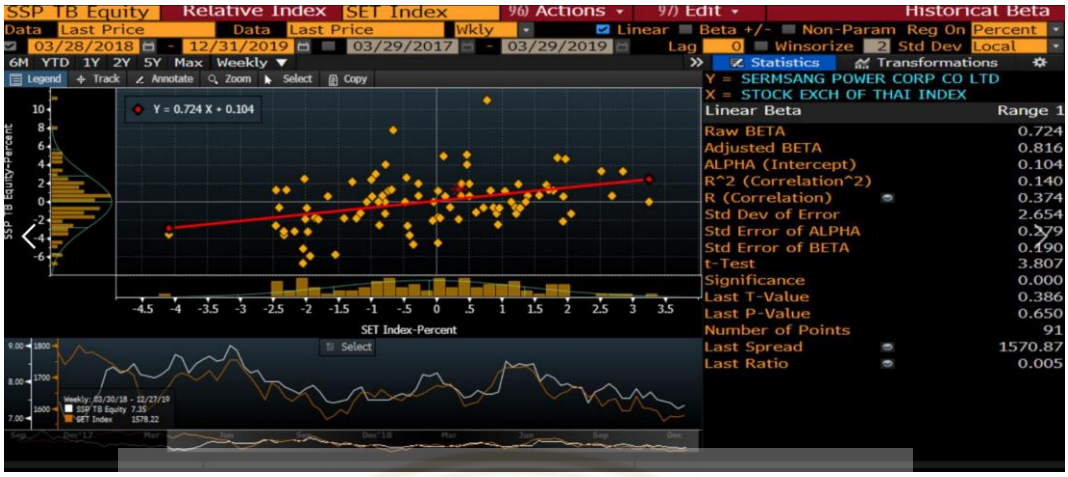


Figure 2.14 SSP 2-Year Adjusted Beta

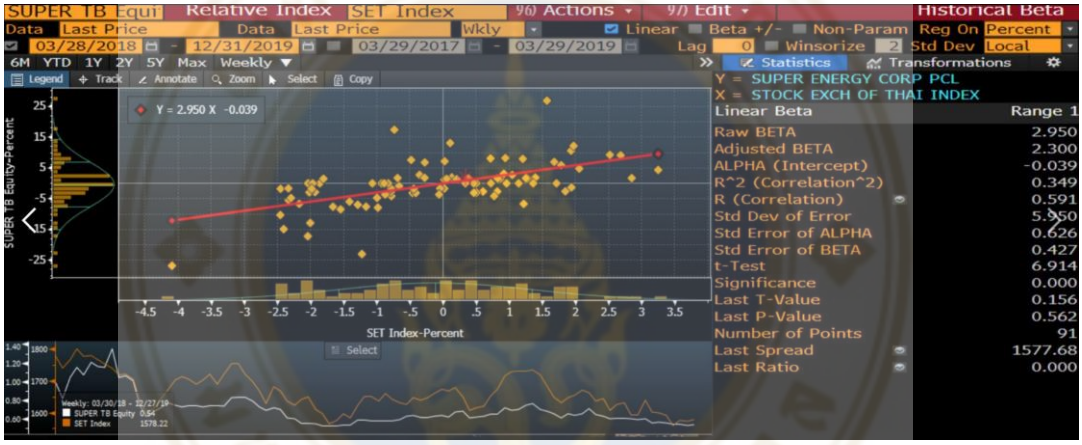


Figure 2.15 SUPER 2-Year Adjusted Beta

2.11 Solar Irradiation Data

Table 2.3 SSE1-PV01 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.3553692,99.4707483
Location:	Lat, Lon: 14.35, 97.95
Lat (deg N):	14.35
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased	10.04
Capacity Factor (%)	15.5
Project	SSE-PV01

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	971,971.69	5.34
2	952,511.13	5.84
3	1,154,760.75	6.36
4	1,135,929.50	6.55
5	883,774.56	4.78
6	749,444.56	4.10
7	757,612.31	4.02
8	721,321.50	3.84
9	736,027.25	4.13
10	958,701.06	5.28
11	914,881.56	5.22
12	951,095.81	5.19
Total	**10,888,031.69**	**60.65**

Source Team's estimate

Table 2.4 SSE1-PV02 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.6345263,99.8906999
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	No utility data available
Capacity Factor (%)	13.7
Project	SSE1-PV02

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	661,835.19	3.63
2	710,493.81	4.28
3	944,098.50	5.21
4	949,349.88	5.36
5	923,621.00	5.02
6	930,991.81	5.15
7	894,035.44	4.80
8	787,551.19	4.21
9	772,402.19	4.28
10	719,707.50	3.86
11	652,700.56	3.70
12	621,612.25	3.42
Total	**9,568,399.31**	**52.90**

Source Team's estimate

Table 2.5 SSE1-PV03 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.7732614,99.9510646
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	13.7
Project	SSE1-PV03

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	661,835.19	3.63
2	710,493.81	4.28
3	944,098.50	5.21
4	949,349.88	5.36
5	923,621.00	5.02
6	930,991.81	5.15
7	894,035.44	4.80
8	787,551.19	4.21
9	772,402.19	4.28
10	719,707.50	3.86
11	652,700.56	3.70
12	621,612.25	3.42
Total	**9,568,399.31**	**52.90**

Source Team's estimate

Table 2.6 SSE1-PV04 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.8712691,99.8290513
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	13.7
Project	SSE1-PV04

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	661,835.19	3.63
2	710,493.81	4.28
3	944,098.50	5.21
4	949,349.88	5.36
5	923,621.00	5.02
6	930,991.81	5.15
7	894,035.44	4.80
8	787,551.19	4.21
9	772,402.19	4.28
10	719,707.50	3.86
11	652,700.56	3.70
12	621,612.25	3.42
Total	**9,568,399.31**	**52.90**

Source Team's estimate

Table 2.7 SSE1-PV05 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.8704264,99.8315012
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	13.7
Project	SSE1-PV05

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	661,835.19	3.63
2	710,493.81	4.28
3	944,098.50	5.21
4	949,349.88	5.36
5	923,621.00	5.02
6	930,991.81	5.15
7	894,035.44	4.80
8	787,551.19	4.21
9	772,402.19	4.28
10	719,707.50	3.86
11	652,700.56	3.70
12	621,612.25	3.42
Total	**9,568,399.31**	**52.90**

Source Team's estimate

Table 2.8 SSE1-PV06 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.8244512,99.4236553
Location:	Lat, Lon: 13.85, 97.95
Lat (deg N):	13.85
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	180
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	16.3
Project	SSE1-PV06

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	1,159,174.75	6.42
2	1,085,020.50	6.64
3	1,193,084.63	6.63
4	1,093,523.50	6.32
5	751,631.06	4.05
6	679,452.50	3.70
7	676,526.88	3.54
8	700,946.50	3.69
9	772,381.13	4.34
10	1,036,717.38	5.72
11	1,118,613.63	6.39
12	1,145,265.50	6.29
Total	**11,412,337.94**	**63.74**

Source Team's estimate

Table 2.9 SSE1-PV07 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.873558,99.5017661
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	20
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	13.7
Project	SSE1-PV07

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	673,339.75	3.68
	2	715,737.75	4.31
	3	948,413.13	5.24
	4	947,585.88	5.35
	5	922,312.81	5.01
	6	929,019.81	5.14
	7	896,620.38	4.81
	8	787,047.19	4.20
	9	778,048.63	4.31
	10	724,522.50	3.88
	11	664,362.31	3.75
	12	634,952.63	3.48
	Total	**9,621,962.75**	**53.18**

Source Team's estimate

Table 2.10 SSE1-PV08 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.218525,99.7336386
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	14.6
Project	SSE1-PV08

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	832,631.13	4.55
2	836,333.69	5.05
3	1,023,135.88	5.67
4	955,267.56	5.41
5	890,721.81	4.85
6	879,456.50	4.88
7	841,699.00	4.52
8	779,079.63	4.17
9	786,551.31	4.37
10	786,391.88	4.22
11	799,468.19	4.51
12	813,852.38	4.44
Total	**10,224,588.94**	**56.62**

Source Team's estimate

Table 2.11 SSE1-PV09 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.4014773,99.8288037
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	45
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.01
Capacity Factor (%)	14.0
Project	SSE1-PV09

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	715,466.19	3.90
	2	742,129.81	4.46
	3	966,889.06	5.34
	4	945,724.38	5.35
	5	915,457.94	4.98
	6	918,403.44	5.09
	7	892,839.44	4.79
	8	784,960.63	4.20
	9	788,268.13	4.37
	10	741,284.56	3.97
	11	703,667.50	3.96
	12	683,667.25	3.72
	Total	**9,798,758.31**	**54.14**

Source Team's estimate

Table 2.12 SSE1-PV10 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.7394269,100.1287375
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	60
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	10.04
Capacity Factor (%)	14.2
Project	SSE1-PV10

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	751,393.38	4.09
2	765,899.00	4.61
3	983,370.94	5.44
4	945,750.31	5.35
5	909,566.94	4.95
6	908,815.25	5.04
7	887,412.31	4.77
8	783,394.50	4.19
9	795,474.13	4.41
10	755,791.63	4.05
11	735,868.50	4.14
12	724,200.94	3.94
Total	**9,946,937.81**	**54.97**

Source Team's estimate

Table 2.13 INS Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.5542857,100.3540097
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	2000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	90
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	5.66
Capacity Factor (%)	14.7
Project	INS

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	208,616.41	4.55
2	205,771.81	4.96
3	255,420.95	5.67
4	236,813.69	5.36
5	224,017.53	4.87
6	221,581.55	4.91
7	217,965.78	4.68
8	195,044.81	4.17
9	202,494.55	4.50
10	197,312.98	4.24
11	202,030.58	4.55
12	204,066.22	4.43
Total	**2,571,136.86**	**56.89**

Source Team's estimate

Table 2.14 SSP Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	11.4251263,99.5567533
Location:	Lat, Lon: 11.45, 97.95
Lat (deg N):	11.45
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	8000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	11.54
Capacity Factor (%)	16.0
Project	SSP

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	1,026,260.06	5.57
	2	985,736.44	6.05
	3	1,156,396.00	6.44
	4	1,133,996.00	6.60
	5	863,084.19	4.66
	6	798,156.94	4.40
	7	775,772.94	4.10
	8	812,348.25	4.31
	9	784,896.63	4.35
	10	917,466.63	5.03
	11	963,316.13	5.46
	12	964,761.13	5.20
	Total	**11,182,191.31**	**62.18**

Source Team's estimate

Table 2.15 SLC Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	12.6177363,98.9377384
Location:	Lat, Lon: 12.65, 97.95
Lat (deg N):	12.65
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	60
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	5.66
Capacity Factor (%)	13.9
Project	SLC

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	102,829.80	4.50
2	104,289.85	5.11
3	125,329.61	5.59
4	131,982.27	6.14
5	99,689.82	4.29
6	91,840.54	4.03
7	84,802.74	3.57
8	87,567.17	3.68
9	89,672.82	3.97
10	102,264.02	4.44
11	99,553.96	4.47
12	95,315.59	4.13
Total	**1,215,138.20**	**53.93**

Source Team's estimate

Table 2.16 BSS Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.3815844,100.6063156
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	5000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	45
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	5.66
Capacity Factor (%)	14.0
Project	BSS

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	447,166.44	3.90
2	463,831.03	4.46
3	604,305.81	5.34
4	591,077.63	5.35
5	572,161.13	4.98
6	574,002.13	5.09
7	558,024.81	4.79
8	490,600.56	4.20
9	492,667.22	4.37
10	463,302.94	3.97
11	439,792.28	3.96
12	427,291.91	3.72
Total	**6,124,223.88**	**54.14**

Source Team's estimate

Table 2.17 BSE Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	17.6967967,102.4951128
Location:	HA TINH, VIETNAM
Lat (deg N):	18.29
Long (deg E):	105.78
Elev (m):	91
DC System Size (kW):	5000
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	4.12
Capacity Factor (%)	10.6
Project	BSE

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	233,470.58	1.86
2	255,603.13	2.32
3	436,834.41	3.73
4	425,630.28	3.76
5	614,843.44	5.51
6	537,835.69	4.92
7	440,163.06	3.82
8	553,431.00	4.90
9	310,862.75	2.78
10	337,833.81	2.88
11	259,906.05	2.27
12	230,680.75	1.93
Total	**4,637,094.94**	**40.69**

Source Team's estimate

Table 2.18 TSER-RT01 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.7845899,100.6821341
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	155
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	15.3
Project	TSER-RT01

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	121,036.22	5.37
	2	114,885.73	5.63
	3	134,364.56	6.05
	4	117,659.70	5.39
	5	107,242.14	4.71
	6	104,200.30	4.65
	7	102,785.39	4.45
	8	95,771.57	4.13
	9	102,258.86	4.60
	10	104,861.46	4.57
	11	115,061.46	5.28
	12	120,690.45	5.34
	Total	**1,340,817.84**	**60.17**

Source Team's estimate

Table 2.19 TSER-RT02 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	18.1195413,100.1366767
Location:	Lat, Lon: 18.15, 97.95
Lat (deg N):	18.15
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	130
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	14.9
Project	TSER-RT02

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	117,858.91	5.48
2	114,170.08	6.03
3	126,156.65	6.04
4	121,765.29	6.01
5	109,042.05	5.00
6	93,566.60	4.31
7	92,124.37	4.08
8	94,421.73	4.20
9	104,817.27	4.96
10	114,074.32	5.27
11	110,272.59	5.28
12	110,228.26	5.06
Total	**1,308,498.10**	**61.72**

Source Team's estimate

Table 2.20 TSER-RT03 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	15.7387478,100.1164451
Location:	Lat, Lon: 15.75, 97.95
Lat (deg N):	15.75
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	30
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	13.2
Project	TSER-RT03

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	82,557.00	3.75
2	92,278.88	4.58
3	118,891.80	5.31
4	125,742.46	5.85
5	107,114.19	4.68
6	93,952.47	4.15
7	88,178.80	3.81
8	88,506.19	3.77
9	91,081.91	4.10
10	98,755.43	4.41
11	85,127.80	3.95
12	79,808.58	3.59
Total	**1,151,995.49**	**51.96**

