PROFILE ON THE PRODUCTION OF HINGES

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I. SUMMARY

This profile envisages the establishment of a plant for the production of hinges with a capacity of 900 tons per annum. Hinges are devices that are made out of two symmetrical or none symmetrical sheet metal pieces pivot joined together with wire rod for free swinging of the two parts and are used to support doors or windows of buildings and furniture allowing a swing about the support frames.

The demand for hinges is met entirely through import. The present (2012) demand for hinges is estimated at 1,236 tons. The demand for hinges is projected to reach 1,990 tons and 3,205 tons by the year 2017 and 2022, respectively.

The principal raw materials required is sheet metals which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 11.97 million. From the total investment cost the highest share (Birr 5.89 million or 49.28%) is accounted by fixed investment cost followed by initial working capital (Birr 4.85 million or 40.53%) and pre operation cost (Birr 1.21 million or 10.19%). From the total investment cost Birr 1.44 million or 12.02% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 29.83% and a net present value (NPV) of Birr 13.02 million discounted at 10%.

The project can create employment for 26 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 construction and furniture sub sectors and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Hinges are devices that are made out of two symmetrical or none symmetrical sheet metal pieces pivot joined together with wire rod for free swinging of the two parts. Hinges are used to support doors or windows of buildings and furniture allowing a swing about the support frames. Hinges

are made in several designs and strengths. This plant produces out of sheet metal H hinges, T hinges for doors, windows and furniture.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

In Ethiopia the demand for hinges is met through imports. Accordingly, the annual import of the product during the period 2002 - 2011 is shown in Table 3.1.

Table 3.1

IMPORT OF HINGES (TONS)

Year	Quantity
2002	655
2003	637
2004	575
2005	914
2006	1,071
2007	900
2008	844
2009	1,269
2010	923
2011	1,123

***Source**: - Ethiopian Revenue and Customs Authority.*

As could be seen from Table 3.1, import data of the product show a general increasing trend with some fluctuations. For example the average import during the first five years (2002 – 2006 which was 771 tons has increased by 31% to 1,012 tons in the subsequent five years (2009 –

2011). Hence, the products supply has exhibited an increase of 31% between the two periods. During the period under consideration (2002 – 2011) import or apparent consumption of hinges has registered an average annual growth rate of 10%.

For estimating the present effective demand for hinges, it is assumed that the average growth rate exhibited by the products import or apparent consumption will continue at least in the near future. Accordingly, by taking the year 2011 level of supply as a base and applying a growth rate of 10%, the present (2012) effective demand for hinges is estimated at 1,236 tons.

2. Projected Demand

The demand for hinges depends mainly on the performance of its end-user (i.e. the construction and furinture manufactering sectors). Therefore, the demand for the products under consideration is a derived demand, which depends directly on the performance of its major end – user.

The construction sector of the country has undergone tremendous changes and development in recent years. The contribution of the construction sector to the GDP during the period 2001 – 2010 have been growing at annual average growth rate of 13 percent which is above the average annual growth rate of real GDP during the period under consideration (11.4 %), indicating a rise in the share of the construction sector within the overall economy. Moreover, during the GTP period (2010 – 2015), the construction sector is expected to grow at annual average growth rate of 20%.

On the other hand among the factors that influence the demand for hinges one of the critical factor is identified to be economic growth leading to growth of the construction and furinture manufactering sectors. According to the government's "Growth and Transformation Plan" during the period 2010 – 2015 the GDP of the country is expected to grow at a minimum average annual growth rate of 11.2%.

Accordingly, based on the above discussion and in order to be conservative a growth rate of 10% which is slightly lower than the expected growth rate of the country's GDP during the GTP period (2011 – 2015) is used.

Based on the above assumption and using the estimated present demand as a base the projected demand for hinges is shown in Table 3.2.

Table 3.2

DEMAND PROJECTION FOR HINGES (TONS)

Year	Projected Demand
2013	1,359
2014	1,495
2015	1,645
2016	1,809
2017	1,990
2018	2,189
2019	2,408
2020	2,649
2021	2,913
2022	3,205
2023	3,525
2024	3,878
2025	4,266

3. Pricing and Distribution

The CIF price of the product in 2011 was Birr 22,170 per tone. Allowing 30% for import duty and other clearing expenses, the factory gate price of the envisaged plant is estimate at Birr 28,821 per tone.

Considering the nature of the products and the characteristics of the end users a combination both direct distribution to end users (for bulk purchasers) and indirect distribution (using agents) is selected as the most appropriate distribution channel.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

By looking at the market demand and the available technologies the manufacturing capacity of the selected plant is 900 tons of hinges in a 1 shift of 8 hours a day for annual working days of 300 days.

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 will operate at 75% during its first year operation and it will increase to 85% and 100% during the second and third year and then after, respectively (see Table 3.3).

