PROFILE ON THE PRODUCTION OF MOSAIC TILES

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I. SUMMARY

This profile envisages the establishment of a plant for the production of mosaic tiles with a capacity of 500 tons per annum. Mosaic tiles are used for covering & decorating walls & other interior spaces of buildings.

The demand for mosaic tiles is entirely met through import. The present (2012) demand for mosaic tiles is estimated at 569 tones. The demand for mosaic tiles is projected to reach 916 tones and 1,476 tones by the year 2017 and 2022, respectively.

The principal raw materials required are Portland cement, white cement and sand. All these materials can be purchased locally.

The total investment cost of the project including working capital is estimated at Birr 8.28 million. From the total investment cost ,the highest share (Birr 6.10 million or 84.44%) is accounted by fixed investment cost followed by pre operation cost (1.03 million or 12.41%) and initial working capital (Birr 260.95 thousand or 3.15%). From the total investment cost Birr 3.50 million or 42.24% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 33.46% and a net present value (NPV) of Birr 9.32 million discounted at 10%.

The project can create employment for 36 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 sector and also generates income for the government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Mosaic tiles are one of the most essential building materials used for covering & decorating walls & other interior spaces of buildings. The development of the tile manufacturing industry is closely related to the development of the construction industry.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement of mosaic tiles is supplied through import. The quantity of the product imported annually during the period 2002 - 2011 is presented in Table 3.1.

Table 3.1

IMPORT OF MOSAIC TILES (TONS)

Year	Import
2002	2
2003	26
2004	95
2005	239
2006	62
2007	372
2008	131
2009	427
2010	771
2011	509

Source: *Ethiopian Revenue and Customs Authority.*

As can be seen from Table 3.1, import of mosaic tiles fluctuates from year to year. However, a general growth trend can be observed. The yearly average quantity imported during the period 2003-2005 was around 120 tons. But during the period 2006 - 2008 and 2009 - 2011 the average amount annually supplied to the market has increased to about 188 tones and 569 tons, respectively.

In estimating the present demand for the product it is assumed that the recent three years average (2008 – 2011) is a reasonable approximate of current level of demand. Accordingly, current (2012) demand for mosaic tiles is estimated at about 569 tons.

2. Projected Demand

The demand for mosaic tiles is directly related with the growth in the construction sector in general and the housing construction sub sector in particular which in turn depends on the overall economic development of the country.

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 same period (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 mosaic tiles one of the critical factor is identified to be economic growth leading to growth of the construction sector. 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 mosaic tiles is shown in Table 3.2.

Table 3.2

FORECASTED DEMAND (TONS)

Year	Projected Demand
2013	626
2014	688
2015	757
2016	833
2017	916
2018	1,008
2019	1,109
2020	1,220
2021	1,342
2022	1,476
2023	1,623
2024	1,786
2025	1,964

3. Pricing and Distribution

The average CIF price of mosaic tiles in the recent two years (2010 and 2011) is Birr 10,245 per ton. Allowing 25% for import duty and other clearing expenses, the factory gate price of the envisaged plant is estimate at Birr 12,806 per ton.

Currently the product is distributed mainly through building materials shops. The envisage plant can also use the existing building materials shops or establish own distribution centers in major urban areas.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Calcinations takes place in a tunnel kiln for 33 hours at a temperature of l250^{o}C. The plant capacity therefore, depends on the capacity of the tunnel kiln. For the purpose of this study, considering the fierce competition from plastic tiles and the required investment a plant capacity of 500 tons is envisaged. This would mean a daily production capacity of 1.7 tons, working in 3 shifts a day for 300 days a year. The tunnel kiln can be made to have a single chamber for calcinations.

Owing to a relatively high energy requirement of the production process, it is preferable to operate the plant continuously. Besides, energy saving and recovery methods are devised and implemented. In addition, good maintenance practice, and careful monitoring of the operation are required to minimize operating costs as much as possible.