Table 2.21 TSER-RT04 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	10.5030969,99.1430209
Location:	Lat, Lon: 10.55, 97.95
Lat (deg N):	10.55
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	15.9
Project	TSER-RT04

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	125,641.38	5.54
2	123,782.62	6.13
3	141,028.97	6.36
4	137,570.22	6.53
5	106,331.93	4.66
6	97,036.25	4.27
7	105,864.95	4.53
8	104,706.88	4.46
9	103,455.98	4.62
10	115,917.98	5.09
11	117,612.76	5.38
12	114,672.27	5.07
Total	**1,393,622.16**	**62.64**

Source Team's estimate

Table 2.22 TSER-RT05 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	9.11766, 99.299472
Location:	Lat, Lon: 9.15, 97.95
Lat (deg N):	9.15
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	100
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	15.4
Project	TSER-RT05

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	124,435.24	5.51
2	118,616.18	5.88
3	134,308.03	6.07
4	127,417.11	6.01
5	107,170.51	4.68
6	96,770.02	4.37
7	102,195.29	4.39
8	107,578.34	4.66
9	98,707.73	4.46
10	108,289.20	4.82
11	113,453.14	5.17
12	113,444.45	5.00
Total	**1,352,385.24**	**61.03**

Source Team's estimate

Table 2.23 TSER-RT06 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	8.3859584,99.9773017
Location:	Lat, Lon: 8.45, 97.95
Lat (deg N):	8.45
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	16.0
Project	TSER-RT06

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	121,909.55	5.40
2	122,335.06	6.05
3	136,664.08	6.20
4	122,987.64	5.76
5	115,127.82	5.00
6	109,540.13	4.90
7	109,818.60	4.78
8	120,515.52	5.19
9	104,170.45	4.74
10	111,792.18	4.88
11	111,943.44	5.17
12	112,500.63	4.98
Total	**1,399,305.09**	**63.03**

Table 2.24 TSER-RT07 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	6.9829405,100.4786503
Location:	Lat, Lon: 7.05, 97.95
Lat (deg N):	7.05
Long (deg E):	97.95
Elev (m):	0
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	93
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	14.9
Project	TSER-RT07

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	114,247.48	5.02
2	112,645.53	5.52
3	120,786.30	5.39
4	104,817.83	4.83
5	110,861.02	4.90
6	109,845.45	4.95
7	112,051.61	4.90
8	117,981.88	5.18
9	106,547.22	4.84
10	100,995.10	4.44
11	97,478.62	4.44
12	101,194.97	4.42
Total	**1,309,453.01**	**58.85**

Source Team's estimate

Table 2.25 TSER-RT08 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	15.2433607,104.8220489
Location:	HA TINH, VIETNAM
Lat (deg N):	18.29
Long (deg E):	105.78
Elev (m):	91
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	233
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	11.4
Project	TSER-RT08

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	56,634.48	2.27
2	60,230.75	2.77
3	102,802.09	4.48
4	89,393.12	4.00
5	119,441.28	5.44
6	102,458.28	4.75
7	84,833.70	3.71
8	110,891.15	4.99
9	64,547.18	2.94
10	79,137.52	3.43
11	67,479.63	2.98
12	64,065.06	2.69
Total	**1,001,914.22**	**44.46**

Source Team's estimate

Table 2.26 TSER-RT09 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	14.6594671,101.3926167
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	14.4
Project	TSER-RT09

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	102,805.36	4.55
2	103,297.11	5.05
3	126,212.39	5.67
4	118,059.07	5.41
5	110,141.69	4.85
6	108,935.18	4.88
7	104,203.41	4.52
8	96,475.27	4.17
9	97,284.38	4.37
10	97,254.96	4.22
11	98,720.98	4.51
12	100,495.14	4.44
Total	**1,263,884.95**	**56.62**

Source Team's estimate

Table 2.27 TSER-RT10 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.7991245,100.6127508
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	25
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	13.6
Project	TSER-RT10

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	84,120.44	3.71
2	89,034.02	4.33
3	117,440.04	5.25
4	117,078.70	5.35
5	113,888.99	5.01
6	114,848.80	5.14
7	110,910.55	4.81
8	97,423.98	4.20
9	96,488.70	4.32
10	89,996.36	3.90
11	82,955.21	3.78
12	79,528.75	3.51
Total	**1,193,714.55**	**53.32**

Source Team's estimate

Table 2.28 TSER-RT11 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.8200045,100.4452504
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	20
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	13.6
Project	TSER-RT11

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	83,364.04	3.68
2	88,584.91	4.31
3	117,138.89	5.24
4	117,140.02	5.35
5	114,009.91	5.01
6	115,029.23	5.14
7	110,932.18	4.81
8	97,464.30	4.20
9	96,271.38	4.31
10	89,696.90	3.88
11	82,232.23	3.75
12	78,646.09	3.48
Total	**1,190,510.09**	**53.18**

Source Team's estimate

Table 2.29 TSER-RT12 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.7131982,100.4795616
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	300
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	14.0
Project	TSER-RT12

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	92,711.81	4.09
	2	96,119.53	4.68
	3	121,520.56	5.45
	4	117,768.65	5.39
	5	111,950.48	4.93
	6	111,836.77	5.01
	7	106,646.68	4.63
	8	96,904.67	4.18
	9	95,839.34	4.30
	10	93,196.82	4.04
	11	90,020.55	4.10
	12	89,250.15	3.94
	Total	**1,223,766.02**	**54.74**

Source Team's estimate

Table 2.30 TSER-RT13 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.766061,100.6403032
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	87
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	14.5
Project	TSER-RT13

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	101,972.76	4.50
	2	100,934.00	4.92
	3	125,507.90	5.64
	4	117,016.51	5.36
	5	110,942.03	4.88
	6	110,063.01	4.92
	7	108,097.58	4.69
	8	96,642.31	4.18
	9	99,982.08	4.49
	10	97,162.95	4.22
	11	98,863.39	4.51
	12	99,638.29	4.38
	Total	**1,266,822.80**	**56.70**

Source Team's estimate

Table 2.31 TSER-RT14 Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	13.8552468,100.5413131
Location:	BANGKOK, THAILAND
Lat (deg N):	13.92
Long (deg E):	100.6
Elev (m):	12
DC System Size (kW):	1000
Module Type:	Standard
Array Type:	Fixed (roof mount)
Array Tilt (deg):	20
Array Azimuth (deg):	270
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	6.16
Capacity Factor (%)	14.4
Project	TSER-RT14

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	102,805.36	4.55
	2	103,297.11	5.05
	3	126,212.39	5.67
	4	118,059.07	5.41
	5	110,141.69	4.85
	6	108,935.18	4.88
	7	104,203.41	4.52
	8	96,475.27	4.17
	9	97,284.38	4.37
	10	97,254.96	4.22
	11	98,720.98	4.51
	12	100,495.14	4.44
	Total	**1,263,884.95**	**56.62**

Source Team's estimate

Table 2.32 Kuno Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	36.1590226,139.7759325
Location:	TOKYO HYAKURI, JAPAN
Lat (deg N):	36.18
Long (deg E):	140.42
Elev (m):	35
DC System Size (kW):	500
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	36
Capacity Factor (%)	9.5
Project	Kuno

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	16,995.65	1.45
2	23,104.20	2.10
3	35,714.05	2.82
4	48,341.28	3.99
5	54,329.23	4.41
6	45,750.76	3.88
7	49,499.27	4.10
8	50,691.17	4.29
9	34,755.61	2.97
10	26,950.50	2.24
11	17,030.41	1.52
12	13,058.05	1.14
Total	**416,220.18**	**34.93**

Source Team's estimate

Table 2.33 Shima Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	34.3378441,136.8130642
Location:	NAGOYA, JAPAN
Lat (deg N):	35.25
Long (deg E):	136.93
Elev (m):	17
DC System Size (kW):	1250
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	26
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	32
Capacity Factor (%)	10.3
Project	Shima

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	48,294.18	1.57
2	66,279.26	2.36
3	96,492.96	3.03
4	128,052.91	4.26
5	139,856.72	4.59
6	128,137.55	4.40
7	124,142.19	4.21
8	135,631.30	4.69
9	92,004.27	3.21
10	78,165.36	2.62
11	51,811.11	1.81
12	42,327.95	1.45
Total	**1,131,195.77**	**38.22**

Source Team's estimate

Table 2.34 Hikeme Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	36.0180645,136.1852648
Location:	NAGOYA, JAPAN
Lat (deg N):	35.25
Long (deg E):	136.93
Elev (m):	17
DC System Size (kW):	1500
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	74
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	32
Capacity Factor (%)	11.6
Project	Hikeme

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	80,301.81	2.09
	2	102,317.66	2.95
	3	131,392.86	3.42
	4	164,378.77	4.57
	5	171,710.30	4.72
	6	153,948.25	4.42
	7	151,891.89	4.31
	8	170,871.81	4.94
	9	118,660.89	3.45
	10	112,795.23	3.10
	11	84,347.32	2.37
	12	77,849.33	2.09
	Total	**1,520,466.12**	**42.45**

Source Team's estimate

Table 2.35 Ryugasaki Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	35.9405592,140.1038637
Location:	TOKYO HYAKURI, JAPAN
Lat (deg N):	36.18
Long (deg E):	140.42
Elev (m):	35
DC System Size (kW):	1750
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	36
Capacity Factor (%)	9.5
Project	Ryugasaki

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	59,484.77	1.45
	2	80,864.72	2.10
	3	124,999.12	2.82
	4	169,194.44	3.99
	5	190,152.41	4.41
	6	160,127.59	3.88
	7	173,247.59	4.10
	8	177,419.14	4.29
	9	121,644.65	2.97
	10	94,326.77	2.24
	11	59,606.43	1.52
	12	45,703.15	1.14
	Total	**1,456,770.77**	**34.93**

Source Team's estimate

Table 2.36 Sakura Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	36.5680034,137.2266638
Location:	MATSUMOTO, JAPAN
Lat (deg N):	36.25
Long (deg E):	137.97
Elev (m):	611
DC System Size (kW):	1990
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	178
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	32
Capacity Factor (%)	14.7
Project	Sakura

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	176,330.19	3.37
2	186,764.94	3.97
3	243,308.42	4.82
4	266,017.19	5.60
5	248,645.58	5.20
6	220,570.44	4.82
7	227,437.64	4.89
8	255,864.53	5.57
9	190,146.64	4.16
10	199,560.03	4.12
11	165,914.05	3.41
12	174,184.72	3.39
Total	**2,554,744.36**	**53.31**

Source Team's estimate

Table 2.37 Jyoso Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	36.0575834,139.8914357
Location:	TOKYO HYAKURI, JAPAN
Lat (deg N):	36.18
Long (deg E):	140.42
Elev (m):	35
DC System Size (kW):	1250
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	36
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	36
Capacity Factor (%)	9.9
Project	Jyoso

	Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
	1	50,345.41	1.66
	2	65,289.90	2.32
	3	94,306.46	2.96
	4	122,477.77	4.05
	5	135,804.13	4.43
	6	113,791.32	3.87
	7	123,505.30	4.10
	8	127,162.64	4.31
	9	88,355.91	3.02
	10	70,399.38	2.33
	11	48,443.84	1.69
	12	38,916.88	1.32
	Total	**1,078,798.93**	**36.06**

Source Team's estimate

Table 2.38 Hanamizuki Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	36.9966141,136.8604537
Location:	MATSUMOTO, JAPAN
Lat (deg N):	36.25
Long (deg E):	137.97
Elev (m):	611
DC System Size (kW):	13500
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	0
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	36
Capacity Factor (%)	10.4
Project	Hanamizuki

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	459,346.63	1.42
2	643,391.63	2.12
3	1,087,537.00	3.21
4	1,483,204.88	4.57
5	1,555,429.13	4.74
6	1,434,875.50	4.58
7	1,441,542.88	4.52
8	1,505,254.63	4.78
9	990,773.56	3.18
10	789,908.44	2.46
11	477,109.59	1.56
12	381,612.31	1.23
Total	**12,249,986.16**	**38.38**

Source Team's estimate

Table 2.39 Onikoube Solar Radiation Data

PVWatts: Monthly PV Performance Data	
Requested Location:	38.7871875,140.6371329
Location:	TOKYO HYAKURI, JAPAN
Lat (deg N):	36.18
Long (deg E):	140.42
Elev (m):	35
DC System Size (kW):	154730
Module Type:	Standard
Array Type:	Fixed (open rack)
Array Tilt (deg):	20
Array Azimuth (deg):	180
System Losses:	14.08
Invert Efficiency:	96
DC to AC Size Ratio:	1.2
Average Cost of Electricity Purchased from Utility ($/kWh):	36
Capacity Factor (%)	13.2
Project	Onikoube

Month	AC System Output(kWh)	Solar Radiation (kWh/m^2/day)
1	13,728,486.00	3.44
2	14,230,330.00	3.97
3	15,704,145.00	3.98
4	18,100,354.00	4.86
5	18,081,130.00	4.79
6	14,675,227.00	4.05
7	16,139,059.00	4.34
8	17,996,378.00	4.96
9	13,338,768.00	3.69
10	12,816,262.00	3.39
11	12,240,871.00	3.27
12	11,473,636.00	2.90
Total	**178,524,646.00**	**47.65**

Source Team's estimate

2.12 Solar PV Panel Degradation

Table 2.40 Solar PV Panel Annual Degradation by brand

Brand	Annual Degradation	Source
Canadian Solar	0.50%	https://www.canadiansolar.com/wp-content/uploads/2019/12/PV_Bifacial_Module_Warranty_en.pdf
Trina Solar	0.54%	https://static.trinasolar.com/sites/default/files/Trina%20Datasheet_Tallmax_PE15H_NA_2019_B.pdf
jinko Solar	0.55%	https://www.jinkosolar.com/uploads/5e68b5ff/s4.pdf
Hanwha Q-cells	0.60%	https://www.q-cells.com/en/main/products/solar_panels/power_plant/power_plant01.html
Ja Solar	0.50%	https://www.jasolar.com/uploadfile/2020/0123/20200123123450604.pdf

