

**198. PROFILE ON THE PRODUCTION OF
WELDING MACHINES**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of welding machines with a capacity of 6,000 units or 120 tons per annum. Welding machines is used for fabrication of new parts or for maintenance of factory plants, residential or factory buildings, for fixing together metal structural parts, roofing of houses and other construction.

The demand for welding machines is met through import. The present (2012) demand for welding machines is estimated at 7,017 pieces. The demand for welding machines is projected to reach 11,300 pieces and 18,199 pieces by the year 2017 and 2022, respectively.

The principal raw materials required are enameled copper and aluminum wires of desired sizes which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 13.61 million. From the total investment cost the highest share (Birr 9.12 million or 67.07%) is accounted by fixed investment cost followed by initial working capital (Birr 3.09 million or 22.76%) and pre operation cost (Birr 1.38 million or 10.17%). From the total investment cost Birr 3.32 million or 24.38% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 30.35% and a net present value (NPV) of Birr 14.30 million discounted at 10%.

The project can create employment for 19 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 manufacturing, construction, and furniture sub sectors and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTIONS AND APPLICATIONS

Welding machines which should more appropriately be called “arc welding machines” are being used for fabrication of new parts or for maintenance of factory plants, residential or factory

buildings, for fixing together metal structural parts .Welding machines are also of key advantage to build scaffoldings and ladders during the construction of high rise buildings. Welding Machines use electric arc to melt together the electrodes and the metal parts to be fixed together.

The product has two main categories .The one being used for welding light metal for house hold small items with tube sections .The other type being used for welding heavy structural work and machinery parts. The main types conceived in this project are:-

- Welding Machines using single phase of 220 V electric supply only 100A max
- Welding Machine using three phase of 380 V electric supply only 400A max

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement of welding machines is met mainly through import. In order to analyze the demand for the products, data on import of these items for the period 2002 – 2011 is obtained from the Ethiopian Revenue and Customs Authority (see Table 3.1).

Table 3.1
IMPORT OF WELDING MACHINES (PIECES)

Year	Quantity
2002	8,759
2003	1,789
2004	3,054
2005	3,146
2006	2,950
2007	5,877
2008	3,948
2009	2,898
2010	8,838
2011	9,314

Source: - Ethiopian Revenue and Customs Authority.

The import data in Table 3.1 is characterized with significant fluctuation. Import varied from low level of 1,789 pieces in the year 2003 to 9,314 pieces in the year 2011. The average import during the period 2002 – 2011 was 5,057 pieces. During the same period import of welding machines has registered an average annual growth rate of 26%.

In view of the fluctuating nature of the product's historical supply or apparent consumption, the average of the recent three years import (2009 – 2010) which is 7,017 pieces is considered to reflect the current (2012) effective demand for welding machines.

2. Projected Demand

Welding machines are used extensively in all industries either during manufacturing or repair and maintenance of engineering products and their demand is expected to increase with the development of the manufacturing, maintenance and construction sectors.

According to the government's "Growth and Transformation Plan (2011 – 2015)" during the plan period, the industrial sector, which includes the manufacturing and construction sectors, is expected to grow at an average annual growth rate of 20%.

However, in order to be conservative a growth rate of 10% which is slightly lower than the anticipated growth rate of GDP during the Growth and Transformation period (11.4%) is used to project the demand welding machines (see Table 3.2.).

Table 3.2**PROJECT DEMAND (PIECES)**

Year	Projected Demand
2013	7,718
2014	8,490
2015	9,339
2016	10,273
2017	11,300
2018	12,430
2019	13,673
2020	15,041
2021	16,545
2022	18,199
2023	20,019
2024	22,021
2025	24,223

3. Pricing and Distribution

The price of welding machine varies depending on capacity. Accordingly for the purpose of financial analyses an average price of Birr 3,500 per pieces is adopted.

The plant can sell its product either directly to end users or through agents that distribute similar products throughout the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAM**1. Plant Capacity**

The production capacity of the plant is selected to be 6,000 units or 120 tons of assorted welding machines annually assuming an average weight of 20 kg for each welding machine.

