

74. PROFILE ON BAKING OVENS

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I. SUMMARY

This profile envisages the establishment of a plant for the production of baking oven with a capacity of 300 units per annum.

The raw materials required are RHS, stainless steel sheet, mild steel sheet, screws, bolts & nuts, heat insulating bricks, electric insulator ceramics, switches and electric wires which have to be imported.

The present demand for the proposed product is estimated at 266 units per annum. The demand is expected to reach at 690 units by the year 2018.

The total investment requirement is estimated at Birr 4.42 million, out of which Birr 61 thousand is required for plant and machinery. The plant will create employment opportunities for 22 persons.

The project is financially viable with an internal rate of return (IRR) of 17.67 % and a net present value (NPV) of Birr 2.14 million, discounted at 8.5%.

The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.

II. PRODUCT DESCRIPTION AND APPLICATION

Baking ovens are used to prepare bakery products like bread, cookies, cakes and various sorts of sweet and normal bread. Baking ovens using electric power are clean and comfortable to utilize. They can be made for preparing the products in various capacities. Their sizes can vary from 50x50x50cm small size to larger sizes of 100x100x200cms. Their out put capacity can vary in range from 20kgs/day to 200kgs/day of bread. The electric consumption for such bakery is within the range of 5 kw to 20 kw. These are baking ovens that are useful for small and medium scale bakeries which are commonly spread with in the towns and cities of the country. Their fabrication involves mainly metal tubes and sheet metals utilizing locally available machines.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Supply of bakery ovens is mainly met from import. Although negligible amount of the product is produced in some workshops locally the data could not be found in the Survey of Manufacturing and Electricity Industries published by the Central Statistical Agency. Hence, in the absence of domestic production data the import data obtained from the Customs Authority is used as a proxy to estimate the current unsatisfied demand for bakery ovens.

The quantity of bakery ovens imported during the past 10 years, i.e. 1997-2006, is given in Table 3.1.

Table 3.1**IMPORT OF BAKERY OVENS (UNIT)**

Year	Import
1997	60
1998	399
1999	171
2000	342
2001	78
2002	220
2003	149
2004	231
2005	83
2006	409

Source:- Ethiopian Custom Authority.

The import data depicted in Table 3.1 does not have any trend. It is characterized by a sharp increase and decline from year to year. The imported quantity which was only 60 units during 1997 has sharply increased to 399 units during 1998, which is an increase of almost seven times. In the following year, i.e 1999, the imported quantity declined to 171 units and again increased to 342 units in the year 2000.

Similar trend is observed between the years 2001-2006. The imported quantity during these years has fluctuated from the lowest 78 units during 2001 to the highest 409 units during 2006. One specific features of the data presented in Table 3.1. is that import experiences a sharp decline in the year following large importation.

In the absence of a trend in the data set the following assumptions are adopted to determine the current effective demand.

- The recent three year average which is 241 units is assumed to be the demand for the year 2006.
- To arrive at year 2008 demand urban population growth and income rise has been considered. Accordingly, taking year 2006 as a base a 5% annual growth rate is applied.

Based on the above plausible assumption, current unsatisfied demand for bakery ovens is estimated at 266 units.

2. Projected Demand

The demand for baking ovens is believed to increase with population growth, income rise urbanization and electrification of towns. The combined effect of the above factors is expected to increase the demand by 10% per annum. The projected demand based on this assumption is given in Table 3.2.

Table 3.2
PROJECTED DEMAND FOR BAKING OVENS (UNITS)

Year	Projected Demand
2009	293
2010	322
2011	354
2012	389
2013	428
2014	471
2015	518
2016	570
2017	627
2018	690

The unsatisfied demand for baking ovens will increase from 293 units in the year 2009 to 428 units and 690 units by the year 2013 and 2018, respectively.

3. Pricing and Distribution

Price of baking ovens varies in accordance with size i.e. capacity. The current market price for baking ovens ranges from Birr 4,000 to Birr 6,000. An average factory-gate price of Birr 5,000 per units is recommended for a new entrant.

The product can be distributed directly to the end user at the factory-gate. In addition, it can appoint the existing household and durable goods merchandizing enterprises.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Based on the market study, the capacity of the plant is taken as 300 units per annum.

2. Production Programme

The production programme considers that for the first production year the plant will utilize 45% of its capacity, and 50%, 75%, and 85% in the second, third and fourth year. From the fifth year on ward the plant will utilize its full capacity.