Source Team's estimate

2.13 Energy Output by Project

Table 2.41 SSE1-PV01 Yearly Energy Output

SSE1-PV01 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWh)
31-01-20	31.00	165.47	83.00%	137.3	8,000.00	1,098,708
29-02-20	29.00	169.42	83.00%	140.6	8,000.00	1,124,937
31-03-20	31.00	197.07	83.00%	163.6	8,000.00	1,308,543
30-04-20	30.00	196.51	83.00%	163.1	8,000.00	1,304,852
31-05-20	31.00	148.24	83.00%	123.0	8,000.00	984,299
30-06-20	30.00	122.98	83.00%	102.1	8,000.00	816,558
31-07-20	31.00	124.51	83.00%	103.3	8,000.00	826,757
31-08-20	31.00	119.17	83.00%	98.9	8,000.00	791,289
30-09-20	30.00	123.88	83.00%	102.8	8,000.00	822,576
31-10-20	31.00	163.71	83.00%	135.9	8,000.00	1,087,034
30-11-20	30.00	156.73	83.00%	130.1	8,000.00	1,040,690
31-12-20	31.00	160.84	83.00%	133.5	8,000.00	1,067,967
Total		**1,848.53**	**83.00%**	**1,534.28**	**8,000.00**	**12,274,209.57**

Source Team's estimate

Table 2.42 SSE1-PV02 Yearly Energy Output

SSE1-PV02 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	112.45	83.00%	93.3	8,000.00	746,678
29-02-20	29.00	124.09	83.00%	103.0	8,000.00	823,958
31-03-20	31.00	161.56	83.00%	134.1	8,000.00	1,072,779
30-04-20	30.00	160.71	83.00%	133.4	8,000.00	1,067,139
31-05-20	31.00	155.55	83.00%	129.1	8,000.00	1,032,863
30-06-20	30.00	154.65	83.00%	128.4	8,000.00	1,026,845
31-07-20	31.00	148.71	83.00%	123.4	8,000.00	987,455
31-08-20	31.00	130.37	83.00%	108.2	8,000.00	865,661
30-09-20	30.00	128.39	83.00%	106.6	8,000.00	852,535
31-10-20	31.00	119.54	83.00%	99.2	8,000.00	793,771
30-11-20	30.00	110.91	83.00%	92.1	8,000.00	736,424
31-12-20	31.00	105.96	83.00%	88.0	8,000.00	703,601
Total		**1,612.91**	**83.00%**	**1,338.71**	**8,000.00**	**10,709,708.12**

Source Team's estimate

Table 2.43 SSE1-PV03 Yearly Energy Output

SSE1-PV03 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	112.45	83.00%	93.3	8,000.00	746,678
29-02-20	29.00	124.09	83.00%	103.0	8,000.00	823,958
31-03-20	31.00	161.56	83.00%	134.1	8,000.00	1,072,779
30-04-20	30.00	160.71	83.00%	133.4	8,000.00	1,067,139
31-05-20	31.00	155.55	83.00%	129.1	8,000.00	1,032,863
30-06-20	30.00	154.65	83.00%	128.4	8,000.00	1,026,845
31-07-20	31.00	148.71	83.00%	123.4	8,000.00	987,455
31-08-20	31.00	130.37	83.00%	108.2	8,000.00	865,661
30-09-20	30.00	128.39	83.00%	106.6	8,000.00	852,535
31-10-20	31.00	119.54	83.00%	99.2	8,000.00	793,771
30-11-20	30.00	110.91	83.00%	92.1	8,000.00	736,424
31-12-20	31.00	105.96	83.00%	88.0	8,000.00	703,601
Total		**1,612.91**	**83.00%**	**1,338.71**	**8,000.00**	**10,709,708.12**

Source Team's estimate

Table 2.44 SSE1-PV04 Yearly Energy Output

SSE1-PV04 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	112.45	83.00%	93.3	8,000.00	746,678
29-02-20	29.00	124.09	83.00%	103.0	8,000.00	823,958
31-03-20	31.00	161.56	83.00%	134.1	8,000.00	1,072,779
30-04-20	30.00	160.71	83.00%	133.4	8,000.00	1,067,139
31-05-20	31.00	155.55	83.00%	129.1	8,000.00	1,032,863
30-06-20	30.00	154.65	83.00%	128.4	8,000.00	1,026,845
31-07-20	31.00	148.71	83.00%	123.4	8,000.00	987,455
31-08-20	31.00	130.37	83.00%	108.2	8,000.00	865,661
30-09-20	30.00	128.39	83.00%	106.6	8,000.00	852,535
31-10-20	31.00	119.54	83.00%	99.2	8,000.00	793,771
30-11-20	30.00	110.91	83.00%	92.1	8,000.00	736,424
31-12-20	31.00	105.96	83.00%	88.0	8,000.00	703,601
Total		**1,612.91**	**83.00%**	**1,338.71**	**8,000.00**	**10,709,708.12**

Source Team's estimate

Table 2.45 SSE1-PV05 Yearly Energy Output

SSE1-PV05 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	112.45	83.00%	93.3	8,000.00	746,678
29-02-20	29.00	124.09	83.00%	103.0	8,000.00	823,958
31-03-20	31.00	161.56	83.00%	134.1	8,000.00	1,072,779
30-04-20	30.00	160.71	83.00%	133.4	8,000.00	1,067,139
31-05-20	31.00	155.55	83.00%	129.1	8,000.00	1,032,863
30-06-20	30.00	154.65	83.00%	128.4	8,000.00	1,026,845
31-07-20	31.00	148.71	83.00%	123.4	8,000.00	987,455
31-08-20	31.00	130.37	83.00%	108.2	8,000.00	865,661
30-09-20	30.00	128.39	83.00%	106.6	8,000.00	852,535
31-10-20	31.00	119.54	83.00%	99.2	8,000.00	793,771
30-11-20	30.00	110.91	83.00%	92.1	8,000.00	736,424
31-12-20	31.00	105.96	83.00%	88.0	8,000.00	703,601
Total		**1,612.91**	**83.00%**	**1,338.71**	**8,000.00**	**10,709,708.12**

Source Team's estimate

Table 2.46 SSE1-PV06 Yearly Energy Output

SSE1-PV06 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	199.05	83.00%	165.2	8,000.00	1,321,703
29-02-20	29.00	192.58	83.00%	159.8	8,000.00	1,278,719
31-03-20	31.00	205.52	83.00%	170.6	8,000.00	1,364,656
30-04-20	30.00	189.63	83.00%	157.4	8,000.00	1,259,147
31-05-20	31.00	125.56	83.00%	104.2	8,000.00	833,685
30-06-20	30.00	111.14	83.00%	92.2	8,000.00	737,949
31-07-20	31.00	109.74	83.00%	91.1	8,000.00	728,645
31-08-20	31.00	114.53	83.00%	95.1	8,000.00	760,456
30-09-20	30.00	130.15	83.00%	108.0	8,000.00	864,175
31-10-20	31.00	177.40	83.00%	147.2	8,000.00	1,177,952
30-11-20	30.00	191.65	83.00%	159.1	8,000.00	1,272,523
31-12-20	31.00	194.86	83.00%	161.7	8,000.00	1,293,893
Total		**1,941.79**	**83.00%**	**1,611.69**	**8,000.00**	**12,893,503.21**

Source Team's estimate

Table 2.47 SSE1-PV07 Yearly Energy Output

SSE1-PV07 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	114.20	83.00%	94.8	8,000.00	758,298
29-02-20	29.00	124.92	83.00%	103.7	8,000.00	829,495
31-03-20	31.00	162.33	83.00%	134.7	8,000.00	1,077,880
30-04-20	30.00	160.48	83.00%	133.2	8,000.00	1,065,620
31-05-20	31.00	155.38	83.00%	129.0	8,000.00	1,031,726
30-06-20	30.00	154.33	83.00%	128.1	8,000.00	1,024,757
31-07-20	31.00	149.17	83.00%	123.8	8,000.00	990,509
31-08-20	31.00	130.32	83.00%	108.2	8,000.00	865,346
30-09-20	30.00	129.32	83.00%	107.3	8,000.00	858,680
31-10-20	31.00	120.35	83.00%	99.9	8,000.00	799,103
30-11-20	30.00	112.65	83.00%	93.5	8,000.00	747,982
31-12-20	31.00	107.88	83.00%	89.5	8,000.00	716,312
Total		**1,621.34**	**83.00%**	**1,345.71**	**8,000.00**	**10,765,708.31**

Source Team's estimate

Table 2.48 SSE1-PV08 Yearly Energy Output

SSE1-PV08 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	140.93	83.00%	117.0	8,000.00	935,749
29-02-20	29.00	146.37	83.00%	121.5	8,000.00	971,899
31-03-20	31.00	175.88	83.00%	146.0	8,000.00	1,167,833
30-04-20	30.00	162.22	83.00%	134.6	8,000.00	1,077,129
31-05-20	31.00	150.23	83.00%	124.7	8,000.00	997,496
30-06-20	30.00	146.29	83.00%	121.4	8,000.00	971,337
31-07-20	31.00	140.12	83.00%	116.3	8,000.00	930,379
31-08-20	31.00	129.13	83.00%	107.2	8,000.00	857,437
30-09-20	30.00	131.13	83.00%	108.8	8,000.00	870,691
31-10-20	31.00	130.85	83.00%	108.6	8,000.00	868,818
30-11-20	30.00	135.30	83.00%	112.3	8,000.00	898,381
31-12-20	31.00	137.49	83.00%	114.1	8,000.00	912,913
Total		**1,725.91**	**83.00%**	**1,432.51**	**8,000.00**	**11,460,062.10**

Source Team's estimate

Table 2.49 SSE1-PV09 Yearly Energy Output

SSE1-PV09 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	120.85	83.00%	100.3	8,000.00	802,434
29-02-20	29.00	129.47	83.00%	107.5	8,000.00	859,654
31-03-20	31.00	165.64	83.00%	137.5	8,000.00	1,099,848
30-04-20	30.00	160.35	83.00%	133.1	8,000.00	1,064,738
31-05-20	31.00	154.34	83.00%	128.1	8,000.00	1,024,849
30-06-20	30.00	152.65	83.00%	126.7	8,000.00	1,013,580
31-07-20	31.00	148.62	83.00%	123.4	8,000.00	986,854
31-08-20	31.00	130.07	83.00%	108.0	8,000.00	863,692
30-09-20	30.00	131.11	83.00%	108.8	8,000.00	870,541
31-10-20	31.00	123.15	83.00%	102.2	8,000.00	817,727
30-11-20	30.00	118.93	83.00%	98.7	8,000.00	789,668
31-12-20	31.00	115.43	83.00%	95.8	8,000.00	766,426
Total		**1,650.60**	**83.00%**	**1,370.00**	**8,000.00**	**10,960,011.82**

Source Team's estimate

Table 2.50 SSE1-PV10 Yearly Energy Output

SSE1-PV10 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	126.75	83.00%	105.2	8,000.00	841,633
29-02-20	29.00	133.63	83.00%	110.9	8,000.00	887,271
31-03-20	31.00	168.68	83.00%	140.0	8,000.00	1,120,024
30-04-20	30.00	160.47	83.00%	133.2	8,000.00	1,065,535
31-05-20	31.00	153.36	83.00%	127.3	8,000.00	1,018,338
30-06-20	30.00	151.07	83.00%	125.4	8,000.00	1,003,084
31-07-20	31.00	147.73	83.00%	122.6	8,000.00	980,911
31-08-20	31.00	129.85	83.00%	107.8	8,000.00	862,228
30-09-20	30.00	132.38	83.00%	109.9	8,000.00	879,030
31-10-20	31.00	125.62	83.00%	104.3	8,000.00	834,127
30-11-20	30.00	124.29	83.00%	103.2	8,000.00	825,279
31-12-20	31.00	121.99	83.00%	101.3	8,000.00	810,037
Total		**1,675.83**	**83.00%**	**1,390.94**	**8,000.00**	**11,127,498.95**

Source Team's estimate

Table 2.51 INS Yearly Energy Output

INS Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	140.91	83.00%	117.0	2,000.00	233,907
29-02-20	29.00	143.83	83.00%	119.4	2,000.00	238,755
31-03-20	31.00	175.63	83.00%	145.8	2,000.00	291,548
30-04-20	30.00	160.91	83.00%	133.6	2,000.00	267,109
31-05-20	31.00	151.12	83.00%	125.4	2,000.00	250,854
30-06-20	30.00	147.26	83.00%	122.2	2,000.00	244,459
31-07-20	31.00	145.05	83.00%	120.4	2,000.00	240,788
31-08-20	31.00	129.38	83.00%	107.4	2,000.00	214,775
30-09-20	30.00	134.96	83.00%	112.0	2,000.00	224,027
31-10-20	31.00	131.42	83.00%	109.1	2,000.00	218,153
30-11-20	30.00	136.61	83.00%	113.4	2,000.00	226,766
31-12-20	31.00	137.36	83.00%	114.0	2,000.00	228,016
Total		**1,734.43**	**83.00%**	**1,439.58**	**2,000.00**	**2,879,157.41**

Source Team's estimate

Table 2.52 SSP Yearly Energy Output

SSP Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	172.79	83.00%	143.4	8,000.00	1,147,313
29-02-20	29.00	175.34	83.00%	145.5	8,000.00	1,164,252
31-03-20	31.00	199.55	83.00%	165.6	8,000.00	1,325,039
30-04-20	30.00	198.06	83.00%	164.4	8,000.00	1,315,125
31-05-20	31.00	144.40	83.00%	119.8	8,000.00	958,798
30-06-20	30.00	132.14	83.00%	109.7	8,000.00	877,431
31-07-20	31.00	127.22	83.00%	105.6	8,000.00	844,753
31-08-20	31.00	133.48	83.00%	110.8	8,000.00	886,290
30-09-20	30.00	130.64	83.00%	108.4	8,000.00	867,451
31-10-20	31.00	156.01	83.00%	129.5	8,000.00	1,035,930
30-11-20	30.00	163.78	83.00%	135.9	8,000.00	1,087,496
31-12-20	31.00	161.29	83.00%	133.9	8,000.00	1,070,982
Total		**1,894.71**	**83.00%**	**1,572.61**	**8,000.00**	**12,580,860.55**