2. Production Program

Considering the time for skill level development and for market penetration, the plant will operate at 75 % of its installed capacity during the first year of production. In the second year it will increase its capacity utilization to 85%. During the third year and then after it will operate at full capacity (100%). The detail production program is shown in Table 3.3

Table 3.3
ANNUAL PRODUCTION PROGRAM

Items	Year 1	Year 2	Year 3
Annual production(Ton)	90	102	120
Capacity %	75	85	100

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The production of welding machines requires enameled copper and aluminum wires of desired sizes. Other raw materials required are different types of sheet metal, switches and sockets, lamps, cables, paints & varnishes and ceramic and/or rubber insulators. All the raw materials have to be imported now until they are made available locally. Annual cost of raw materials is Birr 12.962 million. Table 4.1 shows the detail raw material requirement and cost at full production capacity.

Table 4.1**REQUIREMENT OF RAW & AUXILIARY MATERIALS AND COST**

No	Raw Materials	Description	Annual Input	Unit Cost (,000 Birr)		Cost (,000 Birr)
				F.C	L.C	Total
1	Enameled Copper wires	2.5-6mm.sq	32 Ton	30.57		978
2	Enameled Aluminum wire	1.5-4mm.sq	4 Ton	35.00		140
3	M.st. Sheet metal	T. 0.6mm	18Ton	5.00		90
4	Silicon st. Sheet metal	T.0.6mm	60 Ton	10.00		600
5	Switches, pilot lamps, ground & phase clamps		6,000.pcs. of each unit	0.33		1,980
6	Cables, Terminals, sockets		6,000pcs 3of each unit/mts for cables	0.24		1,440
7	Paints and ,Varnishes		3,800 lit	0.03		114
8	Ceramic /rubber/insulators		6,000pcs of each unit	0.12		720
9	Mini fans, screws		6,000pcs of each unit	0.79		4,740
	Total FOB					10,802
	Port handling, inland transport insurance etc				2160	2,160
	Total CIF Addis .A					12,962

B. UTILITIES

The major utilities required by the plant are electricity and water. Annual cost of utilities is estimated at Birr 72,456 of the plant (see Table 4.2)

Table 4.2
ANNUAL UTILITIES REQUIREMENT & COST

No	Utility	Unit	Quantity	Cost (Birr)
1	Electricity	Kwh.	99,000	57,456
2	Water	Meter cube	1,500	15,000
	Total			72,456

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

- Coil formation:-The selected size of enameled copper wire and aluminum wire is wound first on the coil form with the given core size of coil for the primary and secondary sides.
- Core formation:-The transformer magnetic core is formed by laminating strips of silicone sheet steel already cut in sizes.
- Assembly: - The formed coil and the magnetic coils are further assembled together and mounted on metal frames. The electrical wiring of the welder parts is completed.
- Body frame:-The cover body frame is prepared by cutting, drilling of holes, bending & folding and painting of the mild steel sheet.

2. Environmental Impact

The production process involves cutting, drilling, forming machining etc. This process does not have any adverse impact on the environment. The plant has no negative impact on the environment.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery and equipment is estimated at Birr 4.79 million, out of which Birr 3.32 million is required in foreign currency. The list of machinery and equipment required is given in Table 5.1.

Table 5.1
LIST OF MACHINERY AND EQUIPMENT

Sr.No.	Description	Qty. Nos.
1	Guillotine sheering machine (Cap 4mm)	1
2	Sheet metal bending machine (Cap. 2mm)	1
3	Lever Shearing Machine (Cap. 4 mm)	3
4	Spot Welding Machine (Cap 25 Kva)	1
5	Arc Welding machine(Cap 10 Kva)	1
6	Coil winding Machine (with coil former)	2
7	Stoving furnace(10 Kva.)	1
8	Electric portable drill (Cap 12mm)	2
9	Fly wheel press (Cap 10 Ton)	1
10	Pillar drilling machine (Cap 20 mm)	1
11	Compressor with painting accessories	1
12	Pedestal grinding Machine	1
13	Material Handling Equipment	1
14	Tools	1set

2. Land, Building and Civil Works

The plant requires a total area of 1,500 m² for raw material store, chemicals store, production area, packing room, mechanical workshop, administration offices, open space for future expansion and site for the treatment plant for effluent. The built-up area is estimated to be 900 m². Assuming unit construction cost rate of Birr 3,500 per m², the total construction cost is estimated to be Birr 3,150,000.

