

# Decision Analysis

## Rooftop Solar PV System

**State the decision** *The decision is based on the total scores given to each supplier which considers for all aspect including cost, technical, experience and appropriate system proposed*

## Develop objectives

What results do we want?  
What resources should we use or save?  
What restrictions do we have?  
What objectives need to be more specific?

## Classify objectives

If the objective is mandatory, measurable, and realistic, label it a MUST.

## Weigh the WANTs

For the other objectives, what is the relative importance of each WANT?

## Objectives

Must		
1. Minimum capacity of Rooftop solar panel is at least 1,500 kWp	Must	Go / No Go
2. Working at Height complying	Must	Go / No Go
Want - Technical proposal (25% of total points)		
1. Preliminary system design is appropriate for site needs, consider th whole assiged area.	Want	5
2. Projected energy production is realistic and appropriate for the whole site.	Want	5
3. Module, inverter, mouting and monitoring components stanrdard, reliability and warranty.	Want	5
4. Performance or Production energy monitoring system is appropiate and applicable for real time use.	Want	5
5. Project schedule and organization	Want	5
Want - Qualifications and experience (30% of total points)		
1. Financial stability and proof of funding for these projects, considering 3 years financial statement	Want	5
2. Project reference and experience of Rooftop solar, total portfolio considering both EPA and PPA	Want	10
3. HSE standard and other related standards, compliance of OHSAS 18001	Want	15
Want - Commercial proposal (45% of total points)		
1. PPA total discount rate (consider to total capacity) / EPC total purchase cost	Want	30
2. Additional costs stipulated in the proposal or antipaicated reviewer, including operation & maintenance costs, if applicable	Want	10
3. Credit term	Want	5

100

- DA Participants**
1. Mr. Songpon Soontaros
2. Mr. Apicha Krutaroj
3. Mr. Naprud Paisansin

**Executive summary**  
Resulting from decision analysis Cleantech Solar has the highest scores based on outstanding performance of Technical, Qualification and Experiences and HSE management but their commercial benefit offer to business is a second rank because of lower discount rate provided compare to Greenpower.

Based on commercial benefit provided from Cleantech Solar there will be a benefit to business in form of price discount 27.5% which is converted to 2.432 million THB saving per annum however if we consider this to the discount provided from Greenpower, there is an opportunity loss 0.840 million THB per annum.

The decision taken is based on the overall performance of supplier including Technical, Qualification and Experience, HSE management and Commercial. Cleantech Solar is awarded for this project and the negotiation will be continuing to minimize the opportunity loss as much as possible.

## Evaluate Alternatives

### Generate alternatives

New Tenders

### Screen through MUSTs/Compare against WANTs

*How does this alternative satisfy this objective?*  
*Performance: MUST — Eliminate any alternatives that do not meet all MUST objectives. (Label them NO GO.)*  
*WANT — Rate the performance of each alternative against the WANT objectives. Record information on performance by score 10, 7, 5 and 0 repectively.*

Alternative 1			Alternative 2			Alternative 3			Alternative 4		
Performance	Cleantech Solar (Thailand) Limited	Score	Performance	GLOW GROUP	Score	Performance	Greenpower Tech Co.,Ltd	Score	Performance	WHA UTILITIES AND POWER PLC.	Score
GO	2,169.99 kWp		GO	2,025.4 kWp		GO	2,680 kWp (+/- 10%)		GO	1.612 MWp	
GO	Qualified - Rank 1		GO	Qualified - Rank 3		GO	Qualified - Rank 2		NO GO	Disqualified -	
10	Complying with guideline	50	10	Complying with guideline	50	7	Some area is not possible for installation.	35	7	Some area is not possible for installation.	35
10	Complying with guideline with Rank 1 of installed capacity and appropriated efficiency of Solar ratio 1,290	50	7	Complying with guideline with Rank 2 of installed capacity and appropriated efficiency of Solar ratio 1,321	35	5	Some area is not possible for installation and efficiency of Solar ratio 1,352 which is too high.	25	0	Some area is not possible for installation and appropriated efficiency of Solar ratio 1,327	0
10	Solar panel Tellmax 390 - 415 watt/panel, Inverter Huawei	50	10	Solar panel Jinko, Inverter Huawei 16 units (100 kW)	50	10	Solar panel Jager 415-435 watt/panel, 425 - 4555 watt/panel, Inverter ABB, Huawei and SMA	50	7	No equipment brand specified. Inveter 24 units	35
10	Monitoring Systems Overview at Mazak & K&N	50	7	Monitoring system is available for seller	35	10	Green yellow smart solution	50	5	No monitoring system mentioned	25
10	Full team information provided with project lead time 8 months	50	5	Full team information provided with project lead time 18 months	25	7	Full team information provided with project lead time 15 months	35	10	Full team information provided with project lead time 8 months	50
10	Shell is a main shareholder with 49% equity, compay is profitable on 2019 with total equity 200 million THB (registered capital)	50	10	Compay is profitable on 2019 with total equity 500 million THB (registered capital)	50	10	Company is profitable on 2019 with total equity 905 million THB (registered capital)	50	10	Company is profitable on 2019 with total equity 3,825 million THB (registered capital)	50
10	Project reference 226 projects with total capacity 460 MWp largest capacity per site 3.04 MWp	100	0	Rooftop 2 MW, with few project references and PTT gas station	0	5	35 project with capacity 20.5 MWp	50	7	38 projects with 27 MW capacity (largest 5 MW) and conventional power about 2,500 MW	70
10	Completing of HSE assessment as 1st rank	150	5	Completing of HSE assessment as 3rd rank	75	7	Completing of HSE assessment as 2nd rank	105	0	Disqualified for HSE evaluation	0
		0			0			0			0
7	27.5% Discount from tariff	210	5	18% Discount from tariff	150	10	35% Discount from tariff 4.2.1	300	0	7% Discount on tariff	0
10	No additional costs	100	10	No additional costs	100	10	No additional costs	100	10	No additional costs	100
7	7th business day for each calendar month and payment shall be made within 14 days	35	10	10th business day for each calendar month and payment shall be made within 30 days	50	10	Payment shall be made within 30 days following receipt of the invoice.	50	0	Not applicable	0
		0			0			0			0
		895			620			850			365

### Approver Authorization

### Approve by VP HSE THAILAND

Ms. Petcharat Wongkamonnrat

### Approve by VP Supply Chain

Mr. Paisan Korsan-nga-luck

### Approve by VP Manufacturing Thailand:

Mr. Charan Suantai

Make Decision	
Cleantech Solar (Thailand) Limited	#1