GAS LIGHTER

1. INTRODUCTION:

A gas lighter is a device which is used to ignite the gas stove. It is used in gas stoves which do not have automatic ignition systems. It uses a physical phenomenon called piezo-electric effect to generate an electric spark which ignites the combustible gas from the stove burner.The electronic gas lighter uses a piezoelectric crystal. This crystal has a property to generate voltage when it is mechanically deformed. It generates high voltage across a spark gap which when in proximity to a gas would ignite it.

2. PRODUCT & ITS APPLICATION:

Gas lighters are being used by cooking gas users. It is durable due to its performance and economical as compared to the mechanical and electrical lighters. It does not require battery for its operation. It is safer, economical, reliable and quick in action. It requires virtually no maintenance.

Even though several breakthroughs in Chemistry were achieved by them, the Curie's are known to majority of the world for their revolutionary work on radioactivity. However, it is amazing to know that one of their discoveries has given one of the most common accessories any kitchen has. Not related to radioactivity, this is the Gas Lighter. Based on the principle of piezoelectricity, which is one of the discoveries made by Jacques Curie and Pierre Curie. Piezoelectric lighters are an economic solution to light gas stoves. Ever wondered how does a small force of thumb produces a spark of the order of kilo volts (kV)? Let's have a look on the insides and working of the lighter in this device dissection article.

A piezoelectric crystal is the heart of the gas igniter. When a strong force is applied on it by means of a spring loaded hammer it produces an electric spark. Certain dielectric materials have an internal crystalline structure which when subjected to mechanical stress produces an

electric field and vice versa. The degree of electric field produced is directly proportional to the magnitude of force applied. These materials are termed as piezoelectric crystals and this principle is termed as piezoelectricity.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Promoter for this project may have any graduation plus background of sales and marketing.

4. INDUSTRY LOOK OUT AND TRENDS

The electronic gas lighter uses a piezo-electric crystal. This crystal has a property to generate voltage when it is mechanically deformed. It generates high voltage across a spark gap which when in proximity to a gas would ignite it. Gas lighters are being used by cooking gas users. It is durable due to its performance and economical as compared to the mechanical and electrical lighters. It does not require battery for its operation. It is safer, economical, reliable and quick in action. It requires virtually no maintenance.

5. MARKET POTENTIAL AND MARKETING ISSUES:

The demand of any type of gas lighter is directly related to the release of domestic gas connections by various gas companies in the country. However, users go in for various types of gas lighting devices i.e. match electrical or electronic gas lighter. The preference to use electronic gas lighters is quite high because of inherent advantages stated above. Even existing gas users have been increasingly switching over to electronic gas lighters. The cost of gas lighter is very well within the reach of users and therefore demand is increasing day by day.

6. REQUIREMENTS – Material/Equipment:

MS Rivet, SS Rivets, Aluminum Rivets, Screws & Nuts, SS Screw, MS Screws, Aluminum Screws, Aluminum Nuts, MS Nuts and SS Nuts, Piezoelectric ceramic, cartridge/slug, Copper

Contacts, M.S. Tubing, Spring, Plastic powder/granules, M.S. Strip, Hardware, Packing materials.

- ***Operation***

The gas lighter is mostly cylindrical in shape and consists of a piezo-electric crystal over which a spring-loaded hammer is placed. The hammer and spring set up is attached to a button. When this button is pressed, the hammer is moved away from the piezo-electric crystal. When the button is pressed over a limit, the spring releases the hammer. The hammer hits the piezoelectric crystal. Due to piezo-electric effect, a high voltage is generated in the range of 800 volts. The lighter is wired in such a way that this whole voltage is applied in a small region of air gap between two metallic points. Due to high voltage generated, the air is ionized and acts as a path for the discharge. This electric discharge is the spark which when exposed to the combustible gas from the stove ignites it to produce flame. In gas lighters, piezo-electric ceramics like lead zircon atetitan ate also known as PZT are used due to their low cost and high sensitivity.

