PROJECT PROFILE ON LED BASED SOLAR LANTERN

PRODUCT	:	LED Based Solar Lantern
RODUCT CODE (ASICC-2000)	:	79104
PRODUCTION CAPACITY	:	Qty.10200 Nos (Value Rs.2,14,20,000)
YEAR OF PREPARATION	:	2020 - 2021
PREPARED BY	:	ELECTRICAL DIVISION MSME - Development Institute, Shaheed Capt. Gaur MargOppt. Okhla Industrial Area, Estate Okhla, New Delhi:- 110020. Tele. (91) 011-26838269, 26838068, 6838118. Tele/Fax No.: (91) 011-23838016.

1. Introduction:

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

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 safeuse

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 dischargeprotections.

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 theregion

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 andlocation,
- 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 totime,
- The cost of machinery and equipments refer to a particular make/model and the prices areapproximate,
- The break-even point percentage indicated is of full capacity utilization,
- The project preparation cost, etc. whenever required could be considered under the pre-operativeexpense,
- 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 STQCDirectorateofDepartmentofInformationTechnology,

Ministry of Communication and Information Technology to manufacture products conforming to Bureau of IndianStand

4. ImplementationSchedule:

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:

SI.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 initiatedconcurrently,

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 8^{th} 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 theLEDs

I. TechnicalSpecifications

Solar PVPanel	:6V/5W
Battery	: Sealed maintenance free 6V/7Ah
Efficiency	: > 85%
Lightout put	: >150Lumens
Backup	: 7Hrs
LED	: 1W X 4Nos
Case	: Injection mouldedPlastic

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 perannum:

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

IV. Motive powerrequired 8 KVA

V. PollutionControl:

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 testingFacility
- Efficient management of process/manufacturing machineries and systems,QC and testing equipments for yielding maximum EnergyConservation,
- Optimum use of electrical energy for heating during soldering process can be obtained by using efficient temperature controlled soldering and

disorderingstations,

- 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) FixedCapital

i) Land andBuilding

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	105000
3	Semi skilled worker	4	76,000
4	Office Assistant	2	12,000
5	Accountant	1	22,000
6	Marketing/Customer support Executives	2	10,000
7	Un Skilled worker	1	19,000
		Total	**259,000**
	Perquisites @ 15%		**38850**
		Total	**297850**

ii) Raw Materialsp.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 permonth

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 expenditurepermonth **Rs 15, 78,550**
Working capital(3 months) **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 = $\frac{\text{Net profit}}{\text{TotalTurnover}} \times 100$	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 = $\frac{\text{fixed cost} \times 100}{\text{Fixed cost + net profit}}$	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, whereverapplicable,

- 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 globalcompetition,

- 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

M/s Micrologix 473/D, 13th Cross 4th Phase, Peenya Industrial Area, Bangalore 560 058 Ph : +91-80-41272180 E.Mailsates@e-micrologix.com Web site :www.e-micrologix.com
M/s B. M. V. Circuits System C/321, Sector 10 Noida - 201 301 - Uttar Pradesh (India) Phone: + (91)-(120)-4323265 Mobile No. : +(91)-9810188801 / 9310188801 Fax : +(91)-(120)-2533121 E-mail: bmvpcb@rediffmail.com
M/s Buljin ELMEC Pvt. Ltd. 2/10, Plot No: 65 & 78, Krishna Industrial Estate, Mettukuppam, Vanagaram Chennai - 600 095, Tamil Nadu, India Phone: +(91)-(44)-24764657 Fax: +(91)-(44)-24764775 Mobile: +(91)-9841698488 Email: buljin2000@yahoo.com
M/s Signal Circuits 7, Navjeevan, Rajguru Nagar Pune - 410 505, Maharashtra, Tel : +(91)-(20)-65311671 Fax : +(91)-(20)-65311671 Mobile : +(91)-9822900800/9226449257 Email : signalpcb@yahoo.com, ajit@signalpcb.com
M/s Static Systems Pvt Ltd 925, II Floor, 3rd Main, 3rd Cross, 'D' Block, 2nd Stage, Rajajinagar ,Bangalore-560 010, Karnataka Phone : +(91)-(80)-51285756 Mobile Number : 9845374734 / 9880955473 TeleFax : +(91)-(80)-23133597 E-mail: chandrustatic@hotmail.com, staticsystems@airtelbroadband.in

M/s Component and Devices Near Medical trust Hospital, Manikkiri Cross Road Ernamkulam,Kerala Phone : 91-484 2353150,2382250 E mail : component @md3.vsnl.net.in
M/s Kerala sales corporation Post Office Road, Chettiyagadi. Thrissur Kerala. Phone : 0487 2420894 Fax : 0487 2425538
For Solar Panels
M/s EMMVEE SOLAR ,Solar Tower", #55, 6th main, 11th Cross, Lakshmaiah Block, Ganganagar, BANGALORE-560 024.INDIA Phone:+91-80-23337427/28, Fax:+91-80-23332060 E-mail:emmvee@vsnl.com
M/s Ammini Energy Systems Pvt Ltd Industrial Estate Pappanamcode Trivandrum 695 019, India Phone : +91-471-2495588 Fax : +91-471-2495599 Email : mail@ammini.comWeb : www.ammini.com
M/s TATA BP Solar India Ltd, Plot No 78, Electronic City, Hosur Road, Bangalore-560048 Tel: 080-28520972 E-mail:tatabp@tatabp.com Web: tatabpsolar.com
M/s bharat Heavy Electricals Ltd, P.B No 2606, Mysore Road, Bangalore-560026 Tel: 080-26747396
M/sThoshiba Energy and Exports 7, Manjula Apartment, G. G. Road, Near Vishnunagar Police Station 91-251-2497725

TEST EQUIPMENTS
Kamal Electronics 14, Lakshmi Building, J.C Road, Bangalore 560002
Aplab Limited XL 1/583,II Floor KrishnaNivas Adv.EashwaraIyer Road, Kochi 682 035 Phone 0484 2361623 Email aplabkochi@vsnl.net.
Guru Agencies, M.G Road, Ernamkulam, Kerala.
M/s. Meco Instruments Private Limited P.O. Box 6388, 301, Bharat Industrial Estate T.J. Road Sewree (W**)** Mumbai-400015 Tel.022-24137253/24137423 Email sales@mecoinst.comWeb. www.mecoinst.com
M/s. LaxmiElectrotekMana ppat Centre HMT Junction Kaloamassery P.O Ernakulam District Kerala 683 104 Phone 0484-2551288, 2540321