Table 3.3

ANNUAL PRODUCTION PROGRAM

	Year 1	**Year 2**	**Year 3**
Annual production(Ton)	675	765	900
Capacity %	75	85	100

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The manufacturing of the selected type of hinges require different thicknesses of sheet metals as main input. The detail sizes of the sheet metals and the other raw materials along with their cost are given in Table 4.1.

Table 4.1

RAW MATERIALS AND ANNUAL COST

No	Raw Materials	Description	Annual Input	Cost (,000 Birr)		Cost (,000 Birr)
				F.C	L.C	Total
1	M.S drawn wire, roads	Dia.3& 6mm	200 (Ton)	2,600	520	3,120
2	M.s Sheet metal	Thickness 1mm	300 (Ton)	4,500	900	5,400
3	M.s Sheet metal	Thickness1.5 mm	375 (Ton)	6,000	1,200	7,200
4	Brass sheet metal	Thickness 1mm	25 (Ton)	625	125	750
5	Sulphuric acid	Concentrated	3,000 (lit.)		36	36
	Total			**13,725**	**2,781**	**16,506**

B. UTILITIES

The major utility requirements of the project are water and electricity. Annual cost of utilities at full capacity operation is Birr 50,520. The required quantity and cost is shown on the Table 4.2 below.

Table 4.2

ANNUAL UTILITIES REQUIREMENT COST

No	Utility	Unit	Quantity	Cost (Birr)
1	Electricity	kWh	60,000	35,520
2	Water	Meter cube	1,500	15,000
	Total			**50,520**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

Depending on the model of the hinge product there will be two to five operations on a single piece of the product.

- Cutting work: - Cutting of the mild steel and the brass sheet metals into size on shearing machine.
- Press work: - Blanking, bending and folding of the sheet metal on press using appropriate dies tools to obtain the hinges and the washer parts.
- Tumbling work: - Cleaning of rust and removal of sharp edges from the products.

2. Environmental Impact

The production process of hinges involves cutting, drilling and forming of sheet metal on the various machines operated manually and electrically to get the final shape of the hinge. This operation does not have any negative impact on the environment. Thus, the plant has no negative impact on the environment.

B. ENGINEERING

1. Machinery and Equipment

The production of hinges mainly involves pressing operations on sheet metals and wires on various machines. The finally produced hinge products need also cleaning. Cost of machinery and equipment is estimated at Birr 1.72 million. The machinery and equipment required for this purpose are listed in Table 5.1.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT AND COST

Sr. No.	Description	Qty.	Unit price (000 Birr)	Cost (000 Birr)		Total (000) Birr
				FC	LC	Total
1	Mechanical Power Press 120 Ton	1	250	250	50	300
2	Mechanical Power Press 80 Ton	1	200	200	40	240
3	Mechanical Power Press 30 ton	2	180	360	72	432
4	Fly Wheel Press 10 Ton	2	75	150	30	180
5	Power Guillotine Shear 4mm	2	90	180	36	216
6	Manual treadle shearing Machine 2.5 mm.	2	25	50	10	60
7	Lever shear 2.5mm	4	15	60	12	72
8	Pillar Drilling Machine 20 mm.	4	10	40	8	48
9	Portable Electric Drill 10 mm	4	5	20	4	24
10	Tumbling Barrel	2	10	20	4	24
11	Dies and Jigs	5set	15	75	15	90
12	Set of Hand Tools	3set	5	15	3	18
13	Material Handling Equipments	2	10	20	4	24
	Total			**1,440**	**288**	**1,728**

2. Land, Building and Civil Works

The total area required for plant site is estimated to be 800 m^2; of this the built-up area of the factory will be 600 m^2. Building cost is estimated to be Birr 5,000 per m^2, and the total building cost will, then, be Birr 3 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 5000 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 price/m^2
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 212,800 of which 10% or Birr 21,280 will be paid in advance. The remaining Birr 191,520 will be paid in equal installments with in 28 years i.e. Birr 6,840 annually.

NB: The land issue in the above statement narrates or shows only Addis Ababa's city administration land lease price, policy and regulations.

Accordingly the project profile prepared based on the land lease price of Addis Ababa region. To know land lease price, police and regulation of other regional state of the country updated information is available at Ethiopian Investment Agency's website www.eia.gov.et on the factor cost.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The envisaged plant requires 26 workers for one shift. The total salary and yearly benefits is Birr 697,680 as shown on 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	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	Forman	1	2,500	30,000
9	Machinery Operators	7	2,000	168,000
10	Assistant Operators	2	1,500	36,000
11	Mechanics	2	2,000	48,000
12	Electrician	1	2,000	24,000
13	Quality controller	1	1,500	18,000

14	Laborers	4	800	38,400
Subtotal		**17**	**-**	**362,400**
Total Basic Salary				**583,200**
Employee's Benefit (25%Of Basic Salary)				**114,480**
Total		**26**	**-**	**697,680**

B. TRAINING REQUIREMENT

On the job demonstration of the operations of the machine would be enough for workers with technical background knowledge. A cost of Birr 20,000 would be required for on job training of 15 days for 13 workers.