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 399,000 of which 10% or Birr 39,900 will be paid in advance. The remaining Birr 359,100 will be paid in equal installments within 28 years i.e. Birr 12,825 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The plant will create employment opportunities for 19 persons of whom 11 are production workers. Annual labor cost, including employees benefit, is birr 536,175. The details of human resources required by type of job and corresponding cost are shown in Table 6.1.

Table 6.1
LIST OF HUMAN RESOURCE REQUIREMENT AND 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	Cashier	1	2,000	24,000
6	General Service	3	800	28,800
Sub Total		8		202,800
B. Production				
7	Forman	1	2,500	30,000
8	Machinery Operators	2	2,000	72,000
9	Electricians winders	3	2,500	60,000
10	Mechanics	2	2,000	48,000
11	Quality controller	1	1,500	18,000
12	Laborers	2		19,200
Sub Total		11	-	247,200
Total Basic Salary				450,000
Employee's Benefit (25% Of Basic Salary)		-	-	86,175
Grand Total		19	-	536,175

B. TRAINING REQUIREMENT

An on the job demonstration of the manual fabrication of the welding machinery is a necessary skill for the production of best to the standard products. This task of producing up to standard welding machine can be tackled by frequent training of theoretical and practical training. For such training an amount of 20,000 Birr would be required for two months theoretical and practical training.

VII. FINANCIAL ANALYSIS

The financial analysis of the welding machines 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	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 13.61 million (See Table 7.1). From the total investment cost the highest share (Birr 9.12 million or 67.07%) is accounted by fixed investment cost followed by initial working capital (Birr 3.09 million or 22.76%) and pre operation cost (Birr 1.38 million or 10.17%). From the total investment cost Birr 3.32 million or 24.38% 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	39.90		39.90	0.29
1.2	Building and civil work	3,150.00		3,150.00	23.14
1.3	Machinery and equipment	1,470.00	3,320.00	4,790.00	35.19
1.4	Vehicles	900.00		900.00	6.61
1.5	Office furniture and equipment	250.00		250.00	1.84
	Sub total	5,809.90	3,320.00	9,129.90	67.07
2	Pre operating cost *				
2.1	Pre operating cost	493.70		493.70	3.63
2.2	Interest during construction	890.58		890.58	6.54
	Sub total	1,384.28		1,384.28	10.17
3	Working capital **	3,098.98		3,098.98	22.76
	Grand Total	10,293.16	3,320.00	13,613.16	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 4.48 million. However, only the initial working capital of Birr 3.09 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 16.58 million (see Table 7.2). The cost of raw material account for 78.15% of the production cost. The other major components of the production cost are depreciation, financial cost and direct labor, which account for 8.37%, 4.43% and 2.71% respectively. The remaining 4.84% is the share of repair and maintenance, utility, labour 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	12,962.00	78.15
Utilities	72.00	0.43
Maintenance and repair	144.00	0.87
Labour direct	450.00	2.71
Labour overheads	86.00	0.52
Administration Costs	250.00	1.51
Land lease cost	-	-
Cost of marketing and distribution	500.00	3.01
Total Operating Costs	14,464.00	87.20
Depreciation	1,387.74	8.37
Cost of Finance	734.73	4.43
Total Production Cost	16,586.47	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 1.77 million to Birr 3.20 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 31.59 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 6,922,194$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 36\%$$

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 3 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 30.35% 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 principal 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 14.30 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 19 persons. The project will generate Birr 8.09 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 manufacturing, construction, and furniture sub sectors 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	9,073	10,370	11,666	12,962	12,962	12,962	12,962	12,962	12,962	12,962
Utilities	50	58	65	72	72	72	72	72	72	72
Maintenance and repair	101	115	130	144	144	144	144	144	144	144
Labour direct	315	360	405	450	450	450	450	450	450	450
Labour overheads	60	69	77	86	86	86	86	86	86	86
Administration Costs	175	200	225	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	13	13	13	13	13	13
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	10,275	11,671	13,068	14,464	14,477	14,477	14,477	14,477	14,477	14,477
Depreciation	1,388	1,388	1,388	1,388	1,388	151	151	151	151	151
Cost of Finance	0	980	857	735	612	490	367	245	122	0
Total Production Cost	11,663	14,039	15,313	16,586	16,477	15,118	14,995	14,873	14,750	14,628