2. Production Program

The plant is initially made to operate at 75% of the installed capacity. It then gradually builds its capacity up to 85% and l00% of the installed capacity in the second and third years, respectively.

As the plant will be new and to be equipped with new machinery, production build up is made to start at reduced capacity and gradually raise to full capacity. This low production level at the initial stage is to develop substantial market outlets for the product. Machinery operators will also get enough time to develop the required skills and experience.

IV. MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The basic raw materials required by mosaic tiles producing plant include Portland cement, white cement and sand. All these materials can be purchased locally. In addition to the principal raw

materials identified above, mosaic tiles production requires marble chips, mineral colours and chemicals. These materials provide different colours to the product and serve as bonding agents in the process of production. Table 4.1 presents the list of raw and auxiliary materials required by the envisaged plant together with their quantities and costs.

Table 4.1

RAW AND AUXILIARY MATERIALS REQUIREMENT AT FULL CAPACITY

No.	Item	Qty. (tons)	Cost Birr ('000)		
			F.C	L.C	Total
l	Portland cement	100	-	250	250
2	White cement	80	-	104	104
3	Sand	300	-	135	135
4	Marble	40	-	40	40
5	Mineral Colours and chemicals		2.875	-	2.87
	Total		**2.875**	**500.50**	**503.37**

B. UTILITIES

Utilities required by the plant include electricity, water and fuel oil. Water is required for drinking and for other general purposes. Electricity is required to operate production machineries and lighting. Fuel oil is the heat source in the tunnel kiln for the calcination of the product. Quantities required and associated costs are given in Table 4.2.

Table 4.2

UTILITIES REQUIREMENT (AT FULL CAPACITY)

Sr. No.	Items	Qty.	Cost (Birr)
l	Electricity (kWh)	230,000	133,400
2	Water (m^3)	10,000	100,000
3	Heavy Fuel Oil (lt)	70,000	1,015,728
	Total		**1,249,128**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

A number of operations are required in the production of mosaic tiles. These include crushing, pulverizing, drying, ageing, forming, glazing, calcination, screening, back mounting on paper and packaging.

It is assumed that quarrying of the mineral raw materials will be carried out by a separate firm. The required raw materials are purchased and stored at the site of the plant from where feeding to the plant is effected.

- **Crushing**: The mined mineral raw materials are crushed by hammers to the size of about 20 cm prior to the primary crushing in a jaw crusher. It is then further crushed in an impeller breaker to the 4 mesh size and below.

- **Pulverizing:** The crushed mineral raw materials and powdery raw materials are blended in a fixed mixing ratio for pulverization in a ball mill together with water. The pulverization continues for about l7 hours at a rotation speed of l7 rpm.

- **Drying:** The mixture of raw materials and water is what is called slip. This slip is sprayed on a spray dryer (made out of metal having cylindrical shape) and dried at a temperature of about 450 - 500^{o}c. The drying process will produce powder having residual moisture content of 7%.

- **Ageing**: Here the dried powder is left for ageing for 48-72 hours to facilitate subsequent forming.
- **Forming**: After the ageing is completed, the powder is put into metallic moulds according

to sizes and formed by applying the pressure of 300-350 kg/cm^2.

- **Glazing**: Glazing materials are produced from outside the plant. The glazes are sprayed on to the formed semi finished products until the glazing reaches a prescribed thickness while moving on a net conveyor.

- **Calcination**: The net operation is to put the glazed semi-finished product into a refractory box and then place it on a cart. The cart is then placed into tunnel kiln at l250^{o}c for about 33 hours.

- **Screening, back mounting on paper and packing**: The products calcined in the kiln are screened. Many tiles are arranged to be back mounted on papers. After back mounting, the products go through inspection prior to delivery as finished products.

2. Environmental Impact Assessment

The production of mosaic involves mainly a crushing, pulverizing, drying and aging. These unit operations can be performed in a controlled manner. Hence, the plant does not have any adverse impact on environment.

