

Energy Meter

PRODUCT CODE (ASICC)	77522
QUALITY AND STANDARDS	IS 13010 :1990
Production Capacity	Quantity: 2,40,000 Nos. (per annum) Value : Rs. 600,00,000
YEAR OF PREPARATION	2002 _ 2003
PREPARED BY	Small Industries Service Institute Opp. Okhla Industrial Estate New Delhi-110020 and Office of the Development Commissioner Small Scale Industries Electrical and Electronics Division 7th Floor, Nirman Bhavan, New Delhi - 110 011.

Introduction

The energy meter is an electrical measuring device, which is used to record Electrical Energy Consumed over a specified period of time in terms of units.

Market Potential

Every house, small factory, business establishment, shops, offices etc. need at least one energy meter to register power consumption. The supplier of electrical raises the bill on the basis reading shown by this meter. The producer of electricity sale the electricity to the electricity boards and boards have to sale this energy to the consumer. Consumer needs to pay the amount against the bill raised by the supplier. The data generate by the energy meter

is the base to raise the bill by power supplier. Because of massive rural and urban electrification programme of Government, there is a good demand for this product. This product is available in single phase and three phases at different current rating as per customer's requirement. Though, newly developed electronic energy meter is also available in the market but in view of simple technology involved to manufacture this product and for replacement of spare parts, the present demand and future prospect of this product is reasonably good.

Basis and Presumptions

- i) The basis for calculation of production capacity has been taken on single shift basis on 75% efficiency.
- ii) The maximum capacity utilization on single shift basis for 300 days a year. During 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.
- iii) The salaries and wages, cost of raw materials, utilities, rents, etc. are based on the prevailing rates in and around Delhi. These cost factors are likely to vary with time and location.
- iv) Interest on term loan and working capital loan has been taken at the rate of 16% on an average. This rate may vary depending upon the policy of the financial institutions/agencies from time to time.
- v) The cost of machinery and equipments refer to a particular make/model and prices are approximate.
- vi) The break-even point percentage indicated is of full capacity utilization.
- vii) The project preparation cost etc. whenever required could be considered under pre-operative expenses.
- viii) The essential production machinery and test equipment required for the project have been indicated. The unit may also utilize common test facilities available at Electronics Test and Development Centres (ETDCs) and Electronic Regional Test

Laboratories (ERTLs) and Regional Testing Centres (RTCs).

Implementation Schedule

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

<i>Sl.No.</i>	<i>Activity</i>	<i>Period (In Months)</i>
1.	Preparation of project report	1
2.	Registration and other formalities	1
3.	Sanction of loan by financial institutions	3
4.	Plant and Machinery:	
	a) Placement of orders	1
	b) Procurement	2
	c) Power connection/Electrification	2
	d) Installation/Erection of machinery/Test Equipment	2
5.	Procurement of raw materials	2

6.	Recruitment of Technical Personnel etc.	2
7.	Trial production	11
8.	Commercial production	12

Notes

1. Many of the above activities shall be initiated concurrently.
2. Procurement of raw materials commences from the 8th month onwards.
3. When imported plant and machinery are required, the implementation period of project may vary from 12 months to 15 months.

Technical Aspects

Process of Manufacture

Energy meter is basically an assembly of electrical and mechanical components. The design of energy meter depends upon which rating of current and voltage upon meter has to work. The components like potential coils and current coils are to be designed in accordance with customer's requirements. Other components like magnets, terminals, Disc and reading registration mechanism are to be designed accordingly. All these components fixed in housing and connection to be made as per circuit designed. Every step needs to be checked, electrical parameters before sub assembly. Complete assembly put on testing bench for final testing to set accuracy of the meter. This testing bench is very important equipment fully computerized. In this bench we have to set power factor frequency, current ratings and speed of rotating disc. When every electrical parameter is checked than meter is to be sent for despatch and ready to install in the customer's premises.

Quality Control and Standards

Energy meters are manufactured confirming to IS 13010:1990.

Production Capacity (per annum)

Description Quantity Value (Rs.)

