

**171. PROFILE ON THE PRODUCTION OF FUSES
 AND ACCESSORIES**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of fuses with a capacity of 250 tons per annum. Fuses are devices that are inserted in the path of electric circuit to switch off electric power by suddenly breaking out (tripping) or isolating of the working circuit.

The demand for fuses and accessories is met entirely through import. The present (2012) demand for fuses is estimated at 172 tons. The demand for fuses and accessories is projected to reach 316 tons and 583 tons by the year 2017 and 2022, respectively.

The principal raw materials required are silicon sand minerals, plastic granules, and copper sheets which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 13.03 million. From the total investment cost the highest share (Birr 7.81 million or 59.95%) is accounted by fixed investment cost followed by initial working capital (Birr 3.93 million or 30.16%) and pre operation cost (Birr 1.30 million or 9.89%). From the total investment cost Birr 2.53 million or 19.46% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 24.94% and a net present value (NPV) of Birr 11.25 million discounted at 10%.

The project can create employment for 22 persons. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will also create forward linkage with the electrical and electronic equipments manufacturing sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Fuses are devices that are inserted in the path of electric circuit to switch off electric power by suddenly breaking out (tripping) or isolating of the working circuit. Electric current in a circuit normally flows at a given quantity until any faulty connection occurs on the line. When a direct

faulty connection is done on the line in the circuit a big surge (inrush) of large unwanted current occurs. If this large current is allowed to flow in the circuit for a fraction of un-allowed lengths of seconds a total damage is developed on the line and on the device that uses the current. But in such cases if fuses were installed, the fuses disconnect all the circuit in very small fraction of seconds before a sizable damage occurs on the system.

Fuses are manufactured in various physical shapes and sizes from different materials with various current isolating capacities. The type of fuses that use internal rupturing (melting) wires are manufactured from a fraction of amperes to hundreds of ampere ratings for common use. Their cover bodies are made using an outer body of plastic, glass, ceramic or other materials. Fuses are used in houses, offices, hospitals, shops and many other places where electrical and electronic equipments are in use. Fuses are mainly manufactured in cylindrical external shape out of glass or ceramic or plastic materials. They are named as Cartridge type and blade type fuses. The fuse holders and the accessories are made from plastic, ceramic and other materials while the melting fuse is made from wire.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Since there are no domestic production units engaged in producing fuses and accessories, the demand for the products is entirely met through imports. Accordingly, Table 3.1 shows the amount of fuses imported annually during the period 2002 – 2011.

Table 3.1
IMPORT OF FUSES AND ACCESSORIES (TONS)

Year	Quantity
2002	0.57
2003	62
2004	182
2005	80
2006	188
2007	229
2008	143
2009	133
2010	267
2011	114

Source: Ethiopian Revenue and Customs Authority.

As can be seen from Table 3.1 annual import or total supply of fuse and accessories fluctuate from year to year. During the period 2002-2011, the maximum total supply of the products under consideration to the local market was 267 tons (year 2010), while the minimum 0.57 tons was registered in year 2002. In the remaining years, apparent consumption was fluctuating between these two extremes, around a mean figure of 140 tons.

Accordingly, due to the fluctuating nature of the supply data, the average of the recent three years (2009-2011) which amounts to 172 tons is considered to fairly approximate the present (2012) effective demand for fuse and accessories.

2. Demand Forecast

In Ethiopia electronic and communication equipments¹ utilization is on the rise due to the economic progress registered in the country. The other factor that stimulates the use of electronics and communication equipments is the modernization of the society and globalization.

¹ The major items include television, radio, tape player, cassette recorder, I pod, satellite dish, VCD, DVD, VHS, mobile telephone apparatus, telephone apparatus, fax machine...etc

According to data from Ethiopian Revenue and Customs Authority during the period 2005-2006 the average value of imported electronics and communication equipment has been about Birr 2 billion and exhibits an average annual growth rate of 13%. Accordingly, the demand for fuse and accessories is assumed to grow at the same rate.

Hence, using the estimated present demand as a base and applying a growth rate of 13%, the projected demand for fuses and accessories is shown in Table 3.2.

Table 3.2
FORECASTED DEMAND FOR FUSE AND ACCESSORIES

Year	Projected Demand
2013	194
2014	219
2015	248
2016	280
2017	316
2018	357
2019	404
2020	456
2021	516
2022	583
2023	658
2024	744
2025	841

3. Pricing and Distribution

For the purpose of this project the average CIF value of the recent two years plus 30% for various costs is considered. Accordingly, Birr 90/kg is recommended. The product can be distributed through the existing electronics part distributors.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

A plant with a manufacturing capacity of 250 tons of fuses per annum is selected by considering the projected demand and minimum economies of scale.

