

**167. PROFILE ON THE PRODUCTION OF ELECTRIC
WIRES & LV CABLES**

TABLE OF CONTENTS

	<u>PAGE</u>
I. SUMMARY	167-2
II. PRODUCT DESCRIPTION & APPLICATION	167-3
III. MARKET STUDY AND PLANT CAPACITY	167-4
A. MARKET STUDY	167-4
B. PLANT CAPACITY & PRODUCTION PROGRAM	167-7
IV. MATERIALS AND INPUTS	167-8
A. RAW & AUXILIARY MATERIALS	167-8
B. UTILITIES	167-8
V. TECHNOLOGY & ENGINEERING	167-9
A. TECHNOLOGY	167-9
B. ENGINEERING	167-9
VI. HUMAN RESOURCE & TRAINING REQUIREMENT	167-14
A. HUMAN RESOURCE REQUIREMENT	167-14
B. TRAINING REQUIREMENT	167-14
VII. FINANCIAL ANALYSIS	167-15
A. TOTAL INITIAL INVESTMENT COST	167-15
B. PRODUCTION COST	167-16
C. FINANCIAL EVALUATION	167-17
D. ECONOMIC AND SOCIAL BENEFITS	167-19

I. SUMMARY

This profile envisages the establishment of a plant for the production of electrical wire and low voltage (LV) cables with a capacity of 30 tons per annum. Electrical wire and low voltage (LV) cables are woven pieces of fabric either cotton or cotton-polyester that are used to absorb moisture on the body after bathing.

The demand for electrical wire and low voltage (LV) cables is met through import and domestic production. The present (2012) demand for electrical wire and low voltage (LV) cables is estimated at 2,491 tons. The demand for electrical wire and low voltage (LV) cables is projected to reach 4,012 tons and 6,462 tons by the year 2017 and 2022, respectively.

The principal raw materials required are PVC granules and copper wires which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 62.55 million. From the total investment cost the highest share (Birr 40.34 million or 64.49%) is accounted by fixed investment cost followed by initial working capital (Birr 16.82 million or 26.89%) and pre operation cost (Birr 5.39 million or 8.62%). From the total investment cost Birr 25.30 million or 40.45% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 26.32% and a net present value (NPV) of Birr 55.90 million discounted at 10%.

The project can create employment for 23 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 energy and telecommunication sub sectors and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTIONS AND APPLICATIONS

Electric wires and cables are composed of one or more electric conductors made of copper, copper alloy, aluminum, or steel covered by insulation and sometimes a protective sheath, used for transmitting electric power or the impulses of an electric communications system.

The simplest form of electric wires for building wiring is two insulated conductors twinned together to form a unit; wires & cables with two or three conductors are still commonly used in the smaller gauges for low-voltage signal and control applications such as doorbell wiring.

Modern power cables come in a variety of sizes, materials, and types, each particularly adapted to its uses. Conductors used nowadays are made of copper or aluminum wires. Conductors are usually stranded for flexibility, but small cables may use solid conductors.

Conductors in a cable may be of different sizes. Each conductor has its own electrical insulation. The cable may include un-insulated conductors used for the circuit neutral or for ground (earth) connection.

Cables for high-voltage (more than 65,000 volts) power distribution may be insulated with oil and paper, and are run in a semi-rigid steel pipe. The oil is kept under pressure to prevent formation of voids that would allow partial discharges within the cable insulation.

In communications systems, cables commonly consist of numerous pairs of paper-insulated wire, encased in a lead sheath; the individual pairs of wire are intertwined to minimize induced interference with other circuits in the same cable. To avoid electrical interference from external circuits, cables used in radio broadcasting are often shielded with a winding of metal braid, which is grounded. The development of the coaxial cable was an important advance in the communications field. This type of cable consists of several copper tubes; each tube contains a wire conductor that extends along its center. The entire cable is sheathed in lead and is generally filled with nitrogen under pressure to prevent corrosion. Because the coaxial cable has a broad frequency range, it is valuable in the transmission of carrier-current telephony and television.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement of electrical wire and low voltage (LV) cables is supplied through import and local production. Table 3.1 shows local production, import and total supply of electric wire and cables during the period 2002 - 2010.

