161. PROFILE ON THE PRODUCTION OF CONTACTORS AND RELAYS

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I. SUMMARY

This profile envisages the establishment of a plant for the production of contactors and relays with a capacity of 180, 000 pieces per annum. Contactors and relays are electrical devices used for making and breaking electrical circuit in the event of normal operation and overload conditions and are used by motors, compressors, fans, pumps etc in industries, workshops, garages.

The demand for contactors and relays is entirely met through import. The present (2012) demand for contactors and relays is estimated at 157 tons. The demand for contactors and relays is projected to reach 253 tons and 408 tons by the year 2017 and 2022, respectively.

The principal raw materials required are copper conductors & wire, terminal mechanisms, metallic parts for breaking mechanism, and insulating materials which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 9.71 million. From the total investment cost the highest share (Birr 6.90 million or 71.08%) is accounted by fixed investment cost followed by initial working capital (Birr 1.76 million or 18.16%) and pre operation cost (Birr 1.04 million or 10.76%). From the total investment cost Birr 1.63 million or 16.82% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 27.54% and a net present value (NPV) of Birr 9.33 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 subsector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Contractors and relays are electrical devices used for making and breaking electrical circuit in the event of normal operation and overload conditions. They consist of coils, electrical

(electronic) parts/components, terminals, insulation, etc., housed in an enclosed cover so as to protect from mechanical damage.

Contractors and relays are used by motors, compressors, fans, pumps etc in industries, workshops, garages, etc. Contactors are generally used in high current and in heavy industrial settings.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Since there are no local plants that manufacture contractors and relays the demand for the products is met through import. Table 3.1 shows the amount of contractors and relays annually imported during the period 2002 – 2011.

Table 3.1

IMPORT OF CONTRACTORS AND RELAYS (TONS)

Year	Quantity
2002	10
2003	24
2004	50
2005	41
2006	102
2007	41
2008	122
2009	198
2010	156
2011	142

Source: - Ethiopian Revenue and Custom Authority

As can be seen from Table 3.1, import of contractors and relays shows an increasing trend especially during the recent four years. The average annual import during 2002-2007 was 45 tons. However during 2008 – 2011 the average annual import has increased to 154 tons.

During the recent three years (2009 -2010) import or apparent consumption of contractors and relays has exhibited an average annual growth rate of 10.66%. Accordingly, assuming that the growth rate will continue in the near future the present effective demand for the products is estimated by taking the 2011 level of apparent consumption as a base and applying a growth rate of 10.66%.

Based on the above assumption the present (2012) effective demand for contractors and relays is estimated at 157 tons.

2. Projected Demand

The demand for the contractors and relays depends on the performance of the manufacturing sector. Moreover, the products are also used for maintenance purpose. According to the Growth and Transformation Plan (GTP), the industrial sector is expected to grow at an average annual growth rate of 20% during the period 2011 – 2015. Taking this in to account and to be conservative an annual average growth rate of 10% is assumed for projecting the demand for contractors and relays (see Table 3.2.).

Table 3.2

PROJECTED DEMAND FOR CONTRACTORS AND RELAYS (TON)

Year	Projected Demand
2013	173
2014	190
2015	209
2016	230
2017	253
2018	278
2019	306
2020	337
2021	371
2022	408
2023	448
2024	493
2025	543

3. Pricing and Distribution

After assessing the current C.I.F price of contactors and relays, an ex-factory price of Birr 67/ pieces is proposed for the envisaged project. The product can be distributed directly to end users. The product can be distributed by establishing own distribution outlets in major towns or by using construction materials retailers.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

The annual production of the plants operation in a single shift (8) hours a day and 300 days a year at 100% capacity utilization is 180,000 pieces of contactors & relays. The working days are set by deducting Sunday and public holidays from the total days in a year. Production can be doubled or tripled by introducing a two or three shifts operation.

2. Production Programme

A gradual capacity build-up is suggested considering the time required for skill development in operation, market penetration and related technical and technological factors. Accordingly, the production is scheduled in such a way that the plant operates at 75% and 85% of the total installed capacity during the first and second year, respectively. Full production will be achieved during the third year and onwards.