Energy meters

(a) Single Phase 180000 Nos. 3,60,00,000

(b) Three Phase 60000 Nos. 2,40,00,000

Motive Power 20 kW.

Pollution Control

The 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 Chlorofluore Carbon (CFCs), 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.

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 Government 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:

- i) Adoption of energy conserving technologies, production aids and testing facilities.
- ii) Efficient management of process/manufacturing machineries and systems, QC and testing equipments for yielding maximum Energy Conservation.
- iii) Optimum use of electrical energy for heating during soldering process can be obtained by using efficient temperature controlled soldering and de-soldering stations.
- iv) Periodical maintenance of motors, compressors etc.
- v) 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.

Financial Aspects

A. Fixed Capital

(i) Land and Building

Sl. No.	Description	Qty.(Sq. Mtr.)	Price(Rs.)	Value(Rs.)
1	Work Shed			450
2	Office Block			50
	Total Built up area on Rent (per month)	500	40	20,000
	Total			20,000

(ii) Machinery and Equipments*(a) Production Unit*

Sl. No.	Description	Qty./ Nos.	Rate (Rs.)	Total Price(Rs.)
1	Potential coil/Current Coil winding machine	2	11,500	23,000
2	Drill machine single/ three phase	2	3,750	7,500
3	Taping machine, single/three phase	2	5,250	10,500
4	Grinding machine 4" wheel dia	1	5,000	5,000
5	Air compressor 150 lb/cm ²	1	6,000	6,000
Sl. No.	Description	Qty./ Nos.	Rate (Rs.)	Total Price(Rs.)
6	Compressor Moulding Machine	1	35,000	35,000
7	Magnet Charger 2/4 pole	2	10,000	20,000
8	Hand Press	2	12,000	24,000
Total				131000

(b) Testing Equipment

Sl. No.	Description	Qty./ Nos.	Rate (Rs.)	Total Price(Rs.)
1	Computerized Test Bench consisting of Ampere meter, wattmeter, voltmeter, frequency meter, standard Kwh. meter, variac, including software for Single phase/three phase	2	700,000	1,400,000
2	Megar 0-100 M Ohm	1	1,500	1,500
3	Stop Watch 0-60 minutes	1	1,000	1,000
4	H.V. Break down tester 0-3 kV	1	4,000	4,000
5	Shock Tester	1	2,000	2,000
6	Stray field tester	1	5,000	5,000
Total				14,13,500
Say				15,44,500

(iii) Other Contingent Expenses on Fixed Assets (Rs.)

1	Dies, moulds	LS	LS	100,000
2	Tools/Jigs/Furniture	LS	LS	50,000
3	Installation and electrification charges @ 10% of the cost of machinery and equipment			154450

4	Office equipments Furniture	LS	LS	50,000
5	Pre-operative expenses	LS	LS	10,000
	Total			3,64,450
	Total Fixed Capital			19,08,950
	Say			19,09,000

B. Working Capital (per month)**(i) Raw Materials Including Packing Requirement (per month)**

Sl. No.	Description	Qty. (Set/No.)	Rate	Value (Rs.)
1	M.S. Base cover, front cover, terminal cover	20,200	25	5,00,000
2	Aluminium alloy Die cast main frame	20,200	10	2,00,000
3	Enamelled copper wire (Kg.)	900	175	1,57,500
4	Voltage and current coil bobbin	20,000	3	60,000
5	CRNGO Lamination	20,000	77	15,40,000
6	Bakelite terminal Block	20,000	3	60,000
7	Rotor disc aluminum sheet	20,000	5	1,00,000
8	Rotor shaft and Lower Bearing	20,000	10	200,000
9	Register counter:	20,000	35	7,00,000
	(a) Delrin digits			
	(b) Gear and Pinion			
	(c) Worm			
10	Magnet and Magnet Housing	20,000	10	200,000
11	Misc. items (Brass components, resistance wire, UB Pins, glass etc.)	LS	LS	3,49,500
	Total			40,67,000

