66. PROFILE ON THE PRODUCTION OF RED OXIDE PAINT

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I. SUMMARY

This profile envisages the establishment of a plant for the production of red oxide paint with a capacity of 1,000 tons per annum. Red oxide paint is a coating applied to a surface or substrate (base material) to decorate and protect the material from corrosion.

The country`s requirement of red oxide paint is met through import. The present (2012) demand for red oxide paint is estimated at 693 tons. The demand for the product is projected to reach to 1,228 tones and 1,978 tones by the years 2018 and 2023, respectively.

The principal raw materials required are pickle liquor, iron scrap, soda ash, magnesium carbonate, zinc chromate, microtalc, whiting ($caco_3$), cobalt naphthenate, lead naphethenate, M.T.O and matie varnish. All raw materials except iron scrap, soda ash and calcium carbonate have to be imported.

The total investment cost of the project including working capital is estimated at Birr 19.74 million. From the total investment cost the highest share (Birr 14.90 million or 71.38%) is accounted by fixed investment cost followed by initial working capital (3.65 million or 18.51%) and pre operation cost (Birr 1.20 million or 10.11%). From the total investment cost, Birr 6.48 million or 32.83% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 20.13% and a net present value (NPV) of Birr 11.85 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 backward linkage with the chemical manufacturing sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCTION DESCRIPTION AND APPLICATION

Paints are surface coating fluid materials which, when spread over a surface in the form of a thin layer, will form a solid, adherent and cohesive film. Paints can be defined as coatings applied to a surface or substrate (base material) to decorate and protect it or perform some other specialized functions.

The red oxide paints are manufactured from red iron oxide which can be obtained either from nature or manufactured synthetically from scrap iron. The fluid red oxide paint contains three major ingredients that are pigment, binders and these can be varied to produce films with any desired physical and application characteristics.

Red oxide paints are widely used in the decorative as well as in industrial coatings. The function of red oxide pigment is to provide color and opacity, to enhance film's durability and hardness and in primers to suppress corrosion and reduce the moisture permeability of films.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for red/iron oxide paints is largely met through import. Table 3.1 presents the total imported quantity of iron oxides & hydroxides and iron (iii) oxides in the past 12 years covering the period 2000--2011.

As could be seen from Table 3.1, import of red/iron oxide paint in the past 12 years has shown a general increasing trend except slight fluctuations in few years. During the initial three year of the data set i.e. year 2000--2002 the yearly average volume of import was only 205 tons. But in the following three years (2003--2005) it increased to a yearly average of 372 tons, which is an increase of by about 81%. Similarly, during the period 2006--2008 and 2009--2011 the imported quantity increased to a yearly average of 540 tones and 630 tones, respectively. Generally, import of the product in the past 12 years has been growing by about 10% annually.

Table 3.1

IMPORT OF IRON OXIDE (TONS)

Year	Import
2000	217
2001	178
2002	220
2003	382
2004	360
2005	375
2006	419
2007	511
2008	691
2009	770
2010	702
2011	420

Source: - *Ethiopian Revenues and Customs Authority.*

In order to estimate the present (year 2012) effective demand, the recent three years average has been taken as a base. Then, the growth trend observed in the past 12 years, which is 10% per annum, has been applied. Accordingly, the present demand for the product is set at 693 tons.

2. Projected Demand

Since the main application of the product is to protect corrosion (anti rust) its demand will grow with the consumption of metal based products. Consumption of metal based products are in turn influenced by many factors among which are income (GDP) rise, growth of the urban and rural population, growth of the metal manufacturing sub-sector and the construction sector. Due to the positive trends observed in the past and the feature prospects, the combined effects of the above factors will boost the demand for the product. However, to be conservative an annual average growth rate of only 10%, which is observed in the past, is taken in forecasting the future demand (see Table 3.2).

Table 3.2

PROJECTED DEMAND FOR IRON OXIDE (TONS)

Year	Projected Demand
2013	762
2014	838
2015	922
2016	1,014
2017	1,116
2018	1,228
2019	1,351
2020	1,486
2021	1,634
2022	1,780
2023	1,978

The demand for red/ iron oxide paint will increase from 762 tons in the year 2013 to 1,228 tones and 1,978 tones by the years 2018 and 2023, respectively.