VII. FINANCIAL ANALYSIS

The financial analysis of the hinges 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 local	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 11.97 million (See Table 7.1). From the total investment cost the highest share (Birr 5.89 million or 49.28%) is accounted by fixed investment cost followed by initial working capital (Birr 4.85

million or 40.53%) and pre operation cost (Birr 1.21 million or 10.19%). From the total investment cost Birr 1.44 million or 12.02% 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	21.28		21.28	0.18
1.2	Building and civil work	3,000.00		3,000.00	25.06
1.3	Machinery and equipment	288.00	1,440.00	1,728.00	14.44
1.4	Vehicles	900.00		900.00	7.52
1.5	Office furniture and equipment	250.00		250.00	2.09
	Sub total	**4,459.28**	**1,440.00**	**5,899.28**	**49.28**
2	**Pre operating cost ***				
2.1	Pre operating cost	436.40		436.40	3.65
2.2	Interest during construction	783.09		783.09	6.54
	Sub total	**1,219.49**		**1,219.49**	**10.19**
3	**Working capital ****	**4,851.32**		**4,851.32**	**40.53**
	Grand Total	**10,530.09**	**1,440.00**	**11,970.09**	**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 6.91 million. However, only the initial working capital of Birr 4.85 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 23.45 million (see Table 7.2). The cost of raw material account for 87.26% of the production cost. The other major components of the production cost are depreciation, financial cost and labour which account for 3.23%, 2.75% and 2.49% respectively. The remaining 4.27% is the share of utility, marketing and distribution, repair and maintenance, 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	20,466.00	87.26
Utilities	51.00	0.22
Maintenance and repair	86.00	0.37
Labour direct	583.00	2.49
Labour overheads	114.00	0.49
Administration Costs	250.00	1.07
Land lease cost	-	-
Cost of marketing and distribution	500.00	2.13
Total Operating Costs	**22,050.00**	**94.01**
Depreciation	757.88	3.23
Cost of Finance	646.05	2.75
Total Production Cost	**23,453.93**	**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 1.81 million to Birr 2.61 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 29.55 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 7{,}434{,}074$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 29\%$$

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 29.83% 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 10.02 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 26 persons. The project will generate Birr 6.80 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 construction and furniture sub sectors and also generates income for the Government in terms of payroll tax.

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	3,581.55	4,093.20	4,604.85	5,116.50	5,116.50	5,116.50	5,116.50	5,116.50	5,116.50	5,116.50
Accounts receivable	1,298.75	1,478.33	1,657.92	1,837.50	1,838.07	1,838.07	1,838.07	1,838.07	1,838.07	1,838.07
Cash-in-hand	10.04	11.48	12.91	14.35	14.44	14.44	14.44	14.44	14.44	14.44
CURRENT ASSETS	**4,890.34**	**5,583.01**	**6,275.68**	**6,968.35**	**6,969.01**	**6,969.01**	**6,969.01**	**6,969.01**	**6,969.01**	**6,969.01**
Accounts payable	39.03	44.60	50.18	55.75	55.75	55.75	55.75	55.75	55.75	55.75
CURRENT LIABILITIES	**39.03**	**44.60**	**50.18**	**55.75**	**55.75**	**55.75**	**55.75**	**55.75**	**55.75**	**55.75**
TOTAL WORKING CAPITAL	**4,851.32**	**5,538.41**	**6,225.50**	**6,912.60**	**6,913.26**	**6,913.26**	**6,913.26**	**6,913.26**	**6,913.26**	**6,913.26**

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	14,326	16,373	18,419	20,466	20,466	20,466	20,466	20,466	20,466	20,466
Utilities	36	41	46	51	51	51	51	51	51	51
Maintenance and repair	60	69	77	86	86	86	86	86	86	86
Labour direct	408	466	525	583	583	583	583	583	583	583
Labour overheads	80	91	103	114	114	114	114	114	114	114
Administration Costs	175	200	225	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	7	7	7	7	7	7
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	**15,585**	**17,740**	**19,895**	**22,050**	**22,057**	**22,057**	**22,057**	**22,057**	**22,057**	**22,057**
Depreciation	758	758	758	758	758	145	145	145	145	145
Cost of Finance	0	861	754	646	538	431	323	215	108	0
Total Production Cost	**16,343**	**19,359**	**21,407**	**23,454**	**23,353**	**22,633**	**22,525**	**22,417**	**22,310**	**22,202**

