

SOLAR ITEMS

1. INTRODUCTION:

Now a day the non-conventional and renewable sources of energy such as solar energy are gaining importance. Solar energy is abundant, environments friendly and pollution free. India receives high solar radiations in several states and the country's solar potential is estimated at 750 GW assuming use of just 3% of wasteland area. The technology for solar energy conversion to usable electrical and heat has now become very economical.

India, with its tropical climate, can tap Solar energy for heating of water or drying in domestic & industrial purposes as also for non-heating purposes by converting to electrical energy with photo-voltaic (PV) modules viz. Domestic, commercial and street lighting. This energy is free and once initial system cost is incurred, recurring expenses are minimal.

2. PRODUCT & ITS APPLICATION:

Several Solar energy based systems and appliances with various types and sizes of PV modules have become available in markets. Combined with low power consuming LED lights the solar PV system is making inroads in all lighting sectors from Emergency lamps, solar lanterns, domestic and large lighting systems based for powering Homes, commercial housing for lighting, Street lights, etc. as also for running home appliances like Fan, Radio, TV, etc., UPS for Computers/Lap-top, Room heaters and also significantly large Power plants can be operated successfully to supply power to industries and public utilities like railway stations, airports, bus stations etc.

The non-conventional solar heating system is the simplest and reasonable low cost. This system consists of collector panels of 2 M X 1 M, water tanks & insulated piping. The water thus heated can be stored in those tanks, in 100, 200 & 250 lps

for domestic purposes & 1000, 2000 & 3000 lpd for non-domestic segments like kitchen cooking systems, hot water systems for hotels, hostels, hospitals and even residential colonies. The hot water systems have also found important application in the dairy and food industry, post-harvest dryers etc.

A Solar lantern, torch and single light unit are a simple application of solar photovoltaic (SPV) technology, with use in rural regions where the power supply is irregular and scarce. Solar Street Light system is now becoming very popular in the country for public utilities and local governments. This system is an ideal application for campus and village street lighting. The system is provided with battery storage backup sufficient to operate the light for 10-11 hours daily. The system is also provided with automatic ON/OFF switch for dusk to dawn operation and overcharge / deep discharge prevention cut-off with LED indicators.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any ITI, Diploma or Graduate with some background in manufacturing or marketing.

4. INDUSTRY OUTLOOK/TREND

India is now home to world's largest solar plant on a 'single location'. The plant, in Kamuthi, Tamil Nadu, comes with a capacity of 648 MW and covers an area of 10 sq/km. With this, India's total installed capacity of solar plants has nudged across 17.05 GW total capacity as of 2017 and likely to cross over the 20 GW mark in 2018. Indian government is targeting US\$100 billion in investment and 100 GW of solar capacity (40 GW from rooftop solar) by 2022.

The solar power industry in India offering solar power plant for home is still at a crucial stage and likely to emerge in view of the government initiatives. Many small and medium as well as large electric appliances companies have started offering various items /products for solar energy utilization or for solar power plants. These units are located all around industrial and urban centers in India to provide services

to end-user industries. The Indian industry is dominated by Chinese solar cell technology and very rare technological innovation is taken up. However, in recent years, the demand of Solar cell production systems is rising.

Demand for solar items is anticipated to rise significantly due to rapid investments and due to their efficient performance. It is anticipated to be the fastest growing product segment during the next five years. Factors such as lower cost of energy, lower air pollution etc. Has led to its wide usage. The technology trend of new cell technology and machines and hence solar system is likely to dominate.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Our country is spear heading the adoption of non-conventional energy harvesting in a big way. In view of huge potential for solar and wind energy harvesting, government has been encouraging adoption of Solar and Wind farms as thrust area to accompany the conventional power plants. Besides several SPV based products have emerged as mass consumer products for rural as also for need of modern gadgets like mobile etc. charger units.

Looking to the technology trend there will be many new products likely to evolve and the existing products will see exponential growth in coming decades. Street lighting and similar lighting systems are likely to be standard for all future needs.

Similarly solar systems have already gained popularity and likely to emerge as standard system for hotels, Hostels and hospitals in future. A project to take solar SPV based products, and manufacture of SPV modules for larger systems will have good potential in coming decades.