(ii) Salary and Wages

1	Manager	1	14000	14,000
2	Supervisor	1	9,000	9,000
3	Sales cum Service Engineer	1	7000	7,000
4	Tester/Q.C. Supervisors	4	7000	28,000
5	Accountant	1	4000	4000
6	Store keeper	1	4000	4000

7	Clerk	1	5000	5,000
8	Skilled Workers	15	6000	90,000
9	Semi-skilled workers	10	5000	50,000
Sl. No.	Description	Qty. (Set/No.)	Rate	Value (Rs.)
10	Un-skilled Worker	5	4000	20,000
11	Peon/Chowkidar	2	4000	8,000
	Total			239,000
	<i>Perquisites @ 15% of salary</i>			35,850
	Total			274,850

(iii) Utilities (per month)

Sl.No.	Particulars	Value (Rs.)
1	Power	25,000
2	Water	5,000
	Total	30,000

(iv) Other Contingent Expenses (per month) (Rs.)

1	Rent	20,000
2	Postage and Stationery	3,000
3	Telephone	5,000
4	Advertisement	17,000
5	Repair and Maintenance	18,000
6	Transportation Expenses	17,000
7	Insurance	2,000
8	Other Misc. Expenses	5,000
	Total	87,000

(v) Total Recurring Expenditure (per month)(i) + (ii) + (iii) + (iv) **44,58,850**(vi) Working Capital (for 3 months) **133,76,550****C. Total Capital Investment**

Fixed Capital	Rs. 19,09,000
Working Capital on 3 months basis	Rs. 133,76,550

Total **Rs. 152,85,550**

Financial Analysis

(1) Cost of Production (per annum)	(Rs.)
(i) Total recurring expenditure	5,35,06,200
(ii) Depreciation on machinery and equipment @ 10%	1,54,450
(iii) Depreciation on Die, moulds tools, jigs and fixtures @ 25%	37,500
(i) Cost of Production (per annum)	(Rs.)
(iv) Depreciation on office equipment, furniture @ 20%	10,000
(v) Interest on total capital investment @ 16%	24,45,688
Total	56153838
Say	561,54,000

(2) Turnover (per annum)

Item	Qty.(Nos)	Rate/ Unit	Sales (Rs.)	Total (Rs.)
1.	Energy Meter Single Phase	1,80,000	200	3,60,00,000
2.	Energy Meter Three Phase	60,000	400	2,40,00,000
	Total			6,00,00,000

(3) Profit (per annum) (Before Taxes) 3,84,60,00

(4) Net Profit Ratio

$$= \frac{\text{Profit per annum} \times 100}{\text{Sales per annum}}$$

$$= \frac{3,84,60,000 \times 100}{6,00,00,000} = 6.41\%$$

(5) Rate of Return

$$= \frac{\text{Profit per annum} \times 100}{\text{Total capital investment}}$$

$$= \frac{3,84,60,000 \times 100}{15,28,55,550} = 25.16\%$$

(6) Break-even Point

Fixed Cost (per annum)	(Rs.)
Rent	2,40,000
Depreciation on machinery and equipment @ 10%	1,54,450
Depreciation on Die, moulds, tools, jigs and fixtures @ 25%	37,500
Depreciation on office equipment, furniture @ 20%	10,000
Interest on total capital investment @ 16%	24,45,688
Fixed Cost (per annum)	(Rs.)
Insurance	24,000
40% of Salaries and wages	13,19,280
40% of other contingent expenses and utilities (excluding rent and insurance)	4,56,000
Total	46,86,918
Say	46,87,000

$$\text{B.E.P.} = \frac{\text{Fixed cost}}{\text{Fixed cost} + \text{Profit}} \times 100$$

Fixed cost + Profit

$$= \frac{4687000}{4687000 + 3846000} \times 100$$

$$= \frac{4687000}{8533000} \times 100 = 54.93\%$$

$$= \frac{468700}{8533000} \times 100 = 54.93\%$$

8533000

Additional Information

- The Project Profile may be modified/tailored to suit the individual entrepreneurship qualities/capacity, production Programme and also to suit the locational characteristics, wherever applicable.
- The Electrical Technology is undergoing rapid strides of change and there is need for regular monitoring of the national and international technology scenario. The unit may, therefore, keep abreast with the 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 Systems and ISO 14001 defines standards for Environmental Management System for

acceptability at international level. The unit may therefore adopt these standards for global competition.

d. The margin money recommended is 25% of the working capital requirement at an average. However, the percentage of margin money may vary as per bank's discretion.

