

PROJECT PROFILE ON LED BASED SOLAR LANTERN

- 1. Product:-** LED Based Solar Lantern
- 2. NIC Code (1998):-** -
- 3. Product Code (ASICC-2000):-** 79104
- 4. Production capacity:-** Qty. 10200 Nos
(Value Rs 2,14,20,000)
- 5. Month & year of Preparation:-** 2009
- 6. Prepared by:-** MSME-Development Institute
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1. Introduction:

LED solar lantern system is a solar energy based system for operating LED lights for specified hours of operation per day.

LED based lighting system has become a popular substitute for low voltage lighting as LEDs do not suffer from low efficiency, poor reliability and short life time exhibited by bulbs. LED's are favored over incandescent bulb or CFL as LEDs convert far more of their energy in to light .For instance, substantial amount of energy is wasted as heat in bulbs. Increased efficiency means that batteries will last much longer maintaining the brightness. The lifetime of LEDs is over 1000,000 hours. The maintenance cost is negligible. Also it operates in at a voltage as low as 1.8 V. So LED Technology has opened new vistas for lighting with its unparalleled capabilities.

One of the advantages of LED is that it is drawing a very low current compared to a CFL/incandescent bulb. The overall power requirement for LED is much less than CFL. As a result the duration of the light availability is increased (more than 6-7 hours) and the possibility of deep discharge is eliminated. Since the average use of light in any household is less than 6 hours a day, the battery is also getting fully charged everyday and the total backup time is much higher than conventional CFL and the possibility of using the lantern with partial charging is less. The other reason is that the LED uses direct DC voltage from the battery while CFL need high voltage to glow which is converted from the DC voltage of the battery. There is always a conversion loss, which occurs in case of CFL .In this project, super bright white LEDs are used. The light has sufficient intensity for both reading and illumination purpose and is completely UV free for safe use

2. Market:

The future of LED based solar lantern system is very promising. Considering the cost of Electricity and acute shortage of power in the country, LED based solar lantern has the potential to become a green substitute. Utilizing all advantages like efficient LED lamp with lifetime of 100,000 hrs with elegant design and better reliability, variable light output for low and high brightness, this product surely has a future in the coming years. It is also possible to provide an option for solar/AC mains for charging and apply a special circuit for Battery over charge and deep discharge protections.

There are a few Small Scale units manufacturing Solar based lighting systems in Kerala. There is enough scope in the state to manufacture this product and a few units to manufacture Solar LED based lantern with advanced features mentioned above along with after sale service support can be started in the region

3. Basis & Presumptions:

- The basis for calculation of production capacity has been taken on a single shift basis on 75% efficiency,
- The maximum capacity utilization on single shift basis, for 300 days in a year. During the first year and second year of operations, the capacity utilization is 60% and 80% respectively. The unit is expected to achieve full capacity utilization from the third year onwards,
- The salaries and wages, cost of raw materials, utilities, rent, etc. are based on the prevailing rates in and around Thrissur. These cost factors are likely to vary with time and location,
- Interest on term loan and working capital has been taken @ 16% on an average. This rate may vary depending upon the policy of financial institutions/agencies from time to time,
- The cost of machinery and equipments refer to a particular make/model and the prices are approximate,
- The break-even point percentage indicated is of full capacity utilization,
- The project preparation cost, etc. whenever required could be considered under the pre-operative expense,
- The essential machinery and equipments required for the project have been indicated. The unit may also utilize common facilities available at Electronics Test & Development Centers (ETDC) and Electronic Regional Test Laboratories (ERTLs) set up by state Governments and STQC Directorate of Department of Information Technology,

Ministry of Communication and Information Technology to manufacture products conforming to Bureau of Indian Stand

4. Implementation Schedule:

The major activities in the implementation of the project have been listed and the average time for implementation of the project is estimated at 12 months:

Sl.No	Name of the activity	Period in months (Estimated)
1	Preparation of project report	1
2	Registration & other formalities	1
3	Sanction of loan by financial institution	3
4	Plant & machinery:	
A	Placement of orders	1
b	Procurement	2
c	Electrification & installation	2
5	Procurement of raw materials	2
6	Recruitment of technical personnel	2
7	Trial operation	11 th month
8	Commercial operation	12 th month

Note: Many of the above activities shall be initiated concurrently,

When imported equipments are required, the implementation period of the project may vary from 12 months to 15 months,

Procurement of raw materials commences from the 8th month onwards.