- **Machinery and equipment**

1. Bench drilling machine
2. Bench grinder
3. Fly Press
4. Injection Moulding Machine
5. Spot welding machine
6. Test Bench with jigs fitted (motorised)
7. dies/mould/ tools and fixtures

7. MANUFACTURING PROCESS:

Sheet metal work & M.S. Tubing/Cases can be done by job work from outside. Moulded components are made on injection moulding machine. Assembly on Piezoelectric ceramic cartridge along with sheet metal components/parts and moulded parts are carried out and fitted in M.S. tubing/cases. The complete assembled unit is tested for life cycle ignition before it is sent for packing and dispatched.

8. MANPOWER REQUIREMENT:

Sr. No.	Designation OfEmployees	Salary Per Person	Monthly Salary ₹	Number of employees required				
				Year-1	Year-2	Year-3	Year-4	Year-5
1	Operators	12,000	12000.00	1	1	1	1	1
2	Helpers	10,000	10000.00	1	1	1	1	1
1	Admin Manager	15,000	15000.00	1	1	1	1	1
2	Office Boy	9,000	9000.00	1	1	1	1	1
	Total		41000.00	4	4	4	4	4

9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 2 months' time as detailed below:

Sr. No.	Activity	Time Required *(in months)*
1	Acquisition of premises	1.00
2	Construction (if applicable)	1.00
3	Procurement & installation of Plant & Machinery	1.00
4	Arrangement of Finance	2.00
5	Recruitment of required manpower	1.00
	Total time required *(some activities shall run concurrently)*	2.00

10. COST OF PROJECT:

Sr. No.	Particulars	₹ in Lacs
1	Land	0.00
2	Building	0.00
3	Plant & Machinery	1.12
4	Furniture, Electrical Installations	1.00
5	Other Assets including Preliminary / Pre-operative expenses	0.11
6	Working Capital	3.78
	Total	**6.01**

11. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets.

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	1.50
2	Bank Finance	4.51
	Total	**6.01**

12. WORKING CAPITAL CALCULATION:

The project requires working capital of 2.13 lakhs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	1.89	0.25	0.47	1.42
2	Receivables	0.95	0.25	0.24	0.71
3	Overheads	0.95	100%	0.95	0.00
4	Creditors	-		0.00	0.00
	Total	3.78		1.65	2.13

Turnover

Sr No	Description	Cost/Unit	Quantity /Month	Sales/month	Revenue/year
1	Gas Lighter	₹105	1500	₹1,57,500.00	₹**18,90,000**
Total					₹**18,90,000**

13. LIST OF MACHINERY REQUIRED:

The land and building are on rent basis. Power requirement is very negligible.

Sr. No.	Particulars	UOM	Qtty	Rate (₹)	Value (₹ in Lacs)
	Plant & Machinery / equipment				

a)	***Main Machinery***				
1	Bench drilling machine	NOS.	1	20000	0.20
2	Bench grinder	NOS.	1	15000	0.15
3	Fly Press	NOS.	1	25000	0.25
4	Injection Moulding Machine Spot welding machine	NOS.	1	40000	0.30
5	Testing Machine	NOS.	1	30000	0.10
6	Installation, Electrification, taxes and transportation.	NOS.	1	12000	0.12
	sub-total Plant & Machinery				**1.12**
	Furniture / Electrical installations				
a)	Office furniture	LS	1	50000	0.50
b)	Stores cupboard	LS	1	0	0.00
c)	Computer & Printer	L. S.	1	50000	0.50
	sub total				**1.00**
	Other Assets				
a)	preliminary and preoperative				0.11
	sub-total Other Assets				0.11
	Total				**2.23**

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines 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. Bhavya Machine Tools
   A-601, 6th Floor, Sapath-4, Opp. Karnavati Club,
   S.G. Highway Road, Satellite, Ahmedabad-380051, Gujarat, India.
   Phone No: +91- 79 - 4024 2800, +91- 79- 4024 2880

2. Hifine Machine

5, New India Estate, Inside Relief Hotel,
Sanand Char Rasta, Sarkhej, Ahmedabad-382210, Gujarat
Phone: 079 26891274, 079 26890274

3. Heena Machine Product
   No. 1, Samrat Industrial Area,
   Near Ban Labs, Rajkot - 360004, Gujarat, India

4. Sagar Engineering Works
   A-129, Road No. 9 D,
   V. K. I. Area, Jaipur - 302013,
   Rajasthan, India
   Phone: +91-9829024358, +91-141-4064876

5. Uday Enterprises
   Khasra No. 1108, Village Makanpur, Behind Indian Child School
   Opposite Janta Flat No. 433, Nyay Khand 1,
   Indirapuram, Ghaziabad - 201010, Uttar Pradesh, India
   Phone: +91-9212320224.