6. RAW MATERIAL REQUIREMENTS:

The project will require major materials like mono and poly-crystalline silicon PV cells with high efficiency and reliability, electronic components like thirstier modules etc. for inverter systems to convert DC power into AC, various control

units for monitoring SPV modules, positioners and solar trackers sealed energy storage batteries and fabrication materials like plastic and aluminum foils, aluminum sections, sheet glass and steel items for of panels and structures etc. All of these items are to be procured from manufacturers. All materials are available easily.

7. MANUFACTURING PROCESS:

The main process consists of fabricating solar cells joining and building modules. Mono crystalline and Poly crystalline Silicon wafers etched in to solar cells are procured from main suppliers. Depending on the desired capacity and economy of basic power modules sizing is done for the power system. These power modules then connected with individual inverting units of modules. These outputs are then combined by circuit element the voltage and current are brought to transmission system parameters. The storage battery units and charger circuit modules are connected with SPV modules and tested for generation levels and power quality parameters are measured. For lighting systems the module mounting structure is fabricated, treated painted and kept ready.

For smaller solar products viz solar torches and lanterns, chargers etc. The housing is designed to build and mount SPV modules and storage battery units along with charging circuits. These products are assembled and tested for performance parameters and packed for dispatch.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 10 employees initially and increase to 28 or more depending on business volume.

Sr No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	18000	2	3	4	5	6
2	Semi-Skilled/ Helpers	8000	4	6	8	10	12

3	Supervisor/ Manager	30000	1	1	1	1	1
4	Accounts/ Marketing	16000	2	3	3	3	3
5	Other Staff	7000	1	3	6	6	6
	TOTAL		10	16	22	25	28

9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 3 months from the serious initiation of project work.

Sr No	Activities	Time Required in Months
1	Acquisition of Premises	-
2	Construction (if Applicable)	-
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Activities run concurrently)	3

10. COST OF PROJECT:

The unit will require total project cost of Rs 31.19 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	0.00
2	Building	0.00
3	Plant and Machinery	15.67
4	Fixtures and Electrical Installation	1.60
5	<i>Other Assets/ Preliminary and Preoperative Expenses</i>	1.00
6	Margin for working Capital	12.92
	TOTAL PROJECT COST	31.19

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 17.48 lakhs and seek bank loans of Rs 13.70 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	17.48
2	Loan Finance	13.71
	TOTAL:	31.19

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	10.65	40	4.26	6.39
2	Receivables	8.46	40	3.38	5.08
3	Overheads	2.43	100	2.43	0.00
4	Creditors	7.10	40	2.84	4.26
	TOTAL	28.65		12.92	15.73

13. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	In coming material testing	Nos	2	35000	70000
2	Solar Cells Module assembly	Nos	2	100000	200000
3	Solar Light sub Assembly /soldering	Nos	1	100000	100000
4	PV Module Testing unit	Nos	2	65000	130000
5	Torch/ Lanterns Assly Unit	Nos	3	30000	90000
6	Assembled Product Test and Quality check	Nos	2	45000	90000
7	Testing station for final products	Nos	2	75000	150000
8	Packing Labeling Station	Nos	1	35000	35000

9	Oscilloscope single/ dual waves	Nos	1	130000	130000
10	Dimmer stats, Transformers	Nos	2	50000	100000
11	LCR bridges, meters	LS	1	25000	25000
12	Welding machine	Nos	1	35000	35000
13	Drilling machine	Nos	2	40000	80000
14	Shearing machine	Nos	2	15000	30000
15	DC power supply	Nos	2	40000	80000
13	Power, volt, amp etc. meters	Nos	4	8000	32000
Tools and Ancillaries					
1	Jigs Fixture Tools for Assly line etc.	LS	1	150000	150000
Sr No	Particulars	UOM	Quantity	Rate	Total Value
2	Hand Tools and gauges	LS	1	40000	40000
Fixtures and Elect Installation					
	Storage and transport bins and trolleys	LS	1	60000	60000
	Office Furniture	LS	1	20000	20000
	Telephones/ Computer	LS	1	30000	30000
	Electrical Installation	LS	1	50000	50000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	100000	100000
TOTAL PLANT MACHINERY COST					1827000

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of dies and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Machinerics and Spares

Ranjit Chawla (Director)201, Karmastambh, LBS Marg, Vikhroli West
Mumbai - 400083, Maharashtra, India