Table 3.3
PRODUCTION PROGRAMME

Year	1	2	3	4	5
Annual Production (units)	135	150	225	255	300
Capacity Utilization %	45	50	75	85	100

IV. MATERIALS & INPUTS

A. RAW MATERIALS

Baking oven is made by the assembly of different parts of tubular metals, sheet metals, insulating materials, electric resistors, electric insulator materials. The main frame of the

oven is made from tubular metals, typically an electric cooking oven having an external dimension of 100x100x200cms can bake 100 kgs of wheat bread in a day of 8 working hours. The external parts of the stove in touch with bread and exposed to steam and heat are made of stainless steel since the material resists corrosion. All the raw materials are to be imported, except the insulation materials which can be obtained in the local market. The average consumption of all the components parts of the oven is shown on Table 4.1 for full production capacity.

Table 4.1
RAW MATERIALS REQUIREMENT AND COST

Sr. No.	Raw Material	Description	Annual Input	Cost (Birr)		Cost (Birr) Total
				LC	FC	
1	RHS	30x30x1mm	2,400	-	96,000	96,000
2	RHS	25x25x.8mm	800	-	24,000	24,000
3	Stainless Steel Sheet	0.8mm	1,000	-	350,000	350,000
4	Mild steel sheet	0.8mm	1,200	-	180,000	180,000
5	Screws	Assorted	600 pkts	-	12,000	12,000
6	Bolts & nuts	Assorted	150 pkts	-	3,000	3,000
7	Heat insulating Bricks		24,000 pcs	48,000	-	48,000
8	Elect. Insulator bricks, ceramics		9,000 pcs	27,000	-	27,000
9	Switchs		300 pcs	-	36,000	36,000
10	Electric Wires		3,000 mts	-	15,000	15,000
				-	9,000	9,000
Grand Total						800,000

B. UTILITIES

The major utility requirement of the plant is electricity and water. The required quantity and cost of utility is shown in Table4.2.

Table 4.2
ANNUAL UTILITIES REQUIREMENT AND COST

Sr. No.	Utility	Unit	Qty	Cost(Birr)
1	Electricity	kWh	44,928	21,116
2	Water	m ³	4,442	16,224
Total				37,340

V. TECHNOLOGY AND ENGINEERING.

A. TECHNOLOGY

1. Process Description

The manufacturing of ovens consists of fabrication of RHS section metals and sheet metal parts to form the finished part. The process involves cutting and joining by welding of RHS metals and covering the whole structure by stainless steel sheets. The process involves metal cutting, arc welding, sheet metal cutting bending and electric spot welding.

The process does not have any effluent or sewerage that threatens the environment.

2. Source of Technology

The technology required for this project can be obtained locally from the address indicated below.

Ture Pvt. Ltd. Company Tele.756279, 755384 Fax 755055, 755384
P.O.Box 2103,Addis Ababa

B. ENGINEERING

1. Machinery & Equipment

The production of the oven consists mainly cutting, bending, welding and other processes. The necessary machinery & equipment required by the project is indicated in Table 5.1.

Table 5,1

MACHINERY & EQUIPMENT REQUIREMENT & COST

Sr. No.	Description	Qty No.	Cost(birr)
1	Guilotine Shear	1	25,000
2	Circular saw	1	5,000
3	Arc welder	2	4,000
4	Spot welder	1	18,000
5	Lever Shear	2	4,000
6	Sheet metal folder	1	3,000
7	Pipe Bender	1	2,000
	Total		61,000

2. Land, Building and Civil Works

The total area requirement of the plant is 1,000 m², out of this plot 300 m² will be covered by building. The production hall along with the store will be constructed in a single building covering an area of 250m² with the store in the ground floor and the

production facility in the first floor while the office building covers an area of 50m². The total cost of land lease at 2,300 Birr/sq mt is 690,000 Birr.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 272/2002) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO, religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%. The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5000 m² the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m² the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

The land lease price in the industrial zones varies from one place to the other. For example, a land was allocated with a lease price of Birr 284 /m² in Akakai-Kalti and Birr 341/ m² in Lebu and recently the city's Investment Agency has proposed a lease price of Birr 346 per m² for all industrial zones.

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all manufacturing projects will be located in the industrial zones. Therefore, for this profile, which is a manufacturing project a land lease rate of Birr 346 per m² is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency, etc. Accordingly, Table 5.2 shows incentives for lease payment.

Table 5.2

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

Scored Point	Grace Period	Payment Completion Period	Down Payment
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile the average, i.e., five years grace period, 28 years payment completion period and 10% down payment is used. The period of lease for industry is 60 years.