14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	11.34	13.23	15.12	17.01	18.90
3	Raw Materials & Other direct inputs	₹. In Lacs	7.25	8.46	9.67	10.88	12.09
4	Gross Margin	₹. In Lacs	4.09	4.77	5.45	6.13	6.82
5	Overheads except interest	₹. In Lacs	2.02	2.15	2.40	2.48	2.53
6	Interest	₹. In Lacs	0.45	0.45	0.30	0.23	0.18
7	Depreciation	₹. In Lacs	0.78	0.56	0.39	0.28	0.25
8	**Net Profit before tax**	₹. In Lacs	**0.83**	**1.61**	**2.36**	**3.15**	**3.85**

The basis of profitability calculation:
The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study; it can be increased according to the selling strategy.)

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 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

15. BREAKEVEN ANALYSIS:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	18.90
2	Variable costs	₹. In Lacs	12.09
3	Fixed costs incl. interest	₹. In Lacs	2.71
4	BEP = FC/(SR-VC) x 100	% of capacity	39.77%

16. STATUTORY / GOVERNMENT APPROVALS

As per the allocation of business rules under the Constitution, labour is in the concurrent list of subjects. It is dealt with by the MOLE at the Central and Departments of Labour under State Governments in respective States / UTs. The MOLE has enacted workplace safety and health statutes concerning workers in the manufacturing sector, mines, ports and docks and in construction sectors.

Further, otherMinistries of the Government of India have also enacted certain statutes relating to safety aspects of substances, equipment, operations etc. Some of the statutes applicable in the manufacturing sector are discussed below:

The Manufacture, Storage and Import of Hazardous Electronic Rules (MSIHC), 1989

These MSIHC Rules are notified under the Environment (Protection) Act, 1986. These rules are aimed at regulating and handlingof certain specified hazardous chemicals. The rules stipulate requirements regarding notification of site, identification of major hazards, taking

necessary steps to control major accident, notification of major accident, preparation of safety report andon-site emergency plan; prevention and control of major accident, dissemination of information etc. These rules are notified by the Ministry of Environment and Forests (MOEF) but enforced by the Inspectorates of Factories of respective States / UTs in the manufacturing sector.Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATIONS

Both forward and backward integration for any Electrical Industry are strategies to gain better control over the supply chain, reduce dependency on the suppliers and increase their competitiveness. The two strategies can help companies reduce their dependency on suppliers and increase their influence over the customers. The benefits of these strategies can be big. Both impact the bottom line directly. Integration happens if a company moves upward or downward in its supply chain. Starting from the suppliers from whom the raw materials are obtained, the chain moves downstream towards the distributors and the retailers. If the suppliers' power is very high, it can create financial burdens for the company. Suppose the number of suppliers of a company is low, then the control in their hands would be low. The burden in that case will fall upon company's shoulders. Its expenditure on raw materials will be high.

18. TRAINING CENTERS AND COURSES

There is no such training required to start this business but, basic Electrical or IC bachelor's degree is plus point for enterpriser. Promoter may train their employees in such specialized institutions to grow up the business. There are few specialized Institutes provide degree certification in chemical Technology, few most famous and authenticate Institutions are as follows:

1. Department of Electrical LD College of engineering
   No.120, Circular Road, University Area, Navrangpura,
   Opposite Gujarat University, Ahmedabad, Gujarat 380015

2. MIT College of Engineering, Pune
   Gate.No.140, Raj Baugh Educational Complex,
   Pune Solapur Highway,
   LoniKalbhor, Pune – 412201
   Maharashtra, India

Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for handholding 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.