Source Team's estimate

Table 2.53 SLC Yearly Energy Output

SLC Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	139.64	83.00%	115.9	1,000.00	115,901
29-02-20	29.00	148.16	83.00%	123.0	1,000.00	122,969
31-03-20	31.00	173.33	83.00%	143.9	1,000.00	143,866
30-04-20	30.00	184.23	83.00%	152.9	1,000.00	152,914
31-05-20	31.00	133.03	83.00%	110.4	1,000.00	110,417
30-06-20	30.00	120.81	83.00%	100.3	1,000.00	100,271
31-07-20	31.00	110.60	83.00%	91.8	1,000.00	91,799
31-08-20	31.00	114.12	83.00%	94.7	1,000.00	94,723
30-09-20	30.00	118.97	83.00%	98.7	1,000.00	98,742
31-10-20	31.00	137.77	83.00%	114.4	1,000.00	114,350
30-11-20	30.00	134.20	83.00%	111.4	1,000.00	111,383
31-12-20	31.00	128.00	83.00%	106.2	1,000.00	106,237
Total		**1,642.86**	**83.00%**	**1,363.57**	**1,000.00**	**1,363,570.62**

Source Team's estimate

Table 2.54 BSS Yearly Energy Output

BSS Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	120.85	83.00%	100.3	5,000.00	501,522
29-02-20	29.00	129.47	83.00%	107.5	5,000.00	537,284
31-03-20	31.00	165.64	83.00%	137.5	5,000.00	687,405
30-04-20	30.00	160.35	83.00%	133.1	5,000.00	665,461
31-05-20	31.00	154.34	83.00%	128.1	5,000.00	640,531
30-06-20	30.00	152.65	83.00%	126.7	5,000.00	633,488
31-07-20	31.00	148.62	83.00%	123.4	5,000.00	616,784
31-08-20	31.00	130.07	83.00%	108.0	5,000.00	539,807
30-09-20	30.00	131.11	83.00%	108.8	5,000.00	544,088
31-10-20	31.00	123.15	83.00%	102.2	5,000.00	511,079
30-11-20	30.00	118.93	83.00%	98.7	5,000.00	493,542
31-12-20	31.00	115.43	83.00%	95.8	5,000.00	479,016
Total		**1,650.60**	**83.00%**	**1,370.00**	**5,000.00**	**6,850,007.39**

Source Team's estimate

Table 2.55 BSE Yearly Energy Output

BSE Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	57.68	83.00%	47.9	5,000.00	239,386
29-02-20	29.00	67.40	83.00%	55.9	5,000.00	279,704
31-03-20	31.00	115.78	83.00%	96.1	5,000.00	480,485
30-04-20	30.00	112.77	83.00%	93.6	5,000.00	468,002
31-05-20	31.00	170.68	83.00%	141.7	5,000.00	708,339
30-06-20	30.00	147.72	83.00%	122.6	5,000.00	613,031
31-07-20	31.00	118.38	83.00%	98.3	5,000.00	491,269
31-08-20	31.00	151.75	83.00%	126.0	5,000.00	629,772
30-09-20	30.00	83.50	83.00%	69.3	5,000.00	346,534
31-10-20	31.00	89.13	83.00%	74.0	5,000.00	369,902
30-11-20	30.00	68.16	83.00%	56.6	5,000.00	282,862
31-12-20	31.00	59.91	83.00%	49.7	5,000.00	248,620
Total		**1,242.87**	**83.00%**	**1,031.58**	**5,000.00**	**5,157,904.65**

Source Team's estimate

Table 2.56 TSER-RT01 Yearly Energy Output

TSER-RT01 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	166.53	83.00%	138.2	1,000.00	138,222
29-02-20	29.00	163.15	83.00%	135.4	1,000.00	135,414
31-03-20	31.00	187.49	83.00%	155.6	1,000.00	155,621
30-04-20	30.00	161.61	83.00%	134.1	1,000.00	134,137
31-05-20	31.00	146.05	83.00%	121.2	1,000.00	121,223
30-06-20	30.00	139.58	83.00%	115.9	1,000.00	115,852
31-07-20	31.00	137.94	83.00%	114.5	1,000.00	114,491
31-08-20	31.00	128.15	83.00%	106.4	1,000.00	106,363
30-09-20	30.00	137.94	83.00%	114.5	1,000.00	114,494
31-10-20	31.00	141.67	83.00%	117.6	1,000.00	117,588
30-11-20	30.00	158.50	83.00%	131.6	1,000.00	131,556
31-12-20	31.00	165.59	83.00%	137.4	1,000.00	137,442
Total		**1,834.22**	**83.00%**	**1,522.40**	**1,000.00**	**1,522,403.08**

Source Team's estimate

Table 2.57 TSER-RT02 Yearly Energy Output

TSER-RT02 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	169.86	83.00%	141.0	1,000.00	140,980
29-02-20	29.00	174.99	83.00%	145.2	1,000.00	145,243
31-03-20	31.00	187.28	83.00%	155.4	1,000.00	155,445
30-04-20	30.00	180.31	83.00%	149.7	1,000.00	149,656
31-05-20	31.00	154.88	83.00%	128.6	1,000.00	128,553
30-06-20	30.00	129.43	83.00%	107.4	1,000.00	107,425
31-07-20	31.00	126.51	83.00%	105.0	1,000.00	105,007
31-08-20	31.00	130.10	83.00%	108.0	1,000.00	107,979
30-09-20	30.00	148.91	83.00%	123.6	1,000.00	123,598
31-10-20	31.00	163.24	83.00%	135.5	1,000.00	135,491
30-11-20	30.00	158.38	83.00%	131.5	1,000.00	131,457
31-12-20	31.00	156.90	83.00%	130.2	1,000.00	130,230
Total		**1,880.80**	**83.00%**	**1,561.07**	**1,000.00**	**1,561,066.14**

Source Team's estimate

Table 2.58 TSER-RT03 Yearly Energy Output

TSER-RT03 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	116.32	83.00%	96.5	1,000.00	96,543
29-02-20	29.00	132.75	83.00%	110.2	1,000.00	110,184
31-03-20	31.00	164.76	83.00%	136.7	1,000.00	136,750
30-04-20	30.00	175.53	83.00%	145.7	1,000.00	145,688
31-05-20	31.00	144.98	83.00%	120.3	1,000.00	120,330
30-06-20	30.00	124.38	83.00%	103.2	1,000.00	103,234
31-07-20	31.00	118.13	83.00%	98.0	1,000.00	98,048
31-08-20	31.00	117.02	83.00%	97.1	1,000.00	97,127
30-09-20	30.00	123.14	83.00%	102.2	1,000.00	102,205
31-10-20	31.00	136.80	83.00%	113.5	1,000.00	113,543
30-11-20	30.00	118.48	83.00%	98.3	1,000.00	98,336
31-12-20	31.00	111.35	83.00%	92.4	1,000.00	92,417
Total		**1,583.62**	**83.00%**	**1,314.40**	**1,000.00**	**1,314,402.44**

Source Team's estimate

Table 2.59 TSER-RT04 Yearly Energy Output

TSER-RT04 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	171.81	83.00%	142.6	1,000.00	142,598
29-02-20	29.00	177.69	83.00%	147.5	1,000.00	147,483
31-03-20	31.00	197.22	83.00%	163.7	1,000.00	163,696
30-04-20	30.00	195.83	83.00%	162.5	1,000.00	162,538
31-05-20	31.00	144.39	83.00%	119.8	1,000.00	119,840
30-06-20	30.00	128.22	83.00%	106.4	1,000.00	106,427
31-07-20	31.00	140.43	83.00%	116.6	1,000.00	116,555
31-08-20	31.00	138.36	83.00%	114.8	1,000.00	114,837
30-09-20	30.00	138.59	83.00%	115.0	1,000.00	115,031
31-10-20	31.00	157.71	83.00%	130.9	1,000.00	130,898
30-11-20	30.00	161.33	83.00%	133.9	1,000.00	133,905
31-12-20	31.00	157.15	83.00%	130.4	1,000.00	130,435
Total		**1,908.73**	**83.00%**	**1,584.24**	**1,000.00**	**1,584,242.33**

Source Team's estimate

Table 2.60 TSER-RT05 Yearly Energy Output

TSER-RT05 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	170.92	83.00%	141.9	1,000.00	141,864
29-02-20	29.00	170.63	83.00%	141.6	1,000.00	141,619
31-03-20	31.00	188.27	83.00%	156.3	1,000.00	156,266
30-04-20	30.00	180.35	83.00%	149.7	1,000.00	149,694
31-05-20	31.00	145.15	83.00%	120.5	1,000.00	120,475
30-06-20	30.00	131.01	83.00%	108.7	1,000.00	108,738
31-07-20	31.00	136.09	83.00%	113.0	1,000.00	112,954
31-08-20	31.00	144.35	83.00%	119.8	1,000.00	119,808
30-09-20	30.00	133.78	83.00%	111.0	1,000.00	111,035
31-10-20	31.00	149.35	83.00%	124.0	1,000.00	123,960
30-11-20	30.00	155.09	83.00%	128.7	1,000.00	128,728
31-12-20	31.00	155.08	83.00%	128.7	1,000.00	128,717
Total		**1,860.07**	**83.00%**	**1,543.86**	**1,000.00**	**1,543,858.01**

Source Team's estimate

Table 2.61 TSER-RT06 Yearly Energy Output

TSER-RT06 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	167.51	83.00%	139.0	1,000.00	139,032
29-02-20	29.00	175.31	83.00%	145.5	1,000.00	145,510
31-03-20	31.00	192.22	83.00%	159.5	1,000.00	159,540
30-04-20	30.00	172.67	83.00%	143.3	1,000.00	143,317
31-05-20	31.00	154.94	83.00%	128.6	1,000.00	128,603
30-06-20	30.00	146.87	83.00%	121.9	1,000.00	121,900
31-07-20	31.00	148.10	83.00%	122.9	1,000.00	122,922
31-08-20	31.00	160.76	83.00%	133.4	1,000.00	133,429
30-09-20	30.00	142.35	83.00%	118.1	1,000.00	118,147
31-10-20	31.00	151.20	83.00%	125.5	1,000.00	125,499
30-11-20	30.00	154.96	83.00%	128.6	1,000.00	128,617
31-12-20	31.00	154.25	83.00%	128.0	1,000.00	128,029
Total		**1,921.14**	**83.00%**	**1,594.55**	**1,000.00**	**1,594,546.78**

Source Team's estimate

Table 2.62 TSER-RT07 Yearly Energy Output

TSER-RT07 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	155.70	83.00%	129.2	1,000.00	129,228
29-02-20	29.00	160.08	83.00%	132.9	1,000.00	132,870
31-03-20	31.00	167.19	83.00%	138.8	1,000.00	138,769
30-04-20	30.00	145.03	83.00%	120.4	1,000.00	120,379
31-05-20	31.00	152.03	83.00%	126.2	1,000.00	126,186
30-06-20	30.00	148.35	83.00%	123.1	1,000.00	123,131
31-07-20	31.00	152.04	83.00%	126.2	1,000.00	126,195
31-08-20	31.00	160.43	83.00%	133.2	1,000.00	133,156
30-09-20	30.00	145.22	83.00%	120.5	1,000.00	120,533
31-10-20	31.00	137.79	83.00%	114.4	1,000.00	114,363
30-11-20	30.00	133.25	83.00%	110.6	1,000.00	110,595
31-12-20	31.00	137.12	83.00%	113.8	1,000.00	113,813
Total		**1,794.24**	**83.00%**	**1,489.22**	**1,000.00**	**1,489,218.02**

Source Team's estimate

Table 2.63 TSER-RT08 Yearly Energy Output

TSER-RT08 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	70.46	83.00%	58.5	1,000.00	58,486
29-02-20	29.00	80.27	83.00%	66.6	1,000.00	66,625
31-03-20	31.00	139.02	83.00%	115.4	1,000.00	115,388
30-04-20	30.00	120.08	83.00%	99.7	1,000.00	99,670
31-05-20	31.00	168.79	83.00%	140.1	1,000.00	140,095
30-06-20	30.00	142.42	83.00%	118.2	1,000.00	118,207
31-07-20	31.00	115.05	83.00%	95.5	1,000.00	95,492
31-08-20	31.00	154.63	83.00%	128.3	1,000.00	128,343
30-09-20	30.00	88.13	83.00%	73.1	1,000.00	73,145
31-10-20	31.00	106.33	83.00%	88.3	1,000.00	88,255
30-11-20	30.00	89.30	83.00%	74.1	1,000.00	74,121
31-12-20	31.00	83.46	83.00%	69.3	1,000.00	69,269
Total		**1,357.95**	**83.00%**	**1,127.10**	**1,000.00**	**1,127,097.19**

Source Team's estimate

Table 2.64 TSER-RT09 Yearly Energy Output

TSER-RT09 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	140.93	83.00%	117.0	1,000.00	116,969
29-02-20	29.00	146.37	83.00%	121.5	1,000.00	121,487
31-03-20	31.00	175.88	83.00%	146.0	1,000.00	145,979
30-04-20	30.00	162.22	83.00%	134.6	1,000.00	134,641
31-05-20	31.00	150.23	83.00%	124.7	1,000.00	124,687
30-06-20	30.00	146.29	83.00%	121.4	1,000.00	121,417
31-07-20	31.00	140.12	83.00%	116.3	1,000.00	116,297
31-08-20	31.00	129.13	83.00%	107.2	1,000.00	107,180
30-09-20	30.00	131.13	83.00%	108.8	1,000.00	108,836
31-10-20	31.00	130.85	83.00%	108.6	1,000.00	108,602
30-11-20	30.00	135.30	83.00%	112.3	1,000.00	112,298
31-12-20	31.00	137.49	83.00%	114.1	1,000.00	114,114
Total		**1,725.91**	**83.00%**	**1,432.51**	**1,000.00**	**1,432,507.76**

Source Team's estimate

Table 2.65 TSER-RT10 Yearly Energy Output

TSER-RT10 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	115.16	83.00%	95.6	1,000.00	95,582
29-02-20	29.00	125.55	83.00%	104.2	1,000.00	104,208
31-03-20	31.00	162.77	83.00%	135.1	1,000.00	135,102
30-04-20	30.00	160.44	83.00%	133.2	1,000.00	133,168
31-05-20	31.00	155.24	83.00%	128.9	1,000.00	128,852
30-06-20	30.00	154.10	83.00%	127.9	1,000.00	127,906
31-07-20	31.00	149.16	83.00%	123.8	1,000.00	123,805
31-08-20	31.00	130.29	83.00%	108.1	1,000.00	108,140
30-09-20	30.00	129.63	83.00%	107.6	1,000.00	107,590
31-10-20	31.00	120.76	83.00%	100.2	1,000.00	100,229
30-11-20	30.00	113.53	83.00%	94.2	1,000.00	94,233
31-12-20	31.00	108.93	83.00%	90.4	1,000.00	90,411
Total		**1,625.57**	**83.00%**	**1,349.23**	**1,000.00**	**1,349,225.04**