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	18,157	23,345	25,939	25,939	25,939	25,939	25,939	25,939	25,939	25,939
Less variable costs	15,085	17,240	19,395	21,550	21,550	21,550	21,550	21,550	21,550	21,550
VARIABLE MARGIN	**3,072**	**6,105**	**6,544**	**4,389**	**4,389**	**4,389**	**4,389**	**4,389**	**4,389**	**4,389**
in % of sales revenue	16.92	26.15	25.23	16.92	16.92	16.92	16.92	16.92	16.92	16.92
Less fixed costs	1,258	1,258	1,258	1,258	1,265	652	652	652	652	652
OPERATIONAL MARGIN	**1,814**	**4,847**	**5,286**	**3,131**	**3,124**	**3,737**	**3,737**	**3,737**	**3,737**	**3,737**
in % of sales revenue	9.99	20.76	20.38	12.07	12.04	14.41	14.41	14.41	14.41	14.41
Financial costs		861	754	646	538	431	323	215	108	0
GROSS PROFIT	**1,814**	**3,986**	**4,532**	**2,485**	**2,586**	**3,306**	**3,414**	**3,522**	**3,629**	**3,737**
in % of sales revenue	9.99	17.07	17.47	9.58	9.97	12.75	13.16	13.58	13.99	14.41
Income (corporate) tax	0	0	0	746	776	992	1,024	1,057	1,089	1,121
NET PROFIT	**1,814**	**3,986**	**4,532**	**1,740**	**1,810**	**2,315**	**2,390**	**2,465**	**2,541**	**2,616**
in % of sales revenue	9.99	17.07	17.47	6.71	6.98	8.92	9.21	9.50	9.79	10.09

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	**6,336**	**23,830**	**23,351**	**25,945**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**9,518**
Inflow funds	6,336	5,673	6	6	0	0	0	0	0	0	0	0
Inflow operation	0	18,157	23,345	25,939	25,939	25,939	25,939	25,939	25,939	25,939	25,939	0
Other income	0	0	0	0	0	0	0	0	0	0	0	9,518
TOTAL CASH OUTFLOW	**6,336**	**21,258**	**20,371**	**22,418**	**25,211**	**24,448**	**24,556**	**24,481**	**24,405**	**24,330**	**23,178**	**0**
Increase in fixed assets	6,336	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	4,890	693	693	693	1	0	0	0	0	0	0
Operating costs	0	15,085	17,240	19,395	21,550	21,557	21,557	21,557	21,557	21,557	21,557	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	746	776	992	1,024	1,057	1,089	1,121	0
Financial costs	0	783	861	754	646	538	431	323	215	108	0	0
Loan repayment	0	0	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	0	0
SURPLUS (DEFICIT)	**0**	**2,572**	**2,980**	**3,526**	**728**	**1,491**	**1,383**	**1,458**	**1,534**	**1,609**	**2,761**	**9,518**
CUMULATIVE CASH BALANCE	**0**	**2,572**	**5,552**	**9,078**	**9,806**	**11,297**	**12,680**	**14,138**	**15,671**	**17,280**	**20,041**	**29,559**

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**	**18,157**	**23,345**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**25,939**	**9,518**
Inflow operation	0	18,157	23,345	25,939	25,939	25,939	25,939	25,939	25,939	25,939	25,939	0
Other income	0	0	0	0	0	0	0	0	0	0	0	9,518
TOTAL CASH OUTFLOW	**11,187**	**16,272**	**18,427**	**20,582**	**22,796**	**22,833**	**23,049**	**23,081**	**23,113**	**23,146**	**23,178**	**0**
Increase in fixed assets	6,336	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	4,851	687	687	687	1	0	0	0	0	0	0	0
Operating costs	0	15,085	17,240	19,395	21,550	21,557	21,557	21,557	21,557	21,557	21,557	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	746	776	992	1,024	1,057	1,089	1,121	0
NET CASH FLOW	**-11,187**	**1,885**	**4,918**	**5,357**	**3,143**	**3,106**	**2,890**	**2,858**	**2,826**	**2,793**	**2,761**	**9,518**
CUMULATIVE NET CASH FLOW	**-11,187**	**-9,302**	**-4,384**	**973**	**4,116**	**7,222**	**10,112**	**12,970**	**15,796**	**18,589**	**21,350**	**30,868**
Net present value	-11,187	1,714	4,064	4,025	2,147	1,929	1,631	1,467	1,318	1,185	1,064	3,669
Cumulative net present value	-11,187	-9,473	-5,409	-1,384	762	2,691	4,323	5,789	7,107	8,292	9,356	13,026

NET PRESENT VALUE	13,026
INTERNAL RATE OF RETURN	29.83%
NORMAL PAYBACK	3 years