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	13,440	17,280	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200
Less variable costs	9,775	11,171	12,568	13,964	13,964	13,964	13,964	13,964	13,964	13,964
VARIABLE MARGIN	3,665	6,109	6,632	5,236	5,236	5,236	5,236	5,236	5,236	5,236
in % of sales revenue	27.27	35.35	34.54	27.27	27.27	27.27	27.27	27.27	27.27	27.27
Less fixed costs	1,888	1,888	1,888	1,888	1,901	664	664	664	664	664
OPERATIONAL MARGIN	1,777	4,221	4,745	3,348	3,335	4,572	4,572	4,572	4,572	4,572
in % of sales revenue	13.23	24.43	24.71	17.44	17.37	23.81	23.81	23.81	23.81	23.81
Financial costs		980	857	735	612	490	367	245	122	0
GROSS PROFIT	1,777	3,241	3,887	2,614	2,723	4,082	4,205	4,327	4,450	4,572
in % of sales revenue	13.23	18.76	20.25	13.61	14.18	21.26	21.90	22.54	23.18	23.81
Income (corporate) tax	0	0	0	784	817	1,225	1,261	1,298	1,335	1,372
NET PROFIT	1,777	3,241	3,887	1,829	1,906	2,858	2,943	3,029	3,115	3,201
in % of sales revenue	13.23	18.76	20.25	9.53	9.93	14.88	15.33	15.78	16.22	16.67

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	9,624	17,464	17,285	19,205	19,200	19,200	19,200	19,200	19,200	19,200	19,200	7,231
Inflow funds	9,624	4,024	5	5	0	0	0	0	0	0	0	0
Inflow operation	0	13,440	17,280	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	0
Other income	0	0	0	0	0	0	0	0	0	0	0	7,231
TOTAL CASH OUTFLOW	9,624	14,299	14,317	15,591	17,649	17,132	17,416	17,330	17,244	17,159	15,848	0
Increase in fixed assets	9,624	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	3,134	442	442	442	1	0	0	0	0	0	0
Operating costs	0	9,775	11,171	12,568	13,964	13,977	13,977	13,977	13,977	13,977	13,977	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	784	817	1,225	1,261	1,298	1,335	1,372	0
Financial costs	0	891	980	857	735	612	490	367	245	122	0	0
Loan repayment	0	0	1,225	1,225	1,225	1,225	1,225	1,225	1,225	1,225	0	0
SURPLUS (DEFICIT)	0	3,165	2,968	3,614	1,551	2,068	1,784	1,870	1,956	2,041	3,352	7,231
CUMULATIVE CASH BALANCE	0	3,165	6,133	9,747	11,298	13,366	15,150	17,020	18,976	21,017	24,368	31,599

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	13,440	17,280	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	7,231
Inflow operation	0	13,440	17,280	19,200	19,200	19,200	19,200	19,200	19,200	19,200	19,200	0
Other income	0	0	0	0	0	0	0	0	0	0	0	7,231
TOTAL CASH OUTFLOW	12,723	10,712	12,108	13,504	15,249	15,294	15,702	15,738	15,775	15,812	15,848	0
Increase in fixed assets	9,624	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	3,099	437	437	437	1	0	0	0	0	0	0	0
Operating costs	0	9,775	11,171	12,568	13,964	13,977	13,977	13,977	13,977	13,977	13,977	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	784	817	1,225	1,261	1,298	1,335	1,372	0
NET CASH FLOW	-12,723	2,728	5,172	5,696	3,951	3,906	3,498	3,462	3,425	3,388	3,352	7,231
CUMULATIVE NET CASH FLOW	-12,723	-9,994	-4,822	874	4,824	8,730	12,229	15,691	19,116	22,504	25,855	33,086
Net present value	-12,723	2,480	4,274	4,279	2,698	2,425	1,975	1,776	1,598	1,437	1,292	2,788
Cumulative net present value	-12,723	10,242	-5,968	-1,689	1,010	3,435	5,410	7,187	8,784	10,221	11,513	14,301

NET PRESENT VALUE 14,301
INTERNAL RATE OF RETURN 30.35%
NORMAL PAYBACK 3 years