Source Team's estimate

Table 2.66 TSER-RT11 Yearly Energy Output

TSER-RT11 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	114.20	83.00%	94.8	1,000.00	94,787
29-02-20	29.00	124.92	83.00%	103.7	1,000.00	103,687
31-03-20	31.00	162.33	83.00%	134.7	1,000.00	134,735
30-04-20	30.00	160.48	83.00%	133.2	1,000.00	133,202
31-05-20	31.00	155.38	83.00%	129.0	1,000.00	128,966
30-06-20	30.00	154.33	83.00%	128.1	1,000.00	128,095
31-07-20	31.00	149.17	83.00%	123.8	1,000.00	123,814
31-08-20	31.00	130.32	83.00%	108.2	1,000.00	108,168
30-09-20	30.00	129.32	83.00%	107.3	1,000.00	107,335
31-10-20	31.00	120.35	83.00%	99.9	1,000.00	99,888
30-11-20	30.00	112.65	83.00%	93.5	1,000.00	93,498
31-12-20	31.00	107.88	83.00%	89.5	1,000.00	89,539
Total		**1,621.34**	**83.00%**	**1,345.71**	**1,000.00**	**1,345,713.54**

Source Team's estimate

Table 2.67 TSER-RT12 Yearly Energy Output

TSER-RT12 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	126.78	83.00%	105.2	1,000.00	105,229
29-02-20	29.00	135.80	83.00%	112.7	1,000.00	112,716
31-03-20	31.00	168.86	83.00%	140.2	1,000.00	140,157
30-04-20	30.00	161.72	83.00%	134.2	1,000.00	134,231
31-05-20	31.00	152.75	83.00%	126.8	1,000.00	126,780
30-06-20	30.00	150.27	83.00%	124.7	1,000.00	124,726
31-07-20	31.00	143.52	83.00%	119.1	1,000.00	119,124
31-08-20	31.00	129.72	83.00%	107.7	1,000.00	107,667
30-09-20	30.00	129.05	83.00%	107.1	1,000.00	107,108
31-10-20	31.00	125.11	83.00%	103.8	1,000.00	103,845
30-11-20	30.00	123.15	83.00%	102.2	1,000.00	102,213
31-12-20	31.00	121.99	83.00%	101.3	1,000.00	101,252
Total		**1,668.73**	**83.00%**	**1,385.05**	**1,000.00**	**1,385,047.67**

Source Team's estimate

Table 2.68 TSER-RT13 Yearly Energy Output

TSER-RT13 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	139.43	83.00%	115.7	1,000.00	115,723
29-02-20	29.00	142.75	83.00%	118.5	1,000.00	118,485
31-03-20	31.00	174.92	83.00%	145.2	1,000.00	145,186
30-04-20	30.00	160.87	83.00%	133.5	1,000.00	133,520
31-05-20	31.00	151.37	83.00%	125.6	1,000.00	125,634
30-06-20	30.00	147.66	83.00%	122.6	1,000.00	122,560
31-07-20	31.00	145.36	83.00%	120.6	1,000.00	120,647
31-08-20	31.00	129.44	83.00%	107.4	1,000.00	107,434
30-09-20	30.00	134.71	83.00%	111.8	1,000.00	111,811
31-10-20	31.00	130.82	83.00%	108.6	1,000.00	108,582
30-11-20	30.00	135.35	83.00%	112.3	1,000.00	112,340
31-12-20	31.00	135.76	83.00%	112.7	1,000.00	112,679
Total		**1,728.43**	**83.00%**	**1,434.60**	**1,000.00**	**1,434,599.09**

Source Team's estimate

Table 2.69 TSER-RT14 Yearly Energy Output

TSER-RT14 Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	140.93	83.00%	117.0	1,000.00	116,969
29-02-20	29.00	146.37	83.00%	121.5	1,000.00	121,487
31-03-20	31.00	175.88	83.00%	146.0	1,000.00	145,979
30-04-20	30.00	162.22	83.00%	134.6	1,000.00	134,641
31-05-20	31.00	150.23	83.00%	124.7	1,000.00	124,687
30-06-20	30.00	146.29	83.00%	121.4	1,000.00	121,417
31-07-20	31.00	140.12	83.00%	116.3	1,000.00	116,297
31-08-20	31.00	129.13	83.00%	107.2	1,000.00	107,180
30-09-20	30.00	131.13	83.00%	108.8	1,000.00	108,836
31-10-20	31.00	130.85	83.00%	108.6	1,000.00	108,602
30-11-20	30.00	135.30	83.00%	112.3	1,000.00	112,298
31-12-20	31.00	137.49	83.00%	114.1	1,000.00	114,114
Total		**1,725.91**	**83.00%**	**1,432.51**	**1,000.00**	**1,432,507.76**

Source Team's estimate

Table 2.70 Kuno Yearly Energy Output

Kuno Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	44.84	83.00%	37.2	500.00	18,607
29-02-20	29.00	60.94	83.00%	50.6	500.00	25,290
31-03-20	31.00	87.48	83.00%	72.6	500.00	36,306
30-04-20	30.00	119.69	83.00%	99.3	500.00	49,671
31-05-20	31.00	136.85	83.00%	113.6	500.00	56,793
30-06-20	30.00	116.54	83.00%	96.7	500.00	48,366
31-07-20	31.00	127.14	83.00%	105.5	500.00	52,765
31-08-20	31.00	132.91	83.00%	110.3	500.00	55,156
30-09-20	30.00	89.10	83.00%	74.0	500.00	36,975
31-10-20	31.00	69.54	83.00%	57.7	500.00	28,858
30-11-20	30.00	45.73	83.00%	38.0	500.00	18,980
31-12-20	31.00	35.38	83.00%	29.4	500.00	14,682
Total		**1,066.14**	**83.00%**	**884.90**	**500.00**	**442,448.20**

Source Team's estimate

Table 2.71 Shima Yearly Energy Output

Shima Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	48.74	83.00%	40.5	1,250.00	50,567
29-02-20	29.00	68.41	83.00%	56.8	1,250.00	70,977
31-03-20	31.00	94.06	83.00%	78.1	1,250.00	97,592
30-04-20	30.00	127.80	83.00%	106.1	1,250.00	132,594
31-05-20	31.00	142.41	83.00%	118.2	1,250.00	147,746
30-06-20	30.00	132.05	83.00%	109.6	1,250.00	137,000
31-07-20	31.00	130.61	83.00%	108.4	1,250.00	135,513
31-08-20	31.00	145.37	83.00%	120.7	1,250.00	150,819
30-09-20	30.00	96.34	83.00%	80.0	1,250.00	99,954
31-10-20	31.00	81.25	83.00%	67.4	1,250.00	84,296
30-11-20	30.00	54.40	83.00%	45.2	1,250.00	56,443
31-12-20	31.00	44.84	83.00%	37.2	1,250.00	46,518
Total		**1,166.28**	**83.00%**	**968.01**	**1,250.00**	**1,210,018.48**

Source Team's estimate

Table 2.72 Hikeme Yearly Energy Output

Hikeme Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	64.76	83.00%	53.8	1,500.00	80,630
29-02-20	29.00	85.51	83.00%	71.0	1,500.00	106,458
31-03-20	31.00	106.09	83.00%	88.1	1,500.00	132,078
30-04-20	30.00	137.06	83.00%	113.8	1,500.00	170,643
31-05-20	31.00	146.41	83.00%	121.5	1,500.00	182,278
30-06-20	30.00	132.69	83.00%	110.1	1,500.00	165,194
31-07-20	31.00	133.65	83.00%	110.9	1,500.00	166,398
31-08-20	31.00	153.23	83.00%	127.2	1,500.00	190,774
30-09-20	30.00	103.61	83.00%	86.0	1,500.00	128,991
31-10-20	31.00	96.23	83.00%	79.9	1,500.00	119,807
30-11-20	30.00	71.12	83.00%	59.0	1,500.00	88,543
31-12-20	31.00	64.82	83.00%	53.8	1,500.00	80,699
Total		**1,295.17**	**83.00%**	**1,074.99**	**1,500.00**	**1,612,492.42**

Source Team's estimate

Table 2.73 Ryugasaki Yearly Energy Output

Ryugasaki Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	44.84	83.00%	37.2	1,750.00	65,126
29-02-20	29.00	60.94	83.00%	50.6	1,750.00	88,515
31-03-20	31.00	87.48	83.00%	72.6	1,750.00	127,070
30-04-20	30.00	119.69	83.00%	99.3	1,750.00	173,848
31-05-20	31.00	136.85	83.00%	113.6	1,750.00	198,775
30-06-20	30.00	116.54	83.00%	96.7	1,750.00	169,280
31-07-20	31.00	127.14	83.00%	105.5	1,750.00	184,676
31-08-20	31.00	132.91	83.00%	110.3	1,750.00	193,048
30-09-20	30.00	89.10	83.00%	74.0	1,750.00	129,413
31-10-20	31.00	69.54	83.00%	57.7	1,750.00	101,004
30-11-20	30.00	45.73	83.00%	38.0	1,750.00	66,429
31-12-20	31.00	35.38	83.00%	29.4	1,750.00	51,386
Total		**1,066.14**	**83.00%**	**884.90**	**1,750.00**	**1,548,568.69**

Source Team's estimate

Table 2.74 Sakura Yearly Energy Output

Sakura Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	104.41	83.00%	86.7	1,990.00	172,454
29-02-20	29.00	115.07	83.00%	95.5	1,990.00	190,058
31-03-20	31.00	149.57	83.00%	124.1	1,990.00	247,043
30-04-20	30.00	168.01	83.00%	139.4	1,990.00	277,497
31-05-20	31.00	161.25	83.00%	133.8	1,990.00	266,342
30-06-20	30.00	144.61	83.00%	120.0	1,990.00	238,858
31-07-20	31.00	151.48	83.00%	125.7	1,990.00	250,204
31-08-20	31.00	172.66	83.00%	143.3	1,990.00	285,188
30-09-20	30.00	124.76	83.00%	103.6	1,990.00	206,073
31-10-20	31.00	127.57	83.00%	105.9	1,990.00	210,704
30-11-20	30.00	102.17	83.00%	84.8	1,990.00	168,750
31-12-20	31.00	105.05	83.00%	87.2	1,990.00	173,508
Total		**1,626.61**	**83.00%**	**1,350.09**	**1,990.00**	**2,686,678.41**

Source Team's estimate

Table 2.75 Jyoso Yearly Energy Output

Jyoso Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	51.51	83.00%	42.8	1,250.00	53,439
29-02-20	29.00	67.27	83.00%	55.8	1,250.00	69,788
31-03-20	31.00	91.86	83.00%	76.2	1,250.00	95,308
30-04-20	30.00	121.50	83.00%	100.8	1,250.00	126,058
31-05-20	31.00	137.22	83.00%	113.9	1,250.00	142,369
30-06-20	30.00	116.21	83.00%	96.5	1,250.00	120,570
31-07-20	31.00	127.06	83.00%	105.5	1,250.00	131,824
31-08-20	31.00	133.73	83.00%	111.0	1,250.00	138,741
30-09-20	30.00	90.55	83.00%	75.2	1,250.00	93,946
31-10-20	31.00	72.09	83.00%	59.8	1,250.00	74,789
30-11-20	30.00	50.64	83.00%	42.0	1,250.00	52,538
31-12-20	31.00	41.01	83.00%	34.0	1,250.00	42,547
Total		**1,100.64**	**83.00%**	**913.53**	**1,250.00**	**1,141,915.80**

Source Team's estimate

Table 2.76 Hanamizuki Yearly Energy Output

Hanamizuki Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	43.89	83.00%	36.4	13,500.00	491,804
29-02-20	29.00	61.40	83.00%	51.0	13,500.00	687,969
31-03-20	31.00	99.52	83.00%	82.6	13,500.00	1,115,109
30-04-20	30.00	137.13	83.00%	113.8	13,500.00	1,536,580
31-05-20	31.00	147.07	83.00%	122.1	13,500.00	1,647,922
30-06-20	30.00	137.44	83.00%	114.1	13,500.00	1,540,028
31-07-20	31.00	140.26	83.00%	116.4	13,500.00	1,571,661
31-08-20	31.00	148.28	83.00%	123.1	13,500.00	1,661,494
30-09-20	30.00	95.43	83.00%	79.2	13,500.00	1,069,333
31-10-20	31.00	76.26	83.00%	63.3	13,500.00	854,506
30-11-20	30.00	46.93	83.00%	39.0	13,500.00	525,872
31-12-20	31.00	38.12	83.00%	31.6	13,500.00	427,120
Total		**1,171.74**	**83.00%**	**972.55**	**13,500.00**	**13,129,397.02**

Source Team's estimate

Table 2.77 Onikoube Yearly Energy Output

Onikoube Month	Day	Solar Radiation kwh/month/m2	Perfomrance Ratio	Monthly Energy kwh/month/kWp	Selling Cpacity Kwp	Energy Output (kWH)
31-01-20	31.00	106.55	83.00%	88.4	154,730.00	13,684,290
29-02-20	29.00	115.01	83.00%	95.5	154,730.00	14,770,852
31-03-20	31.00	123.45	83.00%	102.5	154,730.00	15,854,482
30-04-20	30.00	145.78	83.00%	121.0	154,730.00	18,722,292
31-05-20	31.00	148.35	83.00%	123.1	154,730.00	19,052,225
30-06-20	30.00	121.62	83.00%	100.9	154,730.00	15,619,123
31-07-20	31.00	134.64	83.00%	111.8	154,730.00	17,291,723
31-08-20	31.00	153.65	83.00%	127.5	154,730.00	19,732,963
30-09-20	30.00	110.83	83.00%	92.0	154,730.00	14,233,320
31-10-20	31.00	105.17	83.00%	87.3	154,730.00	13,506,551
30-11-20	30.00	98.13	83.00%	81.4	154,730.00	12,602,329
31-12-20	31.00	90.04	83.00%	74.7	154,730.00	11,563,062
Total		**1,453.24**	**83.00%**	**1,206.19**	**154,730.00**	**186,633,212.74**