5. Technical aspects:

This LED based solar lantern is made of five main components -the solar photovoltaic panel, battery, driver circuit, protection circuit and LEDs. The solar energy is converted in to Electrical Energy by SPV panel and stored in sealed maintenance free battery. By using this stored electrical energy the drive circuit operate the LEDs

I. Technical Specifications

Solar PV Panel	: 6V/5W
Battery	: Sealed maintenance free 6V /7Ah
Efficiency	: > 85%
Light out put	: >150 Lumens
Back up	: 7 Hrs
LED	: 1W X 4 Nos
Case	: Injection moulded Plastic

II. Process:

The incoming raw materials and components are tested for required quality and specifications. The components are formed, shaped and soldered on pre-designed printed circuit boards and tested for desired performance. The tested PCBs are fixed in the bottom portion of the plastic enclosure; LED array unit is fixed with proper wiring. Connect the PV cell and check whole unit for required performance by measuring the intensity of light produced, charging current, and discharge level of battery.

Finally the tested products are packed with attractive carton for dispatch to dealers/customers.

III. Production Capacity per annum:

Quantity	10,200 Nos
Value	Rs. 2,14,20,000

IV. Motive power required 8 KVA

V. Pollution Control:

Government accords utmost importance to control environmental pollution. The small scale entrepreneurs should have an environmental friendly attitude and adopt pollution control measures by process modification and technology substitution.

India having acceded to the Montreal Protocol in September 1992, the production and use of Ozone Depleting Substances (ODS) like Chlorofluoro Carbon (CFC), Carbon Tetrachloride, Halons and Methyl Chloroform etc. need to be phased out immediately with alternative chemicals/solvents. A notification for detailed rules to regulate ODS phase out under the environment Protection Act, 1986 have been put in place with effect from 19th July, 2000.

The following steps are suggested which may help to control pollution in electronics industry wherever applicable:

In electronic industry fumes and gases are released during hand soldering/wave soldering/dip soldering, which are harmful to people as well as environment and the end products. Alternate technologies may be used to phase out the existing polluting technologies. Numerous new fluxes have been developed containing 2 – 10% solids as opposed to the traditional 15 – 33% solids. Electronic industry uses CFC, Carbon Tetrachloride and Methyl Chloroform for Cleaning of printed circuit boards after assembly to remove flux residues left after soldering, and various kinds of foams for packaging.

Many alternative solvents could replace CFC-113 and Methyl Chloroform in electronics cleaning. Other Chlorinated solvents such as Trichloroethylene, Perchloroethylene and Methylene Chloride have been used as effective cleaners in electronics industry for many years. Other organic solvents such as Ketones and Alcohols are effective in removing both solder fluxes and many polar contaminants.

VI. Energy Conservation

With the growing energy needs and shortage coupled with rising energy cost, a greater thrust in energy efficiency in industrial sector has been given by the Govt. of India since 1980s. The Energy Conservation Act, 2001 has been enacted on 18th August, 2001 which provides for efficient use of energy, its conservation and capacity building of Bureau of Energy Efficiency created under the Act.

The following steps may help for conservation of electrical energy:

- Adoption of energy conserving technologies, production aids and testing

Facility,

- Efficient management of process/manufacturing machineries and systems, QC and testing equipments for yielding maximum Energy Conservation,
- Optimum use of electrical energy for heating during soldering process can be obtained by using efficient temperature controlled soldering and disordering stations,
- Periodical maintenance of motors, compressors, etc.
- Use of power factor correction capacitors. Proper selection and layout of lighting system; timely switching on-off of the lights; use of compact fluorescent lamps wherever possible, etc.

6. Financial Aspects

A) Fixed Capital

i) Land and Building

Built up Area	250 sq.mts,
Office, stores	100 sq.mts.
Assembly and Testing	150 sq.mts.
Rent payable per annum	Rs.1,44,000

ii) Machinery & Equipments

S.No.	Description	Unit(Nos.)	Cost(Rs.)
1	Digital Multimeter ,4½Digit	2	22,000
2	Temp Controlled Soldering Unit	4	20,000
3	LCR Meter	2	20,000
4	Drilling machine	1	6,000
5	Analog Multimeter	2	2,000
6	Tool Kit	4	20,000
7	Electronic screw driver & screw feeder	5	30,000
8	Combined Soldering De soldering Station	2	35,000