2. Production Program

The production program is worked out by considering the complexity of the production process and the time required for skill development. Accordingly, the plant is assumed to start its operation at 75% of its rated full capacity and progressively increases to 85%, and 100% in the second and third year respectively. The production program is provided in Table 3.3.

Table 3.3

ANNUAL PRODUCTION PROGRAM

Type of Product	Year 1	Year 2	Year 3
Fuses (Tons)	188	213	250
Capacity %	75	85	100

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The raw materials required for the manufacture of fuses are silicon sand minerals, plastic granules, and copper sheets etc. that are to be obtained through import. The required raw materials and their costs at full capacity operation are given in Table 4.1.

Table 4.1
RAW MATERIALS REQUIREMENT AND COST

Sr. No	Raw Materials Description	Annual Requirement (ton)	Cost (000 Birr)		
			F.C	L.C	Total
A	For fuses with ceramic body				
1	Kaolin ,Feldspars & quartz Minerals(versa clay)	140	3,360	672	4,032
B	For fuses with glass body				
1	Glass sheets	100	2,400	480	2,880
C	For plastic Case Accessories				
1	Plastic (polyamide granules)	25	1,500	300	1,800
D	For common use				
1	Copper Sheet Metal	30	1,500	300	1,800
2	Copper Bars	50	2,500	500	3,000
3	Fuse wire (assorted sizes)	10	2,500	500	3,000
	Total		13,760	2,752	16,512

B UTILITIES

The major utilities required by the plant are electricity and water. Annual cost of utilities is Birr 72,505. Requirement of utilities at full capacity operation and corresponding cost is shown in Table 4.2

Table 4.2
ANNUAL UTILITIES REQUIREMENT & COST

No	Utility	Unit	Quantity	Cost(Birr)
1	Electricity	kWh	100,000	58,005
2	Water	Meter cube	1,450	14,500
	Total			72,505

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

The production technology of fuses involves the manufacturing of the casings, the formation of the conductor caps and the assembly of the parts with the internal fuse wire elements.

Casing:-The casing of the fuse is made from Plastic (polyamide), Ceramic or Glass.

Plastic casing is made by using plastic injection molding machines.

Ceramic casing is made by using ceramic mixes to form the mould and by drying and firing in an electric furnace.

Glass casing is made by melting glass billets and mixes, forming in a mould and firing in an electric furnace.

Contact Caps: - The contact cups are made from copper sheets by mechanical press using dies.

The components are finally assembled with the selected fuse wire elements at the center.

2. Environmental Impact

The production process involves wire and metal cutting, plastic molding, ceramic molding and electric firing with no negative effect on the environment. Thus, the plant has no negative impact on the environment.

B. ENGINEERING

1. Machinery and Equipment

The total cost of machinery and equipment for the production of fuses and accessories is Birr 2,882,000 of which Birr 2,535,000 will be in foreign currency. The required machinery and equipment with their cost are given in Table 5.1.

Table 5.1**LIST OF MACHINERY AND EQUIPMENT AND COST**

Sr. No.	Machine	Unit	Qty.
A	For Ceramic/glass body making		
1	Planetary Grinder ,crusher	Nos.	1
2	Batch mixer	Nos.	2
3	Pug mill (for clay)	Nos.	1
4	Extruder gun with dies	Nos.	1
5	Electric Chamber Furnace (3-ph 10kva.)	Nos.	2
B	For Plastic Body /accessories making		
1	Plastic Injection Molding Machine.	Nos.	1
2	Set of molds	set	3
3	Mechanical press	Nos.	1
4	Set of Dies(For Cooper sheet metal)	set	5

2. Land, Building and Civil Works

The envisaged plant requires a total land area of 1,000 m², of which 750 m² would be built-up area. Building construction cost at a rate of Birr 5,000/m² is estimated to be Birr 3.75 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) 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 5,000 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.

Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new prices will be used as a benchmark for plots that are going to be auctioned by the city government or transferred under the new "Urban Lands Lease Holding Proclamation."

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m². The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities.

The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m². This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m² (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m² which is equivalent to the average floor price of plots located in expansion zone 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 5.3 shows incentives for lease payment.

Table 5.3

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 land lease period for industry is 60 years.