VI. RAW MATERIAL AND INPUTS

A. RAW MATERIAL

Raw material required at full capacity utilization and the corresponding costs are shown in Table 4.1

Table 4.1

ANNUAL RAW MATERIAL REQUIREMENTS

Sr. No	Raw Material	Cost ('000 Birr)		
		F.C.	L.C.	Total
1	Copper Conductors & Wire	750.8	246.3	997.1
2	Transformer, rectifier, resistor capacitor etc.	715.1	286.0	1,001.1
3	Enclosures (outer covers)	516.4	206.6	723.0
4	Terminal Mechanisms, metallic parts for breaking mechanism etc.	2,184.9	874.0	3,058.9
5	Insulating materials	317.8	127.1	444.9
6	Connecting wires, springs, hardware etc.	516.4	206.6	723.0
7	Packing materials and other consumable	218.5	87.4	305.9
Total		**5,220**	**2,034**	**7,254**

B. UTILITIES

Electricity and water are the major utilities required by the plan. Annual cost of utilities is Birr 34,304. The quantity required and corresponding cost at full capacity utilization is shown in Table 4.2.

Table 4.2

ANNUAL UTILITY REQUIREMENTS AND COST

No	Utility	Unit	Quantity	Cost (Birr)
1	Electricity	Kwh	30,000	17,304
2	Water	Meter cube	1,700	17,000
	Total			**34,304**

VI. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The manufacturing process of contractors and relays involves the following operations:

- Parts (Components) are procured from outside source;
- Coils are made in coil winding machine in different sizes and rating as per requirement;
- Electrical (electronic) parts & components, mechanisms, terminals, insulators etc. are assembled together to make complete set of contractors and relays;
- The sets are housed in an enclosure (cover) for protecting the system from outside pressure;
- Finally the contractors and relays are tested and packed.

2. Environmental Impact Assessment

The manufacturing process basically involves winding and assembling which do not create any negative impact on the environment. Hence, the envisaged plant is environment friendly.

B. ENGINEERING

1. Machinery and Equipment

The list of plant machinery and equipment required for the manufacture of contractors and relays is given in Table 5.1. The total cost of plant machinery and equipment is estimated at Birr 1,976,068 out of which Birr 1,634,246 will be in foreign currency.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT

Sr. No	Description	Qty (No)
1.	Coil winding machine	2
2.	Drilling machine	2
3.	Double ended grinder	2
4.	Digital multi meter	5
5.	H.V. Tester	2
6.	Voltmeter, Ammeter, Wattmeter	1set
7.	Megger	1
8.	Insulation tester	1
9.	Temperature measuring equipment, set	1
10.	Hand press	1
11.	Soldering iron	1
12.	Miscellaneous equipment	1set

2. Building and Civil Works

The envisaged plant requires a total land area of 1,000 $m^{2,}$ of which 750 m^2 would be built-up area. Building construction cost at a rate of Birr 5,000/m^2 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 m^2, 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 m^2, 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 m^2. 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 m^2 .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 m^2 (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor
Central Market District	1st	1686
	2nd	1535
	3rd	1323
	4th	1085
	5th	894
Transitional zone	1st	1035
	2nd	935
	3rd	809
	4th	685
	5th	555
Expansion zone	1st	355
	2nd	299
	3rd	217
	4th	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 m^2 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 criterions 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 m^2 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 RESURCE AND TRAINING REQUIREMENT

A. HUMAN RESURCE REQUIREMENT

Total requirement of the plant for direct and indirect labour is 19 persons. Annual cost of labour is estimated at Birr 468,000. Details of human resource required for a single shift operation of the plant and the corresponding labour costs are shown in Table 6.1.

B. TRAINING REQUIREMENT

Five technical personnel need a short – term on –the job training on manufacturing process and on how to use the machine shop equipment. The training can be given during the factory start up and commissioning period. Total cost of training is estimated at Birr 72,000 out of which 70% is assumed to be in foreign currency.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND COST

Sr. No	Position	No	Salary (Birr)	
			Monthly	Annual
1	Manager	1	6,000	72,000
2	Supervisor	1	3,500	42,000
3	Operators	5	7,500	90,000
4	Assistant operators	6	6,000	72,000
5	Accountant /Clerk	1	3,000	36,000
6	Store Keeper	1	1,500	18,000
7	Sales Clerk	1	1,500	18,000
8	Driver	1	1,000	12,000
9	Watchman	2	1,200	14,400
Sub total		**29**	**31,200**	**374,400**
Employees' benefit (25% of Basic			7,800	93,600
Total			**39,000**	**468,000**

