

Center for investment services- Golestan Province

Financial-technical Pre-feasibility Study Brief

Plan topic: Solar panel

ISIC CODE: ISIC 31101331

Location: Golestan province

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Date: 2019

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1-Project introduction

1-1- project title: Solar panel

1-2- projects proposed location: Golestan province

1-3- product & Annual production capacity: solar panel 260 W, 10 MW

1-4- Total required capital funding: 86666 million Rials (Currency: 485380 USD / Rial: 47835 million Rials)

- **Working Capital:** 25500 million rials

- **Constant capital:** 61166 million rials

1-5- Type of the stock material:

Class A Solar Cell 10 PCS

1-6- Domestic access to stock material in percentage: 8%

1-7- Staff requirements: 29 person

1-8- Rate of output at the breakeven point: 17%

1-9- Internal (gross) Rate of Return: 54%

1-10- Technical knowledge acquirements procedures:

China ,Japan ,South Korea ,Germany ,Italy ,USA

2-Tecnichal details

2-1- product introduction

A solar panel consisting of solar cells that contains a solar cell It consists of a semiconductor with an electrical connection. This piece absorbs solar energy and energizes it Electric converts.

The size of the solar cells is chosen according to the type of application. The size of these cells is usually 10x10 and 15x15cm. The geometric shapes of these cells are rectangular squares, but they can be In other shapes, such as a circle and a semicircle, it was also produced. Adequate conditions for a solar cell with dimensions 10 x 10 centimeters exposed to direct sunlight can produce 1.5 volts of electricity. From joining a number From a solar cell, a module is created, and from the connection of a number of modules, an array is constructed

It's going to include the 061 watt panel design.

Applications of solar cell systems as sources of energy are as follows:

Electric charging devices for water and fountains, supply of public parks and urban public transport systems. Power supply for small boats, telecommunication, traffic signs, data processing intermediates, remote sensing screens, industrial screens, remote monitoring of cathodic protection, hotels and restaurants, cooling of medical supplies (such as vaccines and blood products), Lanterns and lights for guides (sea and ...) Electricity supply of households and rural equipment Charging of batteries, refiners and small water purification equipment Outdoor pedestrian lighting, schools, private roofs, use in educational centers and Research, use in residential and office towers, power generation in solar power plants

2-3- Description of production process:

Lay-up Enhancement: During expansion, the solar cells are a string that is placed on the EVA sheets. -

Wiring: After placing the solar cells and placing electrical contacts between the cells, they are then wired and laid. Lamination: At this stage, cell lamination is performed.

-Forming: At this point, the forms take up the built-in modules and become panels.

Testing and classification of solar panels using a virtual light source (simulated sun) are tested on the tester's simulator and compared to the input and output, and then tested in the visual inspection area and then verified And are ready to go to the warehouse.

3-Economic situation

3-1- Estimated product demand:

1500 MW

3-2- Export rate in the past 3 years:

no export

3-3- current annual local and domestic production rate:

70 MW

3-4- Import rate in the past 3 years:

156 MW

4-Financial studies

4-1- Capital Expenditures (*capital outlays*):

Constant capital:

description	Value in million Rials	Value in Dollar	Total sum
Land acquisition	3200	---	3200
Buildings construction and improvements on the land facilities	21452	---	21452
Machinery and equipments	7600	---	7600
Vehicles	---	193505	15480
Lab, office, and safety equipments	1600	---	1600
10% - Unexpected costs	5500	---	5500
Pre implementation cost	5483	---	5483
Total fixed capital	850	---	850
Total sum	45685	193505	61166
			61166

Exchange rate parity is considered 80000 rials according to Iran Central Bank (Bank Markazi) official report.

Working Capital

description	Value in million Rials	Value in Dollar	Total sum
Stock material (18 days)	---	291875	23350
salaries and wages (2 months)	1700	---	1700
Other (2 months)	450	---	450
sum	2150	291875	25500
Total sum in million Rials			25500

4-2- Land acquisition:

description	Area (sq m2)	Unit Value in million Rials	Total sum in million Rials
Land	4000	800000	3200

4-3- Buildings construction and improvements on the land:

description	Area (sq m2)	Unit Value in million Rials	Total sum in million Rials
Production salon	900	10000000	9000
stores	800	9000000	7200
Office , services building	300	12000000	3600
Improvement on the land	2000	400000	1200
Fencing	565(m)	800000	452
Sum			21452

4-4- Facilities:

description	Technical details	Unit Value in million Rials	Total sum in million Rials
Power supply systems	1	1000	1000
Water supply systems	1	150	150
Gas delivery	1	350	350
Electrical installation	1	550	550
Air composer	1	350	350
Heating & Cooling system	1	2400	2400
Water source	1	120	120
Camera system	1	680	680
Fire suppression system	1	700	700
Generator	1	1300	1300
sum			7600