B. ENGINEERING

1. Machinery and Equipment

Total cost of machinery and equipment is estimated at Birr 4.55 million. The list of machinery and equipment required by a mosaic tile producing plant is given in Table 5.1.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT AND COST

No.	Description	Qty (No.)	Cost, Birr
l	Saw crusher	1	
2	Impeller Breaker	1	
3	Vibrating screen	1	
4	Conveyor belt	1	
5	Bucket Elevator	1	
6	Fret mill	1	
7	Ball mill	1	
8	Spray dryer	1	
9	Friction press	1	
10	High pressure press	1	
11	Glazing machine	1	
12	Tunnel kiln	1	
13	Tile mould of different size and fixtures	-	
	Sub-total		**3. 5 million**
	Freight Insurance, Bank charges, Inland Transport Etc.		1.05 million
	Total Cost		**4.55 million**

2. Land, Building and Civil Works

The plant requires building to accommodate production hall, stores (raw material and finished products) and offices. The total building area is 400 m^2 while land area including provision for open space is 600 m^2. At the rate of Birr 3,500 per m^2, building cost is estimated at Birr 1,280,000.

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 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 159,600 of which 10% or Birr 15,960 will be paid in advance. The remaining Birr 143,640 will be paid in equal installments with in 28 years i.e. Birr 5,130 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 REQUIREMENTS

A. HUMAN RESOURCE REQUIREMENT

The total human resource required by the plant is 36 personnel. Annual labour cost is estimated at Birr 704,460. The list of manpower and corresponding labour cost is presented in Table 6.1.

Table 6.1

HUMAN RESOURCE REQUIREMENT AND COST

No.	Description	No.	Month Salary	Annual
	A. Administration			
1	Plant Manager	1	3500	42,000
2	Secretary	1	1400	16,800
3	Accountant	1	1800	21,600
4	Sales man	1	2000	24,000
5	Clerks	2	1000	12,000
6	General Services	3	2400	28,800
	B. Production			
7	Production	3	6000	72,000
8	Skilled workers	10	1,6000	192,000
9	Unskilled workers	14	1,2600	151,200
	Sub-total	**36**	**46,700**	**560,400**
	Benefits (15% BS)			84,060
	Grand Total			**704,460**

B. TRAINING REQUIREMENT

Training is required for production supervisors and production workers like kiln operator. The training can be conducted at plant site during erection and commissioning period. A total of Birr 60,000 is allotted for carrying out the training activity.

VII. FINANCIAL ANALYSIS

The financial analysis of the Mosaic tiles 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	5 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material local	30 days
Work in progress	5 days
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 8.28 million (see Table 7.1). From the total investment cost ,the highest share (Birr 7 million or 84.44%) is accounted by fixed investment cost followed by pre operation cost (1.03 million or 12.41%) and initial working capital (Birr 260.95 thousand or 3.15%). From the total investment cost Birr 3.50 million or 42.24% 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	15.96		15.96	0.19
1.2	Building and civil work	1,280.00		1,280.00	15.45
1.3	Machinery and equipment	1,050.00	3,500.00	4,550.00	54.92
1.4	Vehicles	900.00		900.00	10.86
1.5	Office furniture and equipment	250.00		250.00	3.02
	Sub total	**3,495.96**	**3,500.00**	**6,995.96**	**84.44**
2	**Pre operating cost ***				
2.1	Pre operating cost	486.50		486.50	5.87
2.2	Interest during construction	542.04		542.04	6.54
	Sub total	**1,028.54**		**1,028.54**	**12.41**
3	**Working capital ****	**260.95**		**260.95**	**3.15**
	Grand Total	**4,785.45**	**3,500.00**	**8,285.45**	**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 363.29 thousand. However, only the initial working capital of Birr 261.05 thousand 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 4.79 million (see Table 7.2). Depreciation account for 26.36% of the production cost. The other major components of the production cost are utility, the cost of raw material, financial cost, and labor, which account for 26.06%, 10.49%, 9.33% and 11.68% respectively. The remaining 16.08% is the share of marketing and distribution, repair and maintenance, labor overhead and administration cost. For detail production cost see Appendix 7.A.2.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY (year three)