3. Pricing and distribution

Based on year 2011 CIF value of the product and considering other costs related to import a factory gate price of Birr 26,720 per tone is recommended for sales revenue projection and financial evaluation.

Red/ iron oxide paint is used in various activities of the metal manufacturing and construction sector. Its end users are numerous and cover a wide geographical area. Hence, the project has to appoint agents and/or distributors in the major cities and towns of the country. Then, the final consumers of the product will access the product from the existing building materials retail shops which are widely distributed throughout the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Based on the indication of the market study, the production capacity at 100% capacity utilization and 300 days' two shift operation of the plant is 1,000 tons of red oxide paint per annum.

2. Production Program

The envisaged plant is scheduled to start production during first year at 60% of designed capacity of the plant and to grow to 75%, 90% and 100% in year second, third and fourth years of its production years.

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The major raw materials required for the production of red oxide paint are pickle liquor, iron scrap, soda ash, magnesium carbonate, zinc chromate, microtalc, whiting ($caco_3$), cobalt naphthenate, lead naphethenate, M.T.O and matie varnish. All raw materials except iron scrap, soda ash and calcium carbonate are to be imported. Annual requirement of raw materials at 100% capacity utilization of the plant and the respective cost is given in Table 4.1.

Table 4.1

RAW MATERIALS REQUIREMENT AND COST

Sr.No.	Material	Qty (Tons)	Unit Price ('000 Birr)	Cost('000 Birr)		
				F.C	L.C	Total
1	Pickle Liquor	4,166.67	0.40	1,665.14	-	1,665.14
2	Iron Scrap	166.67	6.75	-	1,125.00	1,125.00
3	Soda Ash	500.00	5.85	-	2,925.00	2,925.00
4	Magnesium Carbonate	73.33	22.50	1,650.00	-	1,650.00
5	Zince Chromate	100.00	22.50	2,250.00	-	2,250.00
6	Microtalc	3.33	1.53	5.10	-	5.10
7	Whiting (CaCO3)	16.67	4.05	67.50	-	67.50
8	Cobalt Naphthenate	4.00	45.00	180.0	-	180.00
9	Lead Naphthenate	10.00	20.73	207.31	-	207.31
10	M.T.O	200.00	8.21	1,642.21	-	1,642.21
11	Matie Varnish	333.33	6.29	2,097.86	-	2,097.86
12	Plastic package	1,000,000	0.003	-	3,000.00	3,000.00
13	Labels (pcs)	1,000,000	0.001	-	1,000.00	1,000.00
	Total			**9,765.12**	**8,050.00**	**17,815.12**

B. UTILITIES

The main required utilities by the envisaged plant are electricity and water. The annual electric power and water demand of the plant is 186.67 MWH and 15,000 m^3, respectively. The price rate of electric power and water is: 0.65 Birr/kWh for electric power and 10 Birr/m^3 for water. Therefore, the total estimated annual expense of utility is Birr 254,666.67.

IV. TECHNOLOGY AND ENGINEERING

C. TECHNOLOGY

1. Production Processes

The manufacturing process of Red Oxide Paint involves two distinct technological stages: the first step involves manufacturing of Red Oxide Pigment from the Pickle Liquor, and the second step involves the production of the Red Oxide Paints from the Red Oxide Pigment. The operations on each step are as described below.

Step I – Manufacturing of Red Oxide Pigment from Pickle Liquor

The Red Oxide production process consists of the following steps:

- Waste pickle liquor procurement from steel industries;
- Reaction of Iron Scraps with excess acid present in the Pickle Liquor;
- Reaction with Soda Ash (Na_2CO_3) to form Ferrous Carbonate and Sodium Sulphate;
- Reaction of Ferrous Carbonate with atmospheric Oxygen or air to oxidize Ferrous Carbonate to Red Iron Oxide Pigment;
- Filtration and removal of Sodium Sulphate solution;
- Drying of red iron oxide paint; and
- Grinding or pulverizing and sieving to the desired size.