VII. FINANCIAL ANALYSIS

The financial analysis of the contactors and relays 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 9.71 million (See Table 7.1). From the total investment cost the highest share (Birr 6.90 million or 71.08%) is accounted by fixed investment cost followed by initial working capital (Birr 1.76 million or 18.16%) and pre operation cost (Birr 1.04 million or 10.76%). From the total investment cost Birr 1.63 million or 16.82% 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	0.27
1.2	Building and civil work	3,750.00		3,750.00	38.62
1.3	Machinery and equipment	341.82	1,634.25	1,976.07	20.35
1.4	Vehicles	900.00		900.00	9.27
1.5	Office furniture and equipment	250.00		250.00	2.57
	Sub total	**5,268.42**	**1,634.25**	**6,902.67**	**71.08**
2	**Pre operating cost ***				
2.1	Pre operating cost	409.28		409.28	4.21
2.2	Interest during construction	635.31		635.31	6.54
	Sub total	**1,044.59**		**1,044.59**	**10.76**
3	**Working capital ****	**1,763.87**		**1,763.87**	**18.16**
	Grand Total	**8,076.88**	**1,634.25**	**9,711.13**	**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 2.50 million. However, only the initial working capital of Birr 1.76 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 10 million (see Table 7.2). The cost of raw material account for 72.48% of the production cost. The other major components of the production cost are depreciation, financial cost and direct labour, which account for 8.31%, 6.11% and 3.74% respectively. The remaining 9.34% is the share of utility, repair and maintenance, labour overhead, cost of marketing and distribution 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	7,254.00	72.48
Utilities	34.00	0.34
Maintenance and repair	59.00	0.59
Labour direct	374.00	3.74
Labour overheads	94.00	0.94
Administration Costs	250.00	2.50
Land lease cost	-	-
Cost of marketing and distribution	500.00	5.00
Total Operating Costs	**8,565.00**	**85.58**
Depreciation	832.07	8.31
Cost of Finance	611.48	6.11
Total Production Cost	**10,008.55**	**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 1.46 million to Birr 2.31 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 21.83 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 4{,}021{,}218$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 33\%$$

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 27.54% 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 9.33 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 6.01 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 subsector and generate other income for the government.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.1
NET WORKING CAPITAL (in 000 Birr)

Items	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total inventory	1,269.45	1,632.15	1,813.50	1,813.50	1,813.50	1,813.50	1,813.50	1,813.50	1,813.50	1,813.50
Accounts receivable	512.13	646.54	713.75	713.75	714.46	714.46	714.46	714.46	714.46	714.46
Cash-in-hand	7.55	9.71	10.79	10.79	10.91	10.91	10.91	10.91	10.91	10.91
CURRENT ASSETS	**1,789.13**	**2,288.40**	**2,538.04**	**2,538.04**	**2,538.87**	**2,538.87**	**2,538.87**	**2,538.87**	**2,538.87**	**2,538.87**
Accounts payable	25.26	32.48	36.08	36.08	36.08	36.08	36.08	36.08	36.08	36.08
CURRENT LIABILITIES	**25.26**	**32.48**	**36.08**	**36.08**	**36.08**	**36.08**	**36.08**	**36.08**	**36.08**	**36.08**
TOTAL WORKING CAPITAL	**1,763.87**	**2,255.93**	**2,501.96**	**2,501.96**	**2,502.79**	**2,502.79**	**2,502.79**	**2,502.79**	**2,502.79**	**2,502.79**

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	5,078	6,529	7,254	7,254	7,254	7,254	7,254	7,254	7,254	7,254
Utilities	24	31	34	34	34	34	34	34	34	34
Maintenance and repair	41	53	59	59	59	59	59	59	59	59
Labour direct	262	337	374	374	374	374	374	374	374	374
Labour overheads	66	85	94	94	94	94	94	94	94	94
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	**6,146**	**7,759**	**8,565**	**8,565**	**8,574**	**8,574**	**8,574**	**8,574**	**8,574**	**8,574**
Depreciation	832	832	832	832	832	175	175	175	175	175
Cost of Finance	0	699	611	524	437	349	262	175	87	0
Total Production Cost	**6,978**	**9,289**	**10,009**	**9,921**	**9,842**	**9,098**	**9,011**	**8,923**	**8,836**	**8,749**