Source Team's estimate

2.14 Financial Statement Projection

Table 2.78 Forecasted Profit and Loss Year 2020 to 2022

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2018 Actual	2019 Actual	2020 Forecast	2021 Forecast	2022 Forecast
Total Revenue	1,171,556,507	2,008,408,786	2,020,815,803	2,014,038,268	2,130,423,920
Cost of sales and services	(228,530,165)	(613,057,955)	(616,845,142)	(614,776,330)	(650,302,538)
Gross profit (loss)	**943,026,342**	**1,395,350,831**	**1,403,970,660**	**1,399,261,938**	**1,480,121,381**
Dividends income	53	56	55	55	55
Other income	156,191,219	92,716,644	-	-	-
Administrative expenses	(206,642,688)	(233,345,785)	(234,787,287)	(233,999,843)	(247,522,041)
Depreciation expenses	(145,968,764)	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)
(Loss) gain on exchange rate	(47,475)	(5,414,481)	(2,730,978)	(4,072,730)	(3,401,854)
Other expenses	(296,000,000)	-	-	-	-
Finance costs	(123,240,033)	(147,191,521)	(188,268,959)	(180,688,039)	(173,354,625)
Profit (loss) before income tax	**327,318,654**	**803,815,620**	**679,883,367**	**682,201,258**	**757,542,793**
Income tax (20%)	(83,576,890)	(5,073,121)	(135,976,673)	(136,440,252)	(151,508,559)
Profit (loss) for the year	**243,741,764**	**798,742,499**	**543,906,694**	**545,761,007**	**606,034,234**

Source Team's estimate

Table 2.79 Forecasted Profit and Loss Year 2023 to 2027

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2023 Forecast	2024 Forecast	2025 Forecast	2026 Forecast	2027 Forecast
Total Revenue	3,853,360,232	3,529,358,416	3,442,838,985	3,375,185,466	3,360,579,743
Cost of sales and services	(1,176,221,275)	(1,077,321,145)	(1,050,911,469)	(1,030,260,529)	(1,025,802,197)
Gross profit (loss)	**2,677,138,957**	**2,452,037,271**	**2,391,927,516**	**2,344,924,936**	**2,334,777,546**
Dividends income	55	55	55	55	55
Other income	-	-	-	-	-
Administrative expenses	(447,700,376)	(410,056,417)	(400,004,208)	(392,143,924)	(390,446,967)
Depreciation expenses	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)
(Loss) gain on exchange rate	(3,737,292)	(3,569,573)	(3,653,432)	(3,611,502)	(3,632,467)
Other expenses	-	-	-	-	-
Finance costs	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)
Profit (loss) before income tax	**1,776,911,250**	**1,589,621,241**	**1,539,479,836**	**1,500,379,470**	**1,491,908,072**
Income tax (20%)	(355,382,250)	(317,924,248)	(307,895,967)	(300,075,894)	(298,381,614)
Profit (loss) for the year	**1,421,529,000**	**1,271,696,993**	**1,231,583,869**	**1,200,303,576**	**1,193,526,458**

Source Team's estimate

Table 2.80 Forecasted Profit and Loss Year 2028 to 2032

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2028 Forecast	2029 Forecast	2030 Forecast	2031 Forecast	2032 Forecast
Total Revenue	3,345,974,021	3,331,368,298	3,316,762,576	3,302,156,854	3,287,551,131
Cost of sales and services	(1,021,343,864)	(1,016,885,532)	(1,012,427,199)	(1,007,968,867)	(1,003,510,534)
Gross profit (loss)	**2,324,630,156**	**2,314,482,767**	**2,304,335,377**	**2,294,187,987**	**2,284,040,597**
Dividends income	55	55	55	55	55
Other income	-	-	-	-	-
Administrative expenses	(388,750,009)	(387,053,052)	(385,356,095)	(383,659,138)	(381,962,181)
Depreciation expenses	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)
(Loss) gain on exchange rate	(3,621,985)	(3,627,226)	(3,624,605)	(3,625,916)	(3,625,261)
Other expenses	-	-	-	-	-
Finance costs	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)
Profit (loss) before income tax	**1,483,468,122**	**1,475,012,448**	**1,466,564,636**	**1,458,112,893**	**1,449,663,116**
Income tax (20%)	(296,693,624)	(295,002,490)	(293,312,927)	(291,622,579)	(289,932,623)
Profit (loss) for the year	**1,186,774,498**	**1,180,009,959**	**1,173,251,709**	**1,166,490,315**	**1,159,730,493**

Source Team's estimate

Table 2.81 Forecasted Profit and Loss Year 2032 to 2037

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2033 Forecast	2034 Forecast	2035 Forecast	2036 Forecast	2037 Forecast
Total Revenue	3,272,945,409	3,258,339,686	3,243,733,964	3,229,128,241	3,214,522,519
Cost of sales and services	(999,052,201)	(994,593,869)	(990,135,536)	(985,677,204)	(981,218,871)
Gross profit (loss)	**2,273,893,207**	**2,263,745,817**	**2,253,598,428**	**2,243,451,038**	**2,233,303,648**
Dividends income	55	55	55	55	55
Other income	-	-	-	-	-
Administrative expenses	(380,265,223)	(378,568,266)	(376,871,309)	(375,174,352)	(373,477,395)
Depreciation expenses	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)
(Loss) gain on exchange rate	(3,625,588)	(3,625,424)	(3,625,506)	(3,625,465)	(3,625,486)
Other expenses	-	-	-	-	-
Finance costs	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)
Profit (loss) before income tax	**1,441,212,356**	**1,432,762,087**	**1,424,311,572**	**1,415,861,181**	**1,407,410,728**
Income tax (20%)	(288,242,471)	(286,552,417)	(284,862,314)	(283,172,236)	(281,482,146)
Profit (loss) for the year	**1,152,969,885**	**1,146,209,669**	**1,139,449,258**	**1,132,688,944**	**1,125,928,582**

Source Team's estimate

Table 2.82 Forecasted Profit and Loss Year 2038 to 2042

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2038 Forecast	2039 Forecast	2040 Forecast	2041 Forecast	2042 Forecast
Total Revenue	3,154,281,375	2,231,163,343	2,104,316,218	2,020,617,208	1,950,180,204
Cost of sales and services	(962,830,527)	(681,052,805)	(642,333,277)	(616,784,522)	(595,283,936)
Gross profit (loss)	**2,191,450,849**	**1,550,110,539**	**1,461,982,941**	**1,403,832,686**	**1,354,896,267**
Dividends income	55	55	55	55	55
Other income	-	-	-	-	-
Administrative expenses	(366,478,313)	(259,226,391)	(244,488,733)	(234,764,213)	(226,580,532)
Depreciation expenses	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)
(Loss) gain on exchange rate	(3,625,476)	(3,625,481)	(3,625,478)	(3,625,479)	(3,625,479)
Other expenses	-	-	-	-	-
Finance costs	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)
Profit (loss) before income tax	**1,372,557,020**	**838,468,627**	**765,078,690**	**716,652,953**	**675,900,217**
Income tax (20%)	(274,511,404)	(167,693,725)	(153,015,738)	(143,330,591)	(135,180,043)
Profit (loss) for the year	**1,098,045,616**	**670,774,901**	**612,062,952**	**573,322,362**	**540,720,174**

Source Team's estimate

Table 2.83 Forecasted Profit and Loss Year 2043 to 2047

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2043 Forecast	2044 Forecast	2045 Forecast	2046 Forecast	2047 Forecast
Total Revenue	1,908,634,670	1,761,333,501	1,746,065,294	1,735,328,157	1,724,591,021
Cost of sales and services	(582,602,344)	(537,639,310)	(532,978,757)	(529,701,293)	(526,423,830)
Gross profit (loss)	**1,326,032,325**	**1,223,694,191**	**1,213,086,537**	**1,205,626,864**	**1,198,167,191**
Dividends income	55	55	55	55	55
Other income	-	-	-	-	-
Administrative expenses	(221,753,588)	(204,639,489)	(202,865,562)	(201,618,074)	(200,370,586)
Depreciation expenses	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)	(298,300,124)
(Loss) gain on exchange rate	(3,625,479)	(3,625,479)	(3,625,479)	(3,625,479)	(3,625,479)
Other expenses	-	-	-	-	-
Finance costs	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)	(150,489,971)
Profit (loss) before income tax	**651,863,218**	**566,639,182**	**557,805,456**	**551,593,271**	**545,381,086**
Income tax (20%)	(130,372,644)	(113,327,836)	(111,561,091)	(110,318,654)	(109,076,217)
Profit (loss) for the year	**521,490,574**	**453,311,346**	**446,244,365**	**441,274,617**	**436,304,869**

Source Team's estimate

Table 2.84 Forecasted Balance Sheet Year 2020 to 2022 (Assets)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2018 Actual	2019 Actual	2020 Forecasted	2021 Forecasted	2022 Forecasted
Assets					
Current assets					
Cash and cash equivalents	561,020,761	643,594,118	1,180,369,772	1,727,664,285	2,307,364,733
Short-term restricted bank deposits	74,399,234	18,864,046	18,864,046	18,864,046	18,864,046
Short-term investments	459,753	221,114,307	221,114,307	221,114,307	221,114,307
Trade and other receivables	478,067,350	430,399,966	433,058,777	431,606,358	456,547,685
Inventories	14,452,830	24,028,968	24,177,408	24,096,320	25,488,779
Refundable Value Added Tax	181,178,565	273,156,145	273,156,145	273,156,145	273,156,145
Other current assets	152,581,949	30,316,921	30,316,921	30,316,921	30,316,921
Total current assets	**1,462,160,442**	**1,641,474,471**	**2,181,057,376**	**2,726,818,382**	**3,332,852,617**
Non-current assets					
Long-term restricted bank deposits	12,008,535	34,239,939	34,239,939	34,239,939	34,239,939
Investments in joint ventures	1,787,086,887	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520
Investment properties	89,977,885	103,857,149	103,857,149	103,857,149	103,857,149
Property, plant and equipment	6,928,083,195	7,549,859,170	9,199,859,170	10,849,859,170	12,349,859,170
Goodwill	17,726,430	17,112,763	17,112,763	17,112,763	17,112,763
Intangible assets	4,376,580,242	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201
Deferred tax assets	2,409,825	1,623,005	1,623,005	1,623,005	1,623,005
Other non-current assets	13,201,756	11,871,739	11,871,739	11,871,740	11,871,741
Total non-current assets	**13,227,074,755**	**14,228,516,486**	**15,878,516,486**	**17,528,516,487**	**19,028,516,488**
Total assets	**14,689,235,197**	**15,869,990,957**	**18,059,573,862**	**20,255,334,869**	**22,361,369,105**

Source Team's estimate

Table 2.85 Forecasted Balance Sheet Year 2020 to 2022 (Liabilities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2018 Actual	2019 Actual	2020 Forecasted	2021 Forecasted	2022 Forecasted
Liabilities and equity					
Current liabilities					
Short-term borrowings from financial institutions	98,794,277	98,470,171	98,470,171	98,470,171	98,470,171
Construction and other payables	278,445,782	199,267,433	199,267,433	199,267,433	199,267,433
	-	2,056,215	2,056,215	2,056,215	2,056,215
Current portion of finance lease liabilities	2,619,884	7,195,003	7,195,003	7,195,003	7,195,003
Current portion of long-term borrowings	437,241,304	737,755,685	737,755,685	737,755,685	737,755,685
Current portion of debentures	2,048,530,153	949,800,983	949,800,983	949,800,983	949,800,983
Income tax payable	1,349,856	4,404,066	4,404,066	4,404,066	4,404,066
Other current liabilities	15,484,548	26,403,034	26,403,034	26,403,034	26,403,034
Total current liabilities	**2,882,465,804**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**
Non-current liabilities					
Right in power purchase agreement payables	-	73,328,549	73,328,549	73,328,549	73,328,549
Finance lease liabilities	7,979,672	13,280,673	13,280,673	13,280,673	13,280,673
Long-term borrowings from financial institutions	5,922,634,037	5,736,434,390	7,386,434,390	9,036,434,390	10,536,434,390
Debentures	949,065,843	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775
Employee benefit obligations	8,606,509	13,521,825	13,521,825	13,521,825	13,521,825
Provision for decommissioning costs	2,454,578	2,584,824	2,584,824	2,584,824	2,584,824
Deferred tax liabilities	1,335,446	28,066,973	28,066,973	28,066,973	28,066,973
Other non-current liabilities	72,000	72,000	72,000	72,001	72,002
Total non-current liabilities	**6,892,148,085**	**8,212,314,009**	**9,862,314,009**	**11,512,314,010**	**13,012,314,011**
Total liabilities	**9,774,613,889**	**10,237,666,599**	**11,887,666,599**	**13,537,666,600**	**15,037,666,601**

Source Team's estimate

Table 2.86 Forecasted Balance Sheet Year 2020 to 2022 (Equities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2018 Actual	2019 Actual	2020 Forecasted	2021 Forecasted	2022 Forecasted
Equity					
Share capital					
Authorised share capital					
Ordinary shares 2,477,474,454 shares	2,450,250,000	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454
Issued and paid-up share capital					
Ordinary shares 2,117,716,281 shares	1,905,749,580	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281
Premium on ordinary shares	727,554,273	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325
Retained earnings					
Appropriated-legal reserve	63,972,012	81,303,726	81,303,726	81,303,726	81,303,726
Unappropriated retained earnings	2,207,230,671	2,856,783,618	3,400,690,312	3,946,451,318	4,552,485,553
Other components of equity	(134,119,095)	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)
Equity attributable to owners of the parent	4,770,387,441	5,628,000,569	6,171,907,263	6,717,668,269	7,323,702,504
Non-controlling interests	144,233,867	4,323,789	-	-	-
Total equity	**4,914,621,308**	**5,632,324,358**	**6,171,907,263**	**6,717,668,269**	**7,323,702,504**
Total liabilities and equity	**14,689,235,197**	**15,869,990,957**	**18,059,573,862**	**20,255,334,869**	**22,361,369,105**