2. Pacific Engineering Corporation

A-297, MIDC-Mahape, Near Mahape Bus Depot,
Anthony Garage, Thane-Belapur Road, Mahape Midc, Navi Mumbai-400710,

3. Face Automation
D215A, Ghatkopar Industrial Estate,
Agra Road Industrial Premises Co Operative Society Limited,
LBS Marg, Ghatkopar West, Mumbai- 400086, Maharashtra, India
4. Ravi Raj Udyog Flat No. 6, Aniket Building, Plot No. 9, Krishna Colony,
Kothrud,
Pune-411038, Maharashtra, India
5. Ephysx Technologies India Private Limited H. No. 1-90/2/10/E, Ground Floor,
Vittal Rao Nagar, Cyberabad, Madhapur,
Hyderabad-500081, Telangana, India
6. MicroLOGIX473/D, 13th Cross, 4th Phase Peenya Industrial Area,
Bengaluru-560058, Karnataka, India

13. PROFITABILITY CALCULATIONS:

Sr No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	30	40	50	60	70
2	Sales	Rs. Lakhs	101.54	135.39	169.24	203.09	236.94
3	Raw Materials & Other Direct Inputs	Rs. Lakhs	85.22	113.63	142.04	170.45	198.86
4	Gross Margin	Rs. Lakhs	16.32	21.76	27.20	32.64	38.08
5	Overheads Except Interest	Rs. Lakhs	12.67	12.67	12.67	12.67	12.67
6	Interest	Rs. Lakhs	1.92	1.92	1.92	1.92	1.92
7	Depreciation	Rs. Lakhs	1.83	1.83	1.83	1.83	1.83

8	Net Profit Before Tax	Rs. Lakhs	-0.09	5.35	10.79	16.23	21.67
---	-----------------------	--------------	-------	------	-------	-------	-------

The basis of profitability calculation:

The Unit will have capacity of 1000 KW panels and systems per year of different types/ ratings. Depending size/ type/ ratings the bulk sale/ distribution sales prices ranges from Rs 30,000 per Kw to Rs 350000 per kw for systems depending on supply of solar trackers, control panels, safety breakers, back up battery systems etc. and volumes.

The cost of main materials like solar cells material cost ranges from 10 to 50 per watt capacity and panels cost from Rs 25000 to 70000 per KW. The other material requirements are support structure, positioners/ trackers, thyristors and electronic circuit components, inverter units, AC/ dc circuit isolators, breakers etc. The wastage/ scrap etc. is considered at 3% of finished products. The unusable scrap is sold and the income of same is added. Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per liter. The depreciation of plant is taken at 10 % and Interest costs are taken at 14 -15 % depending on type of industry.

14. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 30.17 % of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs. Lakhs	338.48
2	Variable Costs	Rs. Lakhs	284.08
3	Fixed Cost incl. Interest	Rs. Lakhs	16.41
4	Break Even Capacity	% of Inst Capacity	30.17

16. STATUTORY/ GOVERNMENT APPROVALS

The unit shall have to get state industrial unit registration from DIC, IEC Code for Export and local authority clearance. Depending on structure of finance the company shall need to register company with registrar of companies. The registration and approval for factory plan, safety for Fire etc. requirement, registration as per Labour laws ESI, PF etc. shall be required as per rules and applicability. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. As such there is no pollution control registration requirements, except installation of chimney/ blowers for heat treatment furnace / pickling line and ensure safe environment as per rules of factory safety. Solid waste disposal shall have to meet the required norms. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATION

The machines and equipment offer scope for diversification in to producing the continuous flux cored and coated electrode range of products and also take up import substitution for welding electrodes by ensuring metal and flux compositions. The unit can also of other consumer and industrial wire products / components etc. by using the spare capacities and machine capabilities. As such there is not much scope for organic backward or forward integration.

18. TRAINING CENTERS/COURSES

There are no specific training centers for wire drawing technology. There are training for dies and tools development run by several centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, and CTTC Bhubaneswar etc. shall be helpful.

The most important scope of learning is in new product design and development by associating with institutes like NID etc. Entrepreneur may also study the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data. Viz.

North American, Europe, China etc. markets.

Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for hand-holding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.

Source:- Udyami Mitra/Sidbi