Accordingly, the total land lease cost at a rate of Birr 266 per m² is estimated at Birr 266,000 of which 10% or Birr 26,600 will be paid in advance. The remaining Birr 239,400 will be paid in equal installments with in 28 years i.e. Birr 8,550 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

A total of 22 workers are required to operate the plant. Annual cost of labor, including employees benefit is Birr 595,200. The human resource required by job type and their salary is given in Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND LABOR COST

Sr. No.	Description	No.	Salary (Birr)	
			Monthly	Annual
A. ADMINISTRATION				
1	Plant Manager	1	5,000	60,000
2	Secretary	1	2,500	30,000
3	Accountant	1	2,500	30,000
4	Salesman/purchaser	1	2,500	30,000
5	Clerk	1	1,500	18,000
6	Cashier	1	2,000	24,000
7	General Service	3	800	28,800
Sub -Total		9		220,800
B. PRODUCTION				
8	Foreman/	1	2,500	30,000
9	Machinery Operators	7	2,000	168,000
10	Assistant Operators	1	1,500	18,000
11	Machinist technicians	1	2,000	24,000
12	Quality controller	1	1,500	18,000
13	Laborers	2	800	19,200
Sub- Total		13	-	277,200
				498, 000
Employee's Benefit (25% Of Basic Salary)		-	-	
Total		22	-	595,200

B TRAINING REQUIREMENT

On the job training of the operators would be enough for workers with technical back ground .An amount of Birr 20,000 is required for initial period.

VII. FINANCIAL ANALYSIS

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

Construction period	1 year
Source of finance	30 % equity and 70% loan
Tax holidays	3 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material imported	120 days
Work in progress	1 day
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 13.03 million (See Table 7.1). From the total investment cost the highest share (Birr 7.81 million or 59.95%) is accounted by fixed investment cost followed by initial working capital (Birr 3.93 million or 30.16%) and pre operation cost (Birr 1.30 million or 9.89%). From the total investment cost Birr 2.53 million or 19.46% is required in foreign currency.

Table 7.1**INITIAL INVESTMENT COST ('000 Birr)**

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	Fixed investment				
1.1	Land Lease	26.60		26.60	0.20
1.2	Building and civil work	3,750.00		3,750.00	28.79
1.3	Machinery and equipment	347.00	2,535.00	2,882.00	22.13
1.4	Vehicles	900.00		900.00	6.91
1.5	Office furniture and equipment	250.00		250.00	1.92
	Sub total	5,273.60	2,535.00	7,808.60	59.95
2	Pre operating cost *				
2.1	Pre operating cost	436.46		436.46	3.35
2.2	Interest during construction	852.15		852.15	6.54
	Sub total	1,288.61		1,288.61	9.89
3	Working capital **	3,928.58		3,928.58	30.16
	Grand Total	10,490.80	2,535.00	13,025.80	100

* *N.B Pre operating cost include project implementation cost such as installation, startup, commissioning, project engineering, project management etc and capitalized interest during construction.*

** *The total working capital required at full capacity operation is Birr 5.64 million. However, only the initial working capital of Birr 3.92 million during the first year of production is assumed to be funded through external sources. During the remaining years the working capital requirement will be financed by funds to be generated internally (for detail working capital requirement see Appendix 7.A.1).*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 19.91 million (see Table 7.2). The cost of raw material account for 82.92% of the production cost. The other major components of the production cost are depreciation, financial cost, direct labor, and cost of marketing and distribution which account for 5.12%, 4.12%, 2.50%, and 2.51% respectively. The remaining 2.83% is the share of utility, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY (year three)**

Items	Cost (000 Birr)	%
Raw Material and Inputs	16,512	82.92
Utilities	73	0.37
Maintenance and repair	144	0.72
Labor direct	498	2.50
Labor overheads	97	0.49
Administration Costs	250	1.26
Land lease cost	0	0.00
Cost of marketing and distribution	500	2.51
Total Operating Costs	18,074	90.77
Depreciation	1,019	5.12
Cost of Finance	820	4.12
Total Production Cost	19,913	100.00

C. FINANCIAL EVALUATION**1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax will grow from Birr 1.89 million to Birr 2.97 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 28.04 million. For profit and loss statement and cash flow projection see Appendix 7.A.3 and 7.A.4, respectively.

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 for capacity utilization and sales value estimated by using income statement projection are computed as followed.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 9,450,000$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 30.83\%$$

4. Pay-back Period

The pay-back period, also called pay – off period is defined as the period required for recovering 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 4 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 24.94% 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 in to 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 10% discount rate is found to be Birr 11.25 million which is acceptable. For detail discounted cash flow see Appendix 7.A.5.