Step II - Manufacturing of Red Oxide Paint from Red Oxide Pigment

The Red Oxide Pigment production process consists of the following steps:

- Mixing and making of paste of Iron Oxide in a steel ball mill, turning by adding the necessary vehicles to the property ground mill base (paste) to provide the finished paint;
- Tinting with proper toner;
- Screening in vibrating screen with wire mesh of desired size;
- Filling in containers in filling equipment;

- Labeling in labeling machine; and
- Packaging in suitable cartons.

2. Environmental Impact

The production of red oxide paint does not have any negative impact on the environment.

B. ENGINEERING

1. Machinery and Equipment

The list and quantity of plant machinery and equipment required are given in Table 5.1. The total cost of machinery and equipment is estimated at Birr 8.10 million out of which Birr 6.48 million is in foreign currency.

Table 5.1

LIST OF THE REQUIRED MACHINERY AND EQUIPMENT

Sr.No	Description	Qty.
1	Storage Tank	3
2	Settling Tank	2
3	Precipitation tank	1
4	Soda Ash Solution Tank	1
5	Oxidation Tank for Iron Oxide	1
6	Filter Press	1
7	Fluidized Bed Drier	1
8	Sieving Machine	1
9	Mini Boiler	1
10	Edge Runner	1
11	Ball Mill	1
12	Pulveriser	1
13	Mixer or Thinning Tank	1
14	D.G. Set	1

2. Land, Building and Civil Works

The total land area required by the plant is 1,500 m^2, out of which the built-up area is 950 m^2. Based on a rate of Birr 5,000 /m^2 and the building and civil work cost are estimated to be Birr 4.75 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 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 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 with in 28 years i.e. Birr 12,825 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

The total human resource required for the envisaged plant is 22 persons with an annual cost of Birr 930,000. The details of human resource requirement and its related costs are given in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND COST

Sr.No.	Position	No. of Persons	Salary (Birr)	
			Monthly	Annual
1	Manager	1	8,000	96,000.00
2	Sales Person	1	5,000	60,000.00
3	Secretary	1	3,000	36,000.00
4	Accountant	1	5,000	60,000.00
5	Engineer	1	6,000	72,000.00
6	Supervisor	2	4,000	96,000.00
7	Operators	5	2000	120,000.00
8	Unskilled workers	5	1500	90,000.00
9	Diver	1	1500	18,000.00
10	Guards	4	2000	96,000.00
	Sub -total	**22**		744,000.00
	Employees' Benefit (25% of Basic Salary)			186,000.00
	Total			**930,000.00**

B. TRAINING REQUIREMENT

On job-training is proposed to be given to two technical persons for a minimum of two weeks during the commissioning period on project site by experts of machinery supplier. The cost of training is estimated at Birr 50,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the red oxide paint 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 19.74 million (see Table 7.1). From the total investment cost the highest share (Birr 14.90 million or 71.38%) is accounted by fixed investment cost followed by initial working capital (3.65 million or 18.51%) and pre operation cost (Birr 1.20 million or 10.11%). From the total investment cost, Birr 6.48 million or 32.83% 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	0.20
1.2	Building and civil work	4,750.00		4,750.00	24.06
1.3	Machinery and equipment	1,620.00	6,480.00	8,100.00	41.03
1.4	Vehicles	900.00		900.00	4.56
1.5	Office furniture and equipment	300.00		300.00	1.52
	Sub total	**7,609.90**	**6,480.00**	**14,089.90**	**71.38**
2	**Pre operating cost ***				
2.1	Pre operating cost	705.00		705.00	3.57
2.2	Interest during construction	1,291.42		1,291.42	6.54
	Sub total	**1,996.42**		**1,996.42**	**10.11**
3	**Working capital ****	**3,654.00**		**3,654.00**	**18.51**
	Grand Total	**13,260.32**	**6,480.00**	**19,740.32**	**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 6.13 million. However, only the initial working capital of Birr 3.65 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 75.98% of the production cost. The other major components of the production cost are depreciation, financial cost and labor which account for 9.22%, 5.30% and 3.17% respectively. The remaining 6.33% 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 (in 000 Birr)	%
Raw Material and Inputs	17,815.12	75.98
Utilities	254.66	1.09
Maintenance and repair	243.00	1.04
Labour direct	744.00	3.17
Labour overheads	186.00	0.79
Administration Costs	300.00	1.28
Land lease cost	-	-
Cost of marketing and distribution	500.00	2.13
Total Operating Costs	**20,042.78**	**85.48**
Depreciation	2,161.00	9.22
Cost of Finance	1,242.99	5.30
Total Production Cost	**23,446.77**	**100**