Items	Cost (000 Birr)	%
Raw Material and Inputs	503	10.49
Utilities	1,249	26.06
Maintenance and repair	137	2.86
Labor direct	560	11.68
Labor overheads	84	1.75
Administration Costs	200	4.17
Land lease cost	0	0.00
Cost of marketing and distribution	350	7.30
Total Operating Costs	**3,083**	**64.31**
Depreciation	1,264	26.36
Cost of Finance	447	9.33
Total Production Cost	**4,794**	**100.00**

C. FINANCIAL EVALUATION

1. Profitability

Based on the projected profit and loss statement, the project will generate a profit throughout its operation life. Annual net profit after tax will grow from Birr 1.13 million to Birr 2.27million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 19.29 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 2{,}689{,}260$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 40.92\%$$

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 33.46% 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 9.32 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 36 persons. The project will generate Birr 5.62 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 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	94.31	106.89	113.18	125.75	125.75	125.75	125.75	125.75	125.75	125.75
Accounts receivable	199.98	222.75	234.14	256.92	257.34	257.34	257.34	257.34	257.34	257.34
Cash-in-hand	10.22	11.58	12.26	13.63	13.70	13.70	13.70	13.70	13.70	13.70
CURRENT ASSETS	**304.51**	**341.22**	**359.58**	**396.29**	**396.79**	**396.79**	**396.79**	**396.79**	**396.79**	**396.79**
Accounts payable	43.56	49.37	52.28	58.08	58.08	58.08	58.08	58.08	58.08	58.08
CURRENT LIABILITIES	**43.56**	**49.37**	**52.28**	**58.08**	**58.08**	**58.08**	**58.08**	**58.08**	**58.08**	**58.08**
TOTAL WORKING CAPITAL	**260.95**	**291.85**	**307.30**	**338.21**	**338.71**	**338.71**	**338.71**	**338.71**	**338.71**	**338.71**

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	377	428	453	503	503	503	503	503	503	503
Utilities	937	1,062	1,124	1,249	1,249	1,249	1,249	1,249	1,249	1,249
Maintenance and repair	103	116	123	137	137	137	137	137	137	137
Labour direct	420	476	504	560	560	560	560	560	560	560
Labour overheads	63	71	76	84	84	84	84	84	84	84
Administration Costs	150	170	180	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	5	5	5	5	5	5
Cost of marketing and distribution	350	350	350	350	350	350	350	350	350	350
Total Operating Costs	**2,400**	**2,673**	**2,810**	**3,083**	**3,088**	**3,088**	**3,088**	**3,088**	**3,088**	**3,088**
Depreciation	1,264	1,264	1,264	1,264	1,264	76	76	76	76	76
Cost of Finance	0	596	522	447	373	298	224	149	75	0
Total Production Cost	**3,663**	**4,533**	**4,595**	**4,794**	**4,724**	**3,462**	**3,388**	**3,313**	**3,239**	**3,164**

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	4,802	5,443	6,403	6,403	6,403	6,403	6,403	6,403	6,403	6,403
Less variable costs	2,050	2,323	2,460	2,733	2,733	2,733	2,733	2,733	2,733	2,733
VARIABLE MARGIN	**2,752**	**3,120**	**3,943**	**3,670**	**3,670**	**3,670**	**3,670**	**3,670**	**3,670**	**3,670**
in % of sales revenue	57.31	57.32	61.59	57.32	57.32	57.32	57.32	57.32	57.32	57.32
Less fixed costs	1,614	1,614	1,614	1,614	1,619	431	431	431	431	431
OPERATIONAL MARGIN	**1,139**	**1,506**	**2,330**	**2,057**	**2,051**	**3,239**	**3,239**	**3,239**	**3,239**	**3,239**
in % of sales revenue	23.71	27.68	36.39	32.12	32.04	50.58	50.58	50.58	50.58	50.58
Financial costs		596	522	447	373	298	224	149	75	0
GROSS PROFIT	**1,139**	**910**	**1,808**	**1,609**	**1,679**	**2,941**	**3,015**	**3,090**	**3,164**	**3,239**
in % of sales revenue	23.71	16.72	28.24	25.13	26.22	45.92	47.09	48.25	49.42	50.58
Income (corporate) tax	0	0	0	483	504	882	905	927	949	972
NET PROFIT	**1,139**	**910**	**1,808**	**1,127**	**1,175**	**2,058**	**2,111**	**2,163**	**2,215**	**2,267**
in % of sales revenue	23.71	16.72	28.24	17.59	18.35	32.15	32.96	33.78	34.59	35.41