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	8,442	10,854	12,060	12,060	12,060	12,060	12,060	12,060	12,060	12,060
Less variable costs	5,646	7,259	8,065	8,065	8,065	8,065	8,065	8,065	8,065	8,065
VARIABLE MARGIN	**2,797**	**3,596**	**3,995**	**3,995**	**3,995**	**3,995**	**3,995**	**3,995**	**3,995**	**3,995**
in % of sales revenue	33.13	33.13	33.13	33.13	33.13	33.13	33.13	33.13	33.13	33.13
Less fixed costs	1,332	1,332	1,332	1,332	1,341	684	684	684	684	684
OPERATIONAL MARGIN	**1,464**	**2,263**	**2,663**	**2,663**	**2,654**	**3,311**	**3,311**	**3,311**	**3,311**	**3,311**
in % of sales revenue	17.35	20.85	22.08	22.08	22.01	27.46	27.46	27.46	27.46	27.46
Financial costs		699	611	524	437	349	262	175	87	0
GROSS PROFIT	**1,464**	**1,565**	**2,051**	**2,139**	**2,218**	**2,962**	**3,049**	**3,137**	**3,224**	**3,311**
in % of sales revenue	17.35	14.41	17.01	17.73	18.39	24.56	25.29	26.01	26.73	27.46
Income (corporate) tax	0	0	0	642	665	889	915	941	967	993
NET PROFIT	**1,464**	**1,565**	**2,051**	**1,497**	**1,552**	**2,073**	**2,135**	**2,196**	**2,257**	**2,318**
in % of sales revenue	17.35	14.41	17.01	12.41	12.87	17.19	17.70	18.21	18.71	19.22

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	**7,312**	**10,866**	**10,861**	**12,064**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**5,415**
Inflow funds	7,312	2,424	7	4	0	0	0	0	0	0	0	0
Inflow operation	0	8,442	10,854	12,060	12,060	12,060	12,060	12,060	12,060	12,060	12,060	0
Other income	0	0	0	0	0	0	0	0	0	0	0	5,415
TOTAL CASH OUTFLOW	**7,312**	**8,570**	**9,830**	**10,300**	**10,604**	**10,550**	**10,685**	**10,624**	**10,563**	**10,502**	**9,567**	**0**
Increase in fixed assets	7,312	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	1,789	499	250	0	1	0	0	0	0	0	0
Operating costs	0	5,646	7,259	8,065	8,065	8,074	8,074	8,074	8,074	8,074	8,074	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	642	665	889	915	941	967	993	0
Financial costs	0	635	699	611	524	437	349	262	175	87	0	0
Loan repayment	0	0	874	874	874	874	874	874	874	874	0	0
SURPLUS (DEFICIT)	**0**	**2,297**	**1,031**	**1,764**	**1,456**	**1,510**	**1,375**	**1,436**	**1,497**	**1,558**	**2,493**	**5,415**
CUMULATIVE CASH BALANCE	**0**	**2,297**	**3,328**	**5,091**	**6,547**	**8,057**	**9,432**	**10,868**	**12,365**	**13,924**	**16,417**	**21,831**

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**	**8,442**	**10,854**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**12,060**	**5,415**
Inflow operation	0	8,442	10,854	12,060	12,060	12,060	12,060	12,060	12,060	12,060	12,060	0
Other income	0	0	0	0	0	0	0	0	0	0	0	5,415
TOTAL CASH OUTFLOW	**9,076**	**6,638**	**8,005**	**8,565**	**9,207**	**9,239**	**9,462**	**9,488**	**9,515**	**9,541**	**9,567**	**0**
Increase in fixed assets	7,312	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	1,764	492	246	0	1	0	0	0	0	0	0	0
Operating costs	0	5,646	7,259	8,065	8,065	8,074	8,074	8,074	8,074	8,074	8,074	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	642	665	889	915	941	967	993	0
NET CASH FLOW	**-9,076**	**1,804**	**2,849**	**3,495**	**2,853**	**2,821**	**2,598**	**2,572**	**2,545**	**2,519**	**2,493**	**5,415**
CUMULATIVE NET CASH FLOW	**-9,076**	**-7,271**	**-4,422**	**-927**	**1,926**	**4,747**	**7,345**	**9,916**	**12,462**	**14,981**	**17,474**	**22,889**
Net present value	-9,076	1,640	2,355	2,626	1,948	1,752	1,466	1,320	1,187	1,068	961	2,088
Cumulative net present value	-9,076	-7,435	-5,080	-2,455	-506	1,245	2,712	4,031	5,219	6,287	7,248	9,336

NET PRESENT VALUE	9,336
INTERNAL RATE OF RETURN	27.54%
NORMAL PAYBACK	4 years