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 ranges from Birr 2.41 million to Birr 4.51 million during the life of the project. Moreover, at the end of the project life the accumulated net cash

flow amounts to Birr 34.39 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.

$$\text{Break - Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 11{,}222{,}400$$

$$\text{Break - Even Capacity utilization} = \frac{\text{Break -even Sales Value}}{\text{Sales revenue}} \times 100 = 37.08\%$$

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 6 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 20.13% 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 11.85 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 11.26 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 backward linkage with the chemical manufacturing sub sector 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	2,672.27	3,563.02	4,453.78	4,453.78	4,453.78	4,453.78	4,453.78	4,453.78	4,453.78	4,453.78
Accounts receivable	1,018.81	1,344.52	1,670.23	1,670.23	1,670.80	1,670.80	1,670.80	1,670.80	1,670.80	1,670.80
Cash-in-hand	12.28	16.37	20.46	20.46	20.55	20.55	20.55	20.55	20.55	20.55
CURRENT ASSETS	**3,703.35**	**4,923.91**	**6,144.47**	**6,144.47**	**6,145.14**	**6,145.14**	**6,145.14**	**6,145.14**	**6,145.14**	**6,145.14**
Accounts payable	49.35	65.80	82.25	82.25	82.25	82.25	82.25	82.25	82.25	82.25
CURRENT LIABILITIES	**49.35**	**65.80**	**82.25**	**82.25**	**82.25**	**82.25**	**82.25**	**82.25**	**82.25**	**82.25**
TOTAL WORKING CAPITAL	**3,654.00**	**4,858.11**	**6,062.22**	**6,062.22**	**6,062.89**	**6,062.89**	**6,062.89**	**6,062.89**	**6,062.89**	**6,062.89**

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	10,689	14,252	17,815	17,815	17,815	17,815	17,815	17,815	17,815	17,815
Utilities	153	204	255	255	255	255	255	255	255	255
Maintenance and repair	146	194	243	243	243	243	243	243	243	243
Labour direct	446	595	744	744	744	744	744	744	744	744
Labour overheads	112	149	186	186	186	186	186	186	186	186
Administration Costs	180	240	300	300	300	300	300	300	300	300
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	**12,226**	**16,134**	**20,043**	**20,043**	**20,050**	**20,050**	**20,050**	**20,050**	**20,050**	**20,050**
Depreciation	2,161	2,161	2,161	2,161	2,161	220	220	220	220	220
Cost of Finance	0	1,421	1,243	1,065	888	710	533	355	178	0
Total Production Cost	**14,387**	**19,716**	**23,447**	**23,269**	**23,098**	**20,980**	**20,802**	**20,625**	**20,447**	**20,270**

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	16,032	20,040	24,048	26,720	26,720	26,720	26,720	26,720	26,720	26,720
Less variable costs	11,726	15,634	19,543	19,543	19,543	19,543	19,543	19,543	19,543	19,543
VARIABLE MARGIN	**4,306**	**4,406**	**4,505**	**7,177**	**7,177**	**7,177**	**7,177**	**7,177**	**7,177**	**7,177**
in % of sales revenue	26.86	21.98	18.73	26.86	26.86	26.86	26.86	26.86	26.86	26.86
Less fixed costs	2,661	2,661	2,661	2,661	2,668	727	727	727	727	727
OPERATIONAL MARGIN	**1,645**	**1,745**	**1,844**	**4,516**	**4,509**	**6,450**	**6,450**	**6,450**	**6,450**	**6,450**
in % of sales revenue	10.26	8.71	7.67	16.90	16.88	24.14	24.14	24.14	24.14	24.14
Financial costs		1,421	1,243	1,065	888	710	533	355	178	0
GROSS PROFIT	**1,645**	**324**	**601**	**3,451**	**3,622**	**5,740**	**5,918**	**6,095**	**6,273**	**6,450**
in % of sales revenue	10.26	1.62	2.50	12.91	13.55	21.48	22.15	22.81	23.48	24.14
Income (corporate) tax	0	0	0	1,035	1,086	1,722	1,775	1,829	1,882	1,935
NET PROFIT	**1,645**	**324**	**601**	**2,416**	**2,535**	**4,018**	**4,142**	**4,267**	**4,391**	**4,515**
in % of sales revenue	10.26	1.62	2.50	9.04	9.49	15.04	15.50	15.97	16.43	16.90