Source Team's estimate

Table 2.87 Forecasted Balance Sheet Year 2023 to 2027 (Assets)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2023 Forecasted	2024 Forecasted	2025 Forecasted	2026 Forecasted	2027 Forecasted
Assets					
Current assets					
Cash and cash equivalents	3,339,056,705	4,684,063,375	5,935,223,404	7,150,834,480	8,347,665,675
Short-term restricted bank deposits	18,864,046	18,864,046	18,864,046	18,864,046	18,864,046
Short-term investments	221,114,307	221,114,307	221,114,307	221,114,307	221,114,307
Trade and other receivables	825,771,190	756,337,929	737,796,903	723,298,822	720,168,831
Inventories	46,102,303	42,225,886	41,190,752	40,381,333	40,206,587
Refundable Value Added Tax	273,156,145	273,156,145	273,156,145	273,156,145	273,156,145
Other current assets	30,316,921	30,316,921	30,316,921	30,316,921	30,316,921
Total current assets	**4,754,381,616**	**6,026,078,609**	**7,257,662,478**	**8,457,966,054**	**9,651,492,512**
Non-current assets					
Long-term restricted bank deposits	34,239,939	34,239,939	34,239,939	34,239,939	34,239,939
Investments in joint ventures	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520
Investment properties	103,857,149	103,857,149	103,857,149	103,857,149	103,857,149
Property, plant and equipment	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170
Goodwill	17,112,763	17,112,763	17,112,763	17,112,763	17,112,763
Intangible assets	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201
Deferred tax assets	1,623,005	1,623,005	1,623,005	1,623,005	1,623,005
Other non-current assets	11,871,742	11,871,743	11,871,744	11,871,745	11,871,746
Total non-current assets	**19,028,516,489**	**19,028,516,490**	**19,028,516,491**	**19,028,516,492**	**19,028,516,493**
Total assets	**23,782,898,105**	**25,054,595,099**	**26,286,178,969**	**27,486,482,546**	**28,680,009,005**

Source Team's estimate

Table 2.88 Forecasted Balance Sheet Year 2023 to 2027 (Liabilities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2023 Forecasted	2024 Forecasted	2025 Forecasted	2026 Forecasted	2027 Forecasted
Liabilities and equity					
Current liabilities					
Short-term borrowings from financial institutions	98,470,171	98,470,171	98,470,171	98,470,171	98,470,171
Construction and other payables	199,267,433	199,267,433	199,267,433	199,267,433	199,267,433
	2,056,215	2,056,215	2,056,215	2,056,215	2,056,215
Current portion of finance lease liabilities	7,195,003	7,195,003	7,195,003	7,195,003	7,195,003
Current portion of long-term borrowings	737,755,685	737,755,685	737,755,685	737,755,685	737,755,685
Current portion of debentures	949,800,983	949,800,983	949,800,983	949,800,983	949,800,983
Income tax payable	4,404,066	4,404,066	4,404,066	4,404,066	4,404,066
Other current liabilities	26,403,034	26,403,034	26,403,034	26,403,034	26,403,034
Total current liabilities	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**
Non-current liabilities					
Right in power purchase agreement payables	73,328,549	73,328,549	73,328,549	73,328,549	73,328,549
Finance lease liabilities	13,280,673	13,280,673	13,280,673	13,280,673	13,280,673
Long-term borrowings from financial institutions	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390
Debentures	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775
Employee benefit obligations	13,521,825	13,521,825	13,521,825	13,521,825	13,521,825
Provision for decommissioning costs	2,584,824	2,584,824	2,584,824	2,584,824	2,584,824
Deferred tax liabilities	28,066,973	28,066,973	28,066,973	28,066,973	28,066,973
Other non-current liabilities	72,003	72,004	72,005	72,006	72,007
Total non-current liabilities	**13,012,314,012**	**13,012,314,013**	**13,012,314,014**	**13,012,314,015**	**13,012,314,016**
Total liabilities	**15,037,666,602**	**15,037,666,603**	**15,037,666,604**	**15,037,666,605**	**15,037,666,606**

Source Team's estimate

Table 2.89 Forecasted Balance Sheet Year 2023 to 2027 (Equities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2023 Forecasted	2024 Forecasted	2025 Forecasted	2026 Forecasted	2027 Forecasted
Equity					
Share capital					
Authorised share capital					
Ordinary shares 2,477,474,454 shares	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454
Issued and paid-up share capital					
Ordinary shares 2,117,716,281 shares	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281
Premium on ordinary shares	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325
Retained earnings					
Appropriated-legal reserve	81,303,726	81,303,726	81,303,726	81,303,726	81,303,726
Unappropriated retained earnings	5,974,014,552	7,245,711,545	8,477,295,414	9,677,598,990	10,871,125,448
Other components of equity	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)
Equity attributable to owners of the parent	8,745,231,503	10,016,928,496	11,248,512,365	12,448,815,941	13,642,342,399
Non-controlling interests	-	-	-	-	-
Total equity	**8,745,231,503**	**10,016,928,496**	**11,248,512,365**	**12,448,815,941**	**13,642,342,399**
Total liabilities and equity	**23,782,898,105**	**25,054,595,099**	**26,286,178,969**	**27,486,482,546**	**28,680,009,005**

Source Team's estimate

Table 2.90 Forecasted Balance Sheet Year 2028 to 2032 (Assets)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2028	2029	2030	2031	2032
	Forecasted	Forecasted	Forecasted	Forecasted	Forecasted
Assets					
Current assets					
Cash and cash equivalents	9,537,744,910	10,721,059,605	11,897,616,051	13,067,411,103	14,230,446,333
Short-term restricted bank deposits	18,864,046	18,864,046	18,864,046	18,864,046	18,864,046
Short-term investments	221,114,307	221,114,307	221,114,307	221,114,307	221,114,307
Trade and other receivables	717,038,839	713,908,848	710,778,856	707,648,865	704,518,873
Inventories	40,031,842	39,857,096	39,682,351	39,507,605	39,332,860
Refundable Value Added Tax	273,156,145	273,156,145	273,156,145	273,156,145	273,156,145
Other current assets	30,316,921	30,316,921	30,316,921	30,316,921	30,316,921
Total current assets	**10,838,267,010**	**12,018,276,968**	**13,191,528,677**	**14,358,018,992**	**15,517,749,485**
Non-current assets					
Long-term restricted bank deposits	34,239,939	34,239,939	34,239,939	34,239,939	34,239,939
Investments in joint ventures	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520
Investment properties	103,857,149	103,857,149	103,857,149	103,857,149	103,857,149
Property, plant and equipment	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170
Goodwill	17,112,763	17,112,763	17,112,763	17,112,763	17,112,763
Intangible assets	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201
Deferred tax assets	1,623,005	1,623,005	1,623,005	1,623,005	1,623,005
Other non-current assets	11,871,747	11,871,748	11,871,749	11,871,750	11,871,751
Total non-current assets	**19,028,516,494**	**19,028,516,495**	**19,028,516,496**	**19,028,516,497**	**19,028,516,498**
Total assets	**29,866,783,504**	**31,046,793,463**	**32,220,045,173**	**33,386,535,489**	**34,546,265,983**

Source Team's estimate

Table 2.91 Forecasted Balance Sheet Year 2028 to 2032 (Liabilities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2028	2029	2030	2031	2032
	Forecasted	Forecasted	Forecasted	Forecasted	Forecasted
Liabilities and equity					
Current liabilities					
Short-term borrowings from financial institutions	98,470,171	98,470,171	98,470,171	98,470,171	98,470,171
Construction and other payables	199,267,433	199,267,433	199,267,433	199,267,433	199,267,433
	2,056,215	2,056,215	2,056,215	2,056,215	2,056,215
Current portion of finance lease liabilities	7,195,003	7,195,003	7,195,003	7,195,003	7,195,003
Current portion of long-term borrowings	737,755,685	737,755,685	737,755,685	737,755,685	737,755,685
Current portion of debentures	949,800,983	949,800,983	949,800,983	949,800,983	949,800,983
Income tax payable	4,404,066	4,404,066	4,404,066	4,404,066	4,404,066
Other current liabilities	26,403,034	26,403,034	26,403,034	26,403,034	26,403,034
Total current liabilities	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**
Non-current liabilities					
Right in power purchase agreement payables	73,328,549	73,328,549	73,328,549	73,328,549	73,328,549
Finance lease liabilities	13,280,673	13,280,673	13,280,673	13,280,673	13,280,673
Long-term borrowings from financial institutions	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390
Debentures	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775
Employee benefit obligations	13,521,825	13,521,825	13,521,825	13,521,825	13,521,825
Provision for decommissioning costs	2,584,824	2,584,824	2,584,824	2,584,824	2,584,824
Deferred tax liabilities	28,066,973	28,066,973	28,066,973	28,066,973	28,066,973
Other non-current liabilities	72,008	72,009	72,010	72,011	72,012
Total non-current liabilities	**13,012,314,017**	**13,012,314,018**	**13,012,314,019**	**13,012,314,020**	**13,012,314,021**
Total liabilities	**15,037,666,607**	**15,037,666,608**	**15,037,666,609**	**15,037,666,610**	**15,037,666,611**

Source Team's estimate

Table 2.92 Forecasted Balance Sheet Year 2028 to 2032 (Equities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2028 Forecasted	2029 Forecasted	2030 Forecasted	2031 Forecasted	2032 Forecasted
Equity					
Share capital					
Authorised share capital					
Ordinary shares 2,477,474,454 shares	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454
Issued and paid-up share capital					
Ordinary shares 2,117,716,281 shares	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281
Premium on ordinary shares	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325
Retained earnings					
Appropriated-legal reserve	81,303,726	81,303,726	81,303,726	81,303,726	81,303,726
Unappropriated retained earnings	12,057,899,946	13,237,909,904	14,411,161,613	15,577,651,928	16,737,382,421
Other components of equity	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)
Equity attributable to owners of the parent	14,829,116,897	16,009,126,855	17,182,378,564	18,348,868,879	19,508,599,372
Non-controlling interests	-	-	-	-	-
Total equity	**14,829,116,897**	**16,009,126,855**	**17,182,378,564**	**18,348,868,879**	**19,508,599,372**
Total liabilities and equity	**29,866,783,504**	**31,046,793,463**	**32,220,045,173**	**33,386,535,489**	**34,546,265,983**

Source Team's estimate

Table 2.93 Forecasted Balance Sheet Year 2033 to 2037 (Assets)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2033 Forecasted	2034 Forecasted	2035 Forecasted	2036 Forecasted	2037 Forecasted
Assets					
Current assets					
Cash and cash equivalents	15,386,720,954	16,536,235,361	17,678,989,356	18,814,983,037	19,944,216,356
Short-term restricted bank deposits	18,864,046	18,864,046	18,864,046	18,864,046	18,864,046
Short-term investments	221,114,307	221,114,307	221,114,307	221,114,307	221,114,307
Trade and other receivables	701,388,882	698,258,890	695,128,899	691,998,907	688,868,916
Inventories	39,158,114	38,983,369	38,808,623	38,633,878	38,459,132
Refundable Value Added Tax	273,156,145	273,156,145	273,156,145	273,156,145	273,156,145
Other current assets	30,316,921	30,316,921	30,316,921	30,316,921	30,316,921
Total current assets	**16,670,719,369**	**17,816,929,039**	**18,956,378,297**	**20,089,067,241**	**21,214,995,823**
Non-current assets					
Long-term restricted bank deposits	34,239,939	34,239,939	34,239,939	34,239,939	34,239,939
Investments in joint ventures	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520
Investment properties	103,857,149	103,857,149	103,857,149	103,857,149	103,857,149
Property, plant and equipment	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170
Goodwill	17,112,763	17,112,763	17,112,763	17,112,763	17,112,763
Intangible assets	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201
Deferred tax assets	1,623,005	1,623,005	1,623,005	1,623,005	1,623,005
Other non-current assets	11,871,752	11,871,753	11,871,754	11,871,755	11,871,756
Total non-current assets	**19,028,516,499**	**19,028,516,500**	**19,028,516,501**	**19,028,516,502**	**19,028,516,503**
Total assets	**35,699,235,868**	**36,845,445,539**	**37,984,894,798**	**39,117,583,743**	**40,243,512,326**

Source Team's estimate

Table 2.94 Forecasted Balance Sheet Year 2033 to 2037 (Liabilities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2033 Forecasted	2034 Forecasted	2035 Forecasted	2036 Forecasted	2037 Forecasted
Liabilities and equity					
Current liabilities					
Short-term borrowings from financial institutions	98,470,171	98,470,171	98,470,171	98,470,171	98,470,171
Construction and other payables	199,267,433	199,267,433	199,267,433	199,267,433	199,267,433
	2,056,215	2,056,215	2,056,215	2,056,215	2,056,215
Current portion of finance lease liabilities	7,195,003	7,195,003	7,195,003	7,195,003	7,195,003
Current portion of long-term borrowings	737,755,685	737,755,685	737,755,685	737,755,685	737,755,685
Current portion of debentures	949,800,983	949,800,983	949,800,983	949,800,983	949,800,983
Income tax payable	4,404,066	4,404,066	4,404,066	4,404,066	4,404,066
Other current liabilities	26,403,034	26,403,034	26,403,034	26,403,034	26,403,034
Total current liabilities	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**
Non-current liabilities					
Right in power purchase agreement payables	73,328,549	73,328,549	73,328,549	73,328,549	73,328,549
Finance lease liabilities	13,280,673	13,280,673	13,280,673	13,280,673	13,280,673
Long-term borrowings from financial institutions	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390
Debentures	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775
Employee benefit obligations	13,521,825	13,521,825	13,521,825	13,521,825	13,521,825
Provision for decommissioning costs	2,584,824	2,584,824	2,584,824	2,584,824	2,584,824
Deferred tax liabilities	28,066,973	28,066,973	28,066,973	28,066,973	28,066,973
Other non-current liabilities	72,013	72,014	72,015	72,016	72,017
Total non-current liabilities	**13,012,314,022**	**13,012,314,023**	**13,012,314,024**	**13,012,314,025**	**13,012,314,026**
Total liabilities	**15,037,666,612**	**15,037,666,613**	**15,037,666,614**	**15,037,666,615**	**15,037,666,616**