D. ECONOMIC AND SOCIAL BENEFITS

The project can create employment for 22 persons. The project will generate Birr 7.67 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. The project will also create forward linkage with the electrical and electronic equipments manufacturing sub sector and also generates other income for the Government.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.2
PRODUCTION COST (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	11,558	14,861	16,512	16,512	16,512	16,512	16,512	16,512	16,512	16,512
Utilities	51	66	73	73	73	73	73	73	73	73
Maintenance and repair	101	130	144	144	144	144	144	144	144	144
Labour direct	349	448	498	498	498	498	498	498	498	498
Labour overheads	68	87	97	97	97	97	97	97	97	97
Administration Costs	175	225	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	9	9	9	9	9	9
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	12,802	16,317	18,074	18,074	18,083	18,083	18,083	18,083	18,083	18,083
Depreciation	1,019	1,019	1,019	1,019	1,019	175	175	175	175	175
Cost of Finance	0	937	820	703	586	469	352	234	117	0
Total Production Cost	13,820	18,273	19,913	19,796	19,687	18,726	18,609	18,492	18,375	18,258

Appendix 7.A.3
INCOME STATEMENT (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Sales revenue	15,750	20,250	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500
Less variable costs	12,302	15,817	17,574	17,574	17,574	17,574	17,574	17,574	17,574	17,574
VARIABLE MARGIN	3,448	4,433	4,926	4,926	4,926	4,926	4,926	4,926	4,926	4,926
in % of sales revenue	21.89	21.89	21.89	21.89	21.89	21.89	21.89	21.89	21.89	21.89
Less fixed costs	1,519	1,519	1,519	1,519	1,527	684	684	684	684	684
OPERATIONAL MARGIN	1,930	2,915	3,407	3,407	3,399	4,242	4,242	4,242	4,242	4,242
in % of sales revenue	12.25	14.39	15.14	15.14	15.11	18.86	18.86	18.86	18.86	18.86
Financial costs		937	820	703	586	469	352	234	117	0
GROSS PROFIT	1,930	1,977	2,587	2,704	2,813	3,774	3,891	4,008	4,125	4,242
in % of sales revenue	12.25	9.76	11.50	12.02	12.50	16.77	17.29	17.81	18.33	18.86
Income (corporate) tax	0	0	0	811	844	1,132	1,167	1,202	1,238	1,273
NET PROFIT	1,930	1,977	2,587	1,893	1,969	2,642	2,724	2,806	2,888	2,970
in % of sales revenue	12.25	9.76	11.50	8.41	8.75	11.74	12.11	12.47	12.83	13.20

Appendix 7.A.4
CASH FLOW FOR FINANCIAL MANAGEMENT (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	8,245	20,568	20,261	22,505	22,500	22,500	22,500	22,500	22,500	22,500	22,500	8,724
Inflow funds	8,245	4,818	11	5	0	0	0	0	0	0	0	0
Inflow operation	0	15,750	20,250	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	0
Other income	0	0	0	0	0	0	0	0	0	0	0	8,724
TOTAL CASH OUTFLOW	8,245	17,620	19,547	20,627	20,760	20,685	20,855	20,773	20,691	20,609	19,355	0
Increase in fixed assets	8,245	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	3,966	1,121	561	0	1	0	0	0	0	0	0
Operating costs	0	12,302	15,817	17,574	17,574	17,583	17,583	17,583	17,583	17,583	17,583	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	811	844	1,132	1,167	1,202	1,238	1,273	0
Financial costs	0	852	937	820	703	586	469	352	234	117	0	0
Loan repayment	0	0	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	0	0
SURPLUS (DEFICIT)	0	2,948	714	1,879	1,740	1,815	1,645	1,727	1,809	1,891	3,145	8,724
CUMULATIVE CASH BALANCE	0	2,948	3,662	5,541	7,281	9,096	10,741	12,468	14,277	16,168	19,312	28,036

Appendix 7.A.5
DISCOUNTED CASH FLOW (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	0	15,750	20,250	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	8,724
Inflow operation	0	15,750	20,250	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	0
Other income	0	0	0	0	0	0	0	0	0	0	0	8,724
TOTAL CASH OUTFLOW	12,174	13,912	16,872	18,074	18,886	18,926	19,215	19,250	19,285	19,320	19,355	0
Increase in fixed assets	8,245	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	3,929	1,111	555	0	1	0	0	0	0	0	0	0
Operating costs	0	12,302	15,817	17,574	17,574	17,583	17,583	17,583	17,583	17,583	17,583	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	811	844	1,132	1,167	1,202	1,238	1,273	0
NET CASH FLOW	-12,174	1,838	3,378	4,426	3,614	3,574	3,285	3,250	3,215	3,180	3,145	8,724
CUMULATIVE NET CASH FLOW	-12,174	10,336	-6,958	-2,532	1,082	4,656	7,941	11,191	14,406	17,586	20,731	29,455
Net present value	-12,174	1,671	2,792	3,325	2,468	2,219	1,854	1,668	1,500	1,349	1,212	3,363
Cumulative net present value	-12,174	10,503	-7,711	-4,386	-1,918	301	2,156	3,824	5,324	6,672	7,885	11,248

NET PRESENT VALUE 11,248
INTERNAL RATE OF RETURN 24.94%
NORMAL PAYBACK 4 years