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	**14,795**	**21,027**	**20,056**	**24,064**	**26,720**	**26,720**	**26,720**	**26,720**	**26,720**	**26,720**	**26,720**	**10,244**
Inflow funds	14,795	4,995	16	16	0	0	0	0	0	0	0	0
Inflow operation	0	16,032	20,040	24,048	26,720	26,720	26,720	26,720	26,720	26,720	26,720	0
Other income	0	0	0	0	0	0	0	0	0	0	0	10,244
TOTAL CASH OUTFLOW	**14,795**	**17,220**	**20,551**	**24,282**	**23,919**	**23,800**	**24,258**	**24,133**	**24,009**	**23,885**	**21,985**	**0**
Increase in fixed assets	14,795	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	3,703	1,221	1,221	0	1	0	0	0	0	0	0
Operating costs	0	11,726	15,634	19,543	19,543	19,550	19,550	19,550	19,550	19,550	19,550	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	1,035	1,086	1,722	1,775	1,829	1,882	1,935	0
Financial costs	0	1,291	1,421	1,243	1,065	888	710	533	355	178	0	0
Loan repayment	0	0	1,776	1,776	1,776	1,776	1,776	1,776	1,776	1,776	0	0
SURPLUS (DEFICIT)	**0**	**3,806**	**-495**	**-218**	**2,801**	**2,920**	**2,462**	**2,587**	**2,711**	**2,835**	**4,735**	**10,244**
CUMULATIVE CASH BALANCE	**0**	**3,806**	**3,312**	**3,094**	**5,895**	**8,815**	**11,277**	**13,864**	**16,575**	**19,410**	**24,145**	**34,389**

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**	**16,032**	**20,040**	**24,048**	**26,720**	**26,720**	**26,720**	**26,720**	**26,720**	**26,720**	**26,720**	**10,244**
Inflow operation	0	16,032	20,040	24,048	26,720	26,720	26,720	26,720	26,720	26,720	26,720	0
Other income	0	0	0	0	0	0	0	0	0	0	0	10,244
TOTAL CASH OUTFLOW	**18,449**	**13,430**	**17,338**	**20,043**	**21,079**	**21,136**	**21,772**	**21,825**	**21,878**	**21,931**	**21,985**	**0**
Increase in fixed assets	14,795	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	3,654	1,204	1,204	0	1	0	0	0	0	0	0	0
Operating costs	0	11,726	15,634	19,543	19,543	19,550	19,550	19,550	19,550	19,550	19,550	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	1,035	1,086	1,722	1,775	1,829	1,882	1,935	0
NET CASH FLOW	**-18,449**	**2,602**	**2,702**	**4,005**	**5,641**	**5,584**	**4,948**	**4,895**	**4,842**	**4,789**	**4,735**	**10,244**
CUMULATIVE NET CASH FLOW	**-18,449**	**-15,847**	**-13,145**	**-9,140**	**-3,498**	**2,085**	**7,034**	**11,929**	**16,771**	**21,559**	**26,294**	**36,539**
Net present value	-18,449	2,366	2,233	3,009	3,853	3,467	2,793	2,512	2,259	2,031	1,826	3,950
Cumulative net present value	-18,449	-16,083	-13,850	-10,841	-6,988	-3,521	-728	1,784	4,043	6,074	7,899	11,849

NET PRESENT VALUE	11,849
INTERNAL RATE OF RETURN	20.13%
NORMAL PAYBACK	6 years