4-5- Machinery and equipments:

description	quantity	Unit value in Dollar	Total value in Dollar	Unit Value in million Rials	Total value in million Rials	Total sum in million Rials
Full Automatic Solar Cell Tabber Stringer Machine	1	53000	53000			4240
Full Automatic Laminator	1	43000	43000			3440
Solar Cell Fiber Laser Scribing Machine	1	10000	10000			800
Solar Cell Tester	1	10000	10000			800
Solar Panel Tester	1	10000	10000			800
Offline Solar Panel EL Defect Tester	1	10000	10000			800
Semi Automatic Solar Panel Framing Machine	1	5000	5000			400
Solar Cell Welding Station	1	950	950			76
Lay up station	2	900	1800			144
Manual EVA/TPT cutter	1	800	800			64
Visual Inspection Station	1	500	500			40
Glass/Solar Module Carrier	4	250	1000			80
Ready material carrier	4	280	1120			89.6
String Cell Carrier	4	280	1120			89.6
EVA/TPT Carrier	2	280	560			44.8
Loading and shipping			22327.5			1786.2
Installation cost			22327.5			1786.2
sum			193505			15480.4

4-6- Vehicles:

description	quantity	Unit Value in million Rials	Total sum in million Rials
Lift truck	1	1000	1000
Pickup truck	1	600	600
sum			1600

4-7- Lab, office, and safety equipments:

description	quantity	Unit Value in million Rials	Total sum in million Rials
Lab equipments	1	3200	3200
Office supplier	1	1500	1500
Safety equipments	1	800	800
sum			5500

4-8- Pre implementation cost:

description	Total sum in million Rials
Licenses	100
Feasibility study	80
Drawings and plans	670
One person's salary	120
sum	850

Product cost calculation:

4-9- Type, quantity, and cost of the stock material and required packaging:

description	unit	Consumption rate	value in exchange	Total value in Dollar	Value in Rials	Total sum in million Rials
Class A Solar Cell 10PCS	Number	2402000		3603000		288240
Back Sheet TPT	M^2	65340		124146		9931
EVA	M^2	130680		151589		12127
Tempered glass With AR coating	M^2	64445		225557		18045
Junction Box 5 - Pre-Potting Type	unit	40000		130000		10400
Silicone Sealant	number	8500		22100		1768
Solder Strip	Kilogram	3000		33000		2640
Aluminum frame	set	40000		280000		22400
Loading and shipping		1		685409		54833
Internal materials		1			36555	36555
sum				5254801	36555	456939

4-10- Human resources:

description	quantity	Monthly wage (rials)	Monthly wage sum in million Rials	Total sum annual salaries in million Rials
Management staff	1	30000000	30	360
Office worker	3	20000000	60	720
Manufacturing labor				
- Expert	6	25000000	150	1800
- Skilled	10	20000000	200	2400
- Unskilled	9	15000000	135	1620
- welfare				3001
sum				9901

4-11- annual fuel and energy consumption:

description	unit	Consumption rate	Unit Value in Rials	Total sum in million Rials
Water	M ³	1080	1500	1.62
Electricity	Kwh	120000	3000	360
gas	Liter	24000	2000	48
gasoline	Liter	12000	10000	120
Telephone communication	Pals	600000	200	120
sum				649.62

4-12- annual depreciation expenses and repair and maintenance costs:

description	Asset value in million Rials	Deprecation		repair and maintenance	
		Percentage	quantity	Percentage	quantity
Buildings construction and improvements on the land	21452	7	1502	3	644
facilities	7600	7	532	4	304
Machinery and equipments ,vehicles ,lab , office	22580	10	2258	4	903
sum			4292		1851

4-13- Annual earnings forecast:

description	Production rate(watt)	Unit sale in Rials	Earning in million Rials	Earning in Euros	Total sum in million Rials
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Solar panel	10000000	50000	500000		500000
sum					500000

- full price calculation is based on 46673 Rials per watt.
- Sale price of the similar products available in the market is 50000 Rials per watt.
- Production breakeven point: 17 percentage
- rate of return on investment (roi): 54 percentage

5- project justification:

- a) High energy consumption
- b) Decrease environmental pollution
- c) Financial : 1) return on investment 3.5 years 2) Production break even point: 17% 3) rate of return on investment (roi): 54 %

6- qualifications, benefits, and incentives of implementing the project in the region:

- a) Small number of solar panel manufacture
- b) Government support

7- Contact information:

Project plan Consultant :

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