Accordingly, the total lease cost, for a period of 60 years with cost of Birr 346 per m², is estimated at Birr 20.76 million of which 10% or Birr 2,076,000 will be paid in advance. The remaining Birr 18.68 million will be paid in equal installments with in 28 years, i.e., Birr 667,286 annually.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant requires technical and administrative personnel; as the manufacturing process requires manual fabrication jobs the number of technical workers is high in number. Table 6.1 indicates the requirements.

Table 6.1
MANPOWER REQUIREMENT & ANNUAL LABOUR COST

Sr. No.	Description	Req. No.	Monthly Salary (Birr)	Annual Salary (Birr)
1	Manager	1	3,000	36,000
2	Technologist	1	2,000	24,000
3	Technician foreman	1	1,500	18,000
4	Arc welders	2	3,000	36,000
5	spot welders	2	3,000	36,000
6	Electricians	2	1,800	21,600
7	Assembly workers	2	1,600	19,200
5	Administrator	1	2,000	24,000
6	Secretary	1	1,000	12,000
7	Accountant	1	1,200	14,400
8	Cashier	1	700	8,400
9	Purchaser	1	1,200	14,400
10	Store Keeper	1	700	8,400
11	Salesman	1	1,200	14,400
12	Guard	2	700	8,400
13	Cleaner	2	700	8,400
	Sub-Total	22		303,600
	Employee benefits 25% of basic salary			75,900
	Total	22		379,500

B. TRAINING REQUIREMENT

Since the production process is a simple and conventional no special training is required. But the employees to be recruited shall be with technical background.

VII. FINANCIAL ANALYSIS

The financial analysis of the baking oven project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity
	70 % loan
Tax holidays	2 years
Bank interest	8.5%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Raw Material import	90 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 4.42 million. The major breakdown of the total initial investment cost is shown in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST (‘ 000 Birr)

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost
1	Land lease value	2,706.00	-	2,706.00
2	Building and Civil Work	690.00	-	690.00
3	Plant Machinery and Equipment	61.00	-	61.00
4	Office Furniture and Equipment	75.00	-	75.00
5	Vehicle	450.00	-	450.00
6	Pre-production Expenditure*	279.94	-	279.94
7	Working Capital	161.72	-	161.72
	Total Investment cost	4,423.66	-	4,423.66

* *N.B Pre-production expenditure includes interest during construction (Birr 229.94 thousand) and Birr 50 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 1.58 million (see Table 7.2). The raw material cost accounts for 50.38 per cent of the production cost. The other major components of the production cost are depreciation, direct labour and financial cost which account for 17.85 %, 11.47% and 10.10% respectively. The remaining 10.19 % is the share of utility, repair and maintenance, labour over head and other administration cost.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)**

Items	Cost	%
Raw Material and Inputs	800.00	50.38
Utilities	37.34	2.35
Maintenance and repair	3.05	0.19
Labour direct	182.16	11.47
Labour overheads	0.00	0.00
Administration Costs	121.44	7.65
Land lease cost	-	-
Total Operating Costs	1,143.99	72.05
Depreciation	283.40	17.85
Cost of Finance	160.43	10.10
Total Production Cost	1,587.82	100

C. FINANCIAL EVALUATION**1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax will grow from Birr 256.75 thousand to Birr 587.35 thousand during the life of the project. Moreover, at the end of the project life the accumulated cash flow amounts to Birr 5.91 million.

2. Ratios

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by

dividing net income by revenue, return on assets (operating income divided by assets), return on equity (net profit divided by equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 39 \%$$

4. Payback Period

The pay back period, also called pay – off period is defined as the period required to recover the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 5 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money

in a bank account. Accordingly, the IRR of this project is computed to be 17.67 % indicating the viability of the project.

6. Net Present Value

Net present value (NPV) is defined as the total present (discounted) value of a time series of cash flows. NPV aggregates cash flows that occur during different periods of time during the life of a project into a common measuring unit i.e. present value. It is a standard method for using the time value of money to appraise long-term projects. NPV is an indicator of how much value an investment or project adds to the capital invested. In principle a project is accepted if the NPV is non-negative.

Accordingly, the net present value of the project at 8.5% discount rate is found to be Birr 2.14 million which is acceptable.

D. ECONOMIC BENEFITS

The project can create employment for 22 persons. In addition to supply of the domestic needs, the project will generate Birr 1.73 million in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.