Source Team's estimate

Table 2.95 Forecasted Balance Sheet Year 2033 to 2037 (Equities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2033 Forecasted	2034 Forecasted	2035 Forecasted	2036 Forecasted	2037 Forecasted
Equity					
Share capital					
Authorised share capital					
Ordinary shares 2,477,474,454 shares	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454
Issued and paid-up share capital					
Ordinary shares 2,117,716,281 shares	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281
Premium on ordinary shares	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325
Retained earnings					
Appropriated-legal reserve	81,303,726	81,303,726	81,303,726	81,303,726	81,303,726
Unappropriated retained earnings	17,890,352,305	19,036,561,975	20,176,011,233	21,308,700,177	22,434,628,759
Other components of equity	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)
Equity attributable to owners of the parent	20,661,569,256	21,807,778,926	22,947,228,184	24,079,917,128	25,205,845,710
Non-controlling interests	-	-	-	-	-
Total equity	**20,661,569,256**	**21,807,778,926**	**22,947,228,184**	**24,079,917,128**	**25,205,845,710**
Total liabilities and equity	**35,699,235,868**	**36,845,445,539**	**37,984,894,798**	**39,117,583,743**	**40,243,512,326**

Source Team's estimate

Table 2.96 Forecasted Balance Sheet Year 2038 to 2042 (Assets)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2038	2039	2040	2041	2042
	Forecasted	Forecasted	Forecasted	Forecasted	Forecasted
Assets					
Current assets					
Cash and cash equivalents	21,055,892,324	21,935,534,836	22,576,298,620	23,168,558,985	23,725,216,459
Short-term restricted bank deposits	18,864,046	18,864,046	18,864,046	18,864,046	18,864,046
Short-term investments	221,114,307	221,114,307	221,114,307	221,114,307	221,114,307
Trade and other receivables	675,959,300	478,136,042	450,952,831	433,016,218	417,921,640
Inventories	37,738,396	26,694,044	25,176,422	24,175,032	23,332,311
Refundable Value Added Tax	273,156,145	273,156,145	273,156,145	273,156,145	273,156,145
Other current assets	30,316,921	30,316,921	30,316,921	30,316,921	30,316,921
Total current assets	**22,313,041,439**	**22,983,816,341**	**23,595,879,292**	**24,169,201,655**	**24,709,921,828**
Non-current assets					
Long-term restricted bank deposits	34,239,939	34,239,939	34,239,939	34,239,939	34,239,939
Investments in joint ventures	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520
Investment properties	103,857,149	103,857,149	103,857,149	103,857,149	103,857,149
Property, plant and equipment	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170
Goodwill	17,112,763	17,112,763	17,112,763	17,112,763	17,112,763
Intangible assets	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201
Deferred tax assets	1,623,005	1,623,005	1,623,005	1,623,005	1,623,005
Other non-current assets	11,871,757	11,871,758	11,871,759	11,871,760	11,871,761
Total non-current assets	**19,028,516,504**	**19,028,516,505**	**19,028,516,506**	**19,028,516,507**	**19,028,516,508**
Total assets	**41,341,557,943**	**42,012,332,846**	**42,624,395,798**	**43,197,718,162**	**43,738,438,336**

Source Team's estimate

Table 2.97 Forecasted Balance Sheet Year 2038 to 2042 (Liabilities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2038	2039	2040	2041	2042
	Forecasted	Forecasted	Forecasted	Forecasted	Forecasted
Liabilities and equity					
Current liabilities					
Short-term borrowings from financial institutions	98,470,171	98,470,171	98,470,171	98,470,171	98,470,171
Construction and other payables	199,267,433	199,267,433	199,267,433	199,267,433	199,267,433
	2,056,215	2,056,215	2,056,215	2,056,215	2,056,215
Current portion of finance lease liabilities	7,195,003	7,195,003	7,195,003	7,195,003	7,195,003
Current portion of long-term borrowings	737,755,685	737,755,685	737,755,685	737,755,685	737,755,685
Current portion of debentures	949,800,983	949,800,983	949,800,983	949,800,983	949,800,983
Income tax payable	4,404,066	4,404,066	4,404,066	4,404,066	4,404,066
Other current liabilities	26,403,034	26,403,034	26,403,034	26,403,034	26,403,034
Total current liabilities	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**
Non-current liabilities					
Right in power purchase agreement payables	73,328,549	73,328,549	73,328,549	73,328,549	73,328,549
Finance lease liabilities	13,280,673	13,280,673	13,280,673	13,280,673	13,280,673
Long-term borrowings from financial institutions	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390
Debentures	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775
Employee benefit obligations	13,521,825	13,521,825	13,521,825	13,521,825	13,521,825
Provision for decommissioning costs	2,584,824	2,584,824	2,584,824	2,584,824	2,584,824
Deferred tax liabilities	28,066,973	28,066,973	28,066,973	28,066,973	28,066,973
Other non-current liabilities	72,018	72,019	72,020	72,021	72,022
Total non-current liabilities	**13,012,314,027**	**13,012,314,028**	**13,012,314,029**	**13,012,314,030**	**13,012,314,031**
Total liabilities	**15,037,666,617**	**15,037,666,618**	**15,037,666,619**	**15,037,666,620**	**15,037,666,621**

Source Team's estimate

Table 2.98 Forecasted Balance Sheet Year 2038 to 2042 (Equities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2038 Forecasted	2039 Forecasted	2040 Forecasted	2041 Forecasted	2042 Forecasted
Equity					
Share capital					
Authorised share capital					
Ordinary shares 2,477,474,454 shares	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454
Issued and paid-up share capital					
Ordinary shares 2,117,716,281 shares	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281
Premium on ordinary shares	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325
Retained earnings					
Appropriated-legal reserve	81,303,726	81,303,726	81,303,726	81,303,726	81,303,726
Unappropriated retained earnings	23,532,674,375	24,203,449,277	24,815,512,228	25,388,834,591	25,929,554,764
Other components of equity	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)	(473,307,381)
Equity attributable to owners of the parent	26,303,891,326	26,974,666,228	27,586,729,179	28,160,051,542	28,700,771,715
Non-controlling interests	-	-	-	-	-
Total equity	**26,303,891,326**	**26,974,666,228**	**27,586,729,179**	**28,160,051,542**	**28,700,771,715**
Total liabilities and equity	**41,341,557,943**	**42,012,332,846**	**42,624,395,798**	**43,197,718,162**	**43,738,438,336**

Source Team's estimate

Table 2.99 Forecasted Balance Sheet Year 2043 to 2047 (Assets)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2043 Forecasted	2044 Forecasted	2045 Forecasted	2046 Forecasted	2047 Forecasted
Assets					
Current assets					
Cash and cash equivalents	24,256,107,257	24,742,747,433	25,192,446,432	25,636,150,468	26,074,884,756
Short-term restricted bank deposits	18,864,046	18,864,046	18,864,046	18,864,046	18,864,046
Short-term investments	221,114,307	221,114,307	221,114,307	221,114,307	221,114,307
Trade and other receivables	409,018,474	377,451,983	374,180,022	371,879,064	369,578,107
Inventories	22,835,252	21,072,914	20,890,243	20,761,782	20,633,321
Refundable Value Added Tax	273,156,145	273,156,145	273,156,145	273,156,145	273,156,145
Other current assets	30,316,921	30,316,921	30,316,921	30,316,921	30,316,921
Total current assets	**25,231,412,402**	**25,684,723,749**	**26,130,968,115**	**26,572,242,733**	**27,008,547,603**
Non-current assets					
Long-term restricted bank deposits	34,239,939	34,239,939	34,239,939	34,239,939	34,239,939
Investments in joint ventures	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520	1,840,054,520
Investment properties	103,857,149	103,857,149	103,857,149	103,857,149	103,857,149
Property, plant and equipment	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170	12,349,859,170
Goodwill	17,112,763	17,112,763	17,112,763	17,112,763	17,112,763
Intangible assets	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201	4,669,898,201
Deferred tax assets	1,623,005	1,623,005	1,623,005	1,623,005	1,623,005
Other non-current assets	11,871,762	11,871,763	11,871,764	11,871,765	11,871,766
Total non-current assets	**19,028,516,509**	**19,028,516,510**	**19,028,516,511**	**19,028,516,512**	**19,028,516,513**
Total assets	**44,259,928,911**	**44,713,240,259**	**45,159,484,626**	**45,600,759,245**	**46,037,064,116**

Source Team's estimate

Table 2.100 Forecasted Balance Sheet Year 2043 to 2047 (Liabilities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2043 Forecasted	2044 Forecasted	2045 Forecasted	2046 Forecasted	2047 Forecasted
Liabilities and equity					
Current liabilities					
Short-term borrowings from financial institutions	98,470,171	98,470,171	98,470,171	98,470,171	98,470,171
Construction and other payables	199,267,433	199,267,433	199,267,433	199,267,433	199,267,433
	2,056,215	2,056,215	2,056,215	2,056,215	2,056,215
Current portion of finance lease liabilities	7,195,003	7,195,003	7,195,003	7,195,003	7,195,003
Current portion of long-term borrowings	737,755,685	737,755,685	737,755,685	737,755,685	737,755,685
Current portion of debentures	949,800,983	949,800,983	949,800,983	949,800,983	949,800,983
Income tax payable	4,404,066	4,404,066	4,404,066	4,404,066	4,404,066
Other current liabilities	26,403,034	26,403,034	26,403,034	26,403,034	26,403,034
Total current liabilities	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**	**2,025,352,590**
Non-current liabilities					
Right in power purchase agreement payables	73,328,549	73,328,549	73,328,549	73,328,549	73,328,549
Finance lease liabilities	13,280,673	13,280,673	13,280,673	13,280,673	13,280,673
Long-term borrowings from financial institutions	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390	10,536,434,390
Debentures	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775	2,345,024,775
Employee benefit obligations	13,521,825	13,521,825	13,521,825	13,521,825	13,521,825
Provision for decommissioning costs	2,584,824	2,584,824	2,584,824	2,584,824	2,584,824
Deferred tax liabilities	28,066,973	28,066,973	28,066,973	28,066,973	28,066,973
Other non-current liabilities	72,023	72,024	72,025	72,026	72,027
Total non-current liabilities	**13,012,314,032**	**13,012,314,033**	**13,012,314,034**	**13,012,314,035**	**13,012,314,036**
Total liabilities	**15,037,666,622**	**15,037,666,623**	**15,037,666,624**	**15,037,666,625**	**15,037,666,626**

Source Team's estimate

Table 2.101 Forecasted Balance Sheet Year 2043 to 2047 (Equities)

Unit: Baht

Thai Solar Energy Public Company Limited Profit and Loss Statement	2043 Forecasted	2044 Forecasted	2045 Forecasted	2046 Forecasted	2047 Forecasted
Equity					
Share capital					
Authorised share capital					
Ordinary shares 2,477,474,454 shares	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454	2,477,474,454
Issued and paid-up share capital					
Ordinary shares 2,117,716,281 shares	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281	2,117,716,281
Premium on ordinary shares	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325	1,045,504,325
Retained earnings					
Appropriated-legal reserve	81,303,726	81,303,726	81,303,726	81,303,726	81,303,726
Unappropriated retained earnings	26,451,045,338	26,904,356,684	27,350,601,049	27,791,875,666	28,228,180,535
Other components of equity	(473,307,381)	(473,307,380)	(473,307,379)	(473,307,378)	(473,307,377)
Equity attributable to owners of the parent	29,222,262,289	29,675,573,636	30,121,818,002	30,563,092,620	30,999,397,490
Non-controlling interests	-	-	-	-	-
Total equity	**29,222,262,289**	**29,675,573,636**	**30,121,818,002**	**30,563,092,620**	**30,999,397,490**
Total liabilities and equity	**44,259,928,911**	**44,713,240,259**	**45,159,484,626**	**45,600,759,245**	**46,037,064,116**

Source Team's estimate

REFERENCES

Blume method. (n.d.). Retrieved from https://breakingdownfinance.com/finance-topics/performance-measurement/blume-method/

Japan sets solar PV feed-in tariffs for the 2020-2021 year. (2020, February 7). Retrieved from https://www.enerdata.net/publications/daily-energy-news/japan-sets-solar-pv-feed-tariffs-2020-2021-year.html

Japan to more than halve its solar power feed-in tariffs. (2018, September 15). Retrieved from https://www.japantimes.co.jp/news/2018/09/15/business/japan-halve-solar-power-feed-tariffs/#.XqrLyM7itPZ

Mark, C. (2020, April 27). How shinzo abe has fumbled japan's coronavirus response. Retrieved from https://theconversation.com/how-shinzo-abe-has-fumbled-japans-coronavirus-response-136860

Metamotivational knowledge of the role of high-level and low-level construal in goal-relevant task performance. Journal of Personality and Social Psychology, 117(5), 879-899. http://dx.doi.org/10.1037/pspa0000166

Nguyen, T., Carnevale, J. J., Scholer, A. A., Miele, D. B., & Fujita, K. (2019).

Reduction of business days in aprial at Toshiba corporation and Toshiba group companies in japan. (2020, April 16). Retrieved from https://www.toshiba.co.jp/about/press/2020_04/pr1601.htm.

Suphahitanukool, C., Hunsacharoonroj, I., Usapein, P., Khedari, J., Waewsak, J., & Hirunalbh, J. (2018). An evaluation of economic potential solar photovoltanic farm in thailand: case study of polycrystalline silicon and amorphous silicon thin film. International Journal of Energy Economics and Policy, 8(4), 33-41.

Taiwan's solar pv installations could hit 20gw by 2025. (2020, February 24). Retrieved from https://asian-power.com/power-utility/news/taiwans-solar-pv-installations-could-hit-20gw-2025

Toshiba and tse signed the construction agreement for mega solar project “onikoube solar power plant” in miyagi prefecture. (2020, March 30). Retrieved from http://www.thailand4.com/.nrg/2020-03-30/b18a5489c3605b23e23165110a5b3017/

Toshiba signs epc contract for 147mw onikoube solar plant in japan. (2020, March 31). Retrieved from https://www.worldconstructionnetwork.com/news/toshiba-signs-epc-contract-for-147mw-onikoube-solar-plant-in-japan/

Tris rating affirms company rating on “tse” at “bbb” and revises outlook to “negative” from “stable”. (2019, September 26). Retrieved from https://www.ryt9.com/en/trsn/232055.