Addresses of Machinery and Equipment Suppliers

1. M/s. Choudhary Trading Co.

A-91/3, Rowland House,
Naraina Indl Area, Phase- 1, New Delhi- 110028

(Coil Winding machine)

2. M/s. Chawla Trading Co.

1651, Bhagirath Place, Behind Govt. School, Delhi- 110006

(Coil Winding machine)

3. M/s. Rinki Engineering Works

WZ-88, Ramgarh Colony, Gali No. 11-12, Najafgarh Road, Opp. Kirti Nagar,
New Delhi - 110015

(Coil Winding machine)

4. M/s. Balaji Industries

Khasra No. 39,
Nand Ram Pradhan Waligali, Johripur, Delhi-110094

(Stamping and lamination)

5 M/s. Bharat Insulating Company

Molhotra Bhawan, 4653/21, Daryaganj, New Delhi - 110002.

(S.E. Copper wire)

6. M/s. Arun Enterprises

B-48, Site-IV, Sahibabad Ghaziabad (U.P.)

(Base, Copper etc.)

7. M/s. Konark Industries No. 22, Indl. Layout,

Banashakari, II Stage, Bangalore-560070

(Registering counter Delrin digits.)

8. M/s. Bansal Industries

6/5 Chajjupur Babarpur, Delhi-110032.

(Permanent Magnet, Magnets and magnets housing)

9. M/s. Paras Sales

Kishan Chowk Modiwad, Jamnagar,

Pin-361005

(Brass Components)

10. M/s. Bansal Moulders

D-43, Sector-59, Noida.

(All raw casting for meter frame)

11. M/s. A.K. Metal Works

A-34, Manglapuri Indl. Area, Phase-II, Delhi.

(Name plates and all Rotor disc.)

12. M/s. Dhiraj Electricals (P) Ltd.

10/128, Vishnu Gali, Vishwas Nagar, Shahdara, Delhi-110032.

(S.E. Copper wire)

13. M/s. Auto and General Casting Pvt. Ltd.

M-12, Badli Indl. Area, Delhi-42.

(Meter frame, Die cast Al. Alloy)

14. M/s. Allied Glasses Pvt. Ltd.

Ram Bagh, Bagpat Road, Meerut_02

(Toughened glass)

15. M/s. Gudex Glass Industries Pvt. Ltd.

Zakir Colony, Hapur Road, Meerut

(Toughened glass)

16. M/s. Dura Magnets (P) Ltd.

HI MIDC Area, Safara, Maharashtra -415004

(Permanent Magnet, Magnets and magnets housing)

17. M/s. Nowrangroy Rameswar

8899, Muffani Dhanda, Paharganj, New Delhi

(Rotor Disc.)

18. M/s. Sharad Enterprises

5, Bhama Shah Marg, Delhi-110009.

(Gears and opinion/Wheel gears/leaded brass worm)

19. M/s. Usha Engineering Industries (P) Ltd.

D-153, Durga Marg, Bani Park, Jaipur. *(Pin for Upper Bearing)*

20. M/s. Computers 7 Control Systems

108, Sai Plaza, 187-188, Sant Nagar, East of Kailash, New Delhi 110065.

(Test Bench)

Calibration Facilities Available

1. ERTL (North)
S Block, Okhla Indl. Area, Phase- II, New Delhi - 110020
2. Arise Tech Services
224, Desh Bandhu Apartments Behind Desh Bandhu College, Kalkaji, New Delhi-110019
3. College of Engineering Thiruvananthapuram Engineering College, P.O. Thiruvananthapuram- 693016
Kerala, Govt. of Kerala, Deptt. of Technical Education, Deptt. of Electrical Engineering.