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	**7,482**	**5,649**	**5,449**	**6,406**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**1,665**
Inflow funds	7,482	847	6	3	0	0	0	0	0	0	0	0
Inflow operation	0	4,802	5,443	6,403	6,403	6,403	6,403	6,403	6,403	6,403	6,403	0
Other income	0	0	0	0	0	0	0	0	0	0	0	1,665
TOTAL CASH OUTFLOW	**7,482**	**3,246**	**4,051**	**4,095**	**4,795**	**4,710**	**5,014**	**4,962**	**4,909**	**4,857**	**4,060**	**0**
Increase in fixed assets	7,482	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	305	37	18	37	0	0	0	0	0	0	0
Operating costs	0	2,050	2,323	2,460	2,733	2,738	2,738	2,738	2,738	2,738	2,738	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income tax	0	0	0	0	483	504	882	905	927	949	972	0
Financial costs	0	542	596	522	447	373	298	224	149	75	0	0
Loan repayment	0	0	745	745	745	745	745	745	745	745	0	0
SURPLUS (DEFICIT)	**0**	**2,402**	**1,398**	**2,311**	**1,608**	**1,693**	**1,389**	**1,441**	**1,494**	**1,546**	**2,343**	**1,665**
CUMULATIVE CASH BALANCE	**0**	**2,402**	**3,800**	**6,111**	**7,719**	**9,411**	**10,801**	**12,242**	**13,736**	**15,282**	**17,625**	**19,290**

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**	**4,802**	**5,443**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**6,403**	**1,665**
Inflow operation	0	4,802	5,443	6,403	6,403	6,403	6,403	6,403	6,403	6,403	6,403	0
Other income	0	0	0	0	0	0	0	0	0	0	0	1,665
TOTAL CASH OUTFLOW	**7,743**	**2,431**	**2,689**	**2,841**	**3,566**	**3,592**	**3,970**	**3,993**	**4,015**	**4,037**	**4,060**	**0**
Increase in fixed assets	7,482	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	261	31	15	31	0	0	0	0	0	0	0	0
Operating costs	0	2,050	2,323	2,460	2,733	2,738	2,738	2,738	2,738	2,738	2,738	0
Marketing and Distribution cost	0	350	350	350	350	350	350	350	350	350	350	0
Income (corporate) tax		0	0	0	483	504	882	905	927	949	972	0
NET CASH FLOW	**-7,743**	**2,371**	**2,754**	**3,562**	**2,837**	**2,811**	**2,433**	**2,410**	**2,388**	**2,366**	**2,343**	**1,665**
CUMULATIVE NET CASH FLOW	**-7,743**	**-5,372**	**-2,618**	**945**	**3,782**	**6,593**	**9,025**	**11,436**	**13,824**	**16,189**	**18,533**	**20,197**
Net present value	-7,743	2,156	2,276	2,676	1,938	1,746	1,373	1,237	1,114	1,003	903	642
Cumulative net present value	-7,743	-5,588	-3,311	-635	1,303	3,048	4,422	5,658	6,772	7,776	8,679	9,321

NET PRESENT VALUE	9,321
INTERNAL RATE OF RETURN	33.46%
NORMAL PAYBACK	3 years