9	High speed mini drill set	3	30,000
10	Lux meter -digital	1	40,000
11	Digital Storage Oscilloscope 60 MHz	1	60,000
12	Personal Computer with UPS and Printer	2	80,000
Total			3,65,000
13	Electrification charges @ 10% cost of machinery & equipment		36,500
14	Cost of office furniture/test bench/Air Conditioner		1,00,000
15	Pre Operative expenses		1,00,000
Total fixed capital			6,01,500

B) Working Capital

Recurring expenditure per month

i) Staff & Labour

S.No.	Designation	No.of persons	Total salary/month(Rs.)
1	Manager-cum technical Expert	1	15,000
2	Skilled worker	5	35,000
3	Semi skilled worker	4	16,000
4	Office Assistant	2	5,000
5	Accountant	1	5,000
6	Marketing/Customer support Executives	2	10,000
7	Un Skilled worker	1	3,000
Total			89,000
Perquisites @ 15%			13,350
Total			1,02,350

ii) Raw Materials p.m

S.No.	Description	Ind/imp	Qty (Nos.)	Value(Rs.)
1	Single channel LED driver	Ind	850	1,78,500
2	Injection moulded plastic case	Ind	850	1,25,400
4	Connecting cable, socket, pin, fuse, fuse holder	Ind	LS	11,000
5	Packing cartons	Ind	850	4,250
6	Consumables –Solder & flux	Ind		1,550
7	Solar PV panel 6V/5W	Ind	850	7,65,000
8	White LED	Ind	3400	13,600
9	Sealed maintenance free battery	Ind	850	2,83,900
			Total	13,83,200

iii) Utilities

1	Power	5,000
2	Water	1,000
	Total	6,000

iv) Other contingent expenses per month

S.No.	Description	Amount(Rs.)
1	Rent	12,000
2	Postage & Stationery	2,000
3	Telephone	6,000
4	Repair & Maintenance	4,000
5	Transport & Conveyance	30,000
6	Advertisement & Publicity	20,000
7	Insurance	3,000
8	Miscellaneous expenditure	10,000
	Total	87,000

Total recurring expenditure per month
Working capital (3 months)

Rs 15, 78,550
RS 47, 35,650

C	Total Capital Investment	Rs
	Fixed Capital	6,01,500
	Working Capital	47,35,650
	Total	53,37,150
	Say	53,37,000

D	Financial analysis	
1	Cost of production/annum	Rs
	Total recurring expenditure	1,89,42,600
	Depreciation on machinery & equipment @ 10%	36,500
	Depreciation on office equipment & furniture @ 20%	20,000
	Interest on total capital investment @ 16%	8,53,920
	Total	1,98,53,020
2	Turnover per annum	
	Quantity(Numbers)	10,200
	Total turnover @ Rs 2000/-	2,14,20,000
3	Profit per annum(Before taxes)	15,66,980
4	Net profit ratio = $\frac{\text{Net profit} \times 100}{\text{Total Turnover}}$	7.3 %
5	Rate of Return = $\frac{\text{Net profit} \times 100}{\text{Total Capital Investment}}$	29.3%
6	Break-even point	
	Fixed cost per annum	Rs
1	Rent	1,44,000
2	Depreciation on machinery & equipment @ 10%	36,500
3	Depreciation on office equipment, furniture @ 20%	20,000
4	Interest on total capital investment @ 16%	8,53,920
5	40% salary & wages	4,91.280
6	40% of other contingent expenses excluding rent	

	and insurance	3,45,600
	Total fixed cost	18,91,300
	Break-even point = $\frac{\text{fixed cost} \times 100}{\text{Fixed cost} + \text{net profit}}$	55%

Additional Information:

- The project may be modified/tailored to suit the individual entrepreneurship qualities/capacity, production programme and also to suit the locational characteristics, wherever applicable,
- The technology in this sector is undergoing rapid strides of charge and there is a need for regular monitoring of the national and international technology scenario. The unit, may therefore, keep abreast with new technologies in order to keep them in pace with the developments for global competition,
- Quality today is not only confined to the product or service alone. It also extends to the process and environment in which they are generated. The ISO 9000 defines standards for quality management system and ISO 14001 defines standards for environmental management system for acceptability at international level. The unit may therefore adopt these standards for global competition,
- The margin money recommended is 25% of the working capital at an average. However the percentage of margin money vary as per bank's discretion,

**NAMES AND ADDRESSES OF MACHINERY &
EQUIPMENT SUPPLIERS**

For components

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