Table 3.1

IMPORT AND LOCAL PRODUCTION OF ELECTRICAL WIRE AND LV CABLES (TONS)

Year	Local Production¹	Import²	Total
2002	318	232	549
2003	86	239	324
2004	556	1,503	2,059
2005	55	209	265
2006	37	384	421
2007	67	566	632
2008	75	559	635
2009	79	2,523	2,602
2010	813	1,567	2,380

Source:-1. CSA's Large and Medium Manufacturing & Electricity Industries Survey.

2. Ethiopian Revenue and Customs Authority: External Trade Statistics

As can be seen from Table 3.1, total supply or apparent consumption of electric wire and LV cables fluctuates from year to year. However, a general growth trend can be observed. For example the yearly average total supply during the period 2003-2006 was about 767 tons. But during the next four years (2006--2010) the average annual total supply has increased to about 1,562 tons.

In estimating the present demand for the product it is assumed that the recent two years (2009 – 2010) average supply is a reasonable approximate of current level of demand. Accordingly, the current (2012) level of demand for electric wire and LV cables is estimated at 2,491 tons.

2. Demand Forecast

The demand for electric wire and LV cables is directly related with the growth in the construction sector in general and the housing construction sub sector in particular and expansion on the coverage of electricity supply 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 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 metallic sanitary ware 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. Moreover, the maximum production reached by the exiting local producers during the period 2002-2010 which is 813 tons is assumed to be the existing local production capacity. Based on the above assumption and using the estimated present demand as a base the projected demand for electric wire and LV cables and the unsatisfied demand is shown in Table 3.2.

Table 3.2
FORECASTED DEMAND (TONS)

Year	Projected Demand	Existing Capacity	Demand Supply Gap
2013	2,740	813	1,927
2014	3,015	813	2,202
2015	3,316	813	2,503
2016	3,648	813	2,835
2017	4,012	813	3,199
2018	4,414	813	3,601
2019	4,855	813	4,042
2020	5,340	813	4,527
2021	5,875	813	5,062
2022	6,462	813	5,649
2023	7,108	813	6,295
2024	7,819	813	7,006
2025	8,601	813	7,788

3. Pricing and Distribution

Based on the current retail price of electric wires and LV cables and assuming margin for retailers and distributors the recommended factory gate price for the envisaged plant by type is shown in Table 3.3.

Table 3.3
RECOMMENDED FACTORY GATE PRICE BY TYPE OF PRODUCT

Size	Per 100 meters (Birr)
1x1.5mm ²	100.44
1x2.5mm ²	184.96
1x4mm ²	296.97
1x6mm ²	419.87
1x10mm ²	854.84

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

The selected manufacturing capacity of the plant is 800 tons of wires and LV cables annually (30,055,745 meters) on a single shift basis of 8 hours per day.

2. Production Program

The production program is worked out by considering the production process involved and time required for skill development of the workers. Accordingly, the plant will operate at 75% of its installed capacity during the first year of operation. During the second and third year and then after it will operate at 85% and 100%, respectively (see Table 3.1).

Table 3.1
ANNUAL PRODUCTION PROGRAM (TONS)

Size	Year 1	Year 2	Year 3-10
1x1.5mm ²	150	170	200
1x2.5mm ²	150	170	200
1x4mm ²	120	136	160
1x6mm ²	90	102	120
1x10mm ²	90	102	120
Total	600	680	800

IV. RAW MATERIAL AND INPUTS

A. RAW AND AUXILIARY MATERIALS

PVC granules and copper wires are the major raw materials that are required by the plant. Annual cost of raw material is estimated at Birr 71.43 million. All the raw materials have to be imported till they are produced locally. The required raw materials and their corresponding costs at full capacity operation are given Table 4.1.

Table 4.1
RAW MATERIALS AND ANNUAL COST

No.	Description	Unit	Qty	Unit Price Birr/Tone	Unit Price (Birr/Tone)		
					Foreign	Local	Total
1	Copper Wires	Ton	560	95015	53,208,400	7,981,260	61,189,660
2	PVC Compound	Ton	240	37,000	8,880,000	1,332,000	10,212,000
3	Packing Material	Ton	2	16,000		32,000	32,000
	Total				62,088,400	9,345,260	71,433,660

B. UTILITIES

The major utility requirement of the plant is electricity and water. Annual cost of utilities at full capacity operation is estimated at Birr 378,282 (see Table 4.2).

Table 4.2
ANNUAL UTILITY REQUIREMENTS AND COST

No.	Description	Unit	Qty	Unit Price (Birr)	Total
1	Electric power	kWh	600,000	0.58	348,282
2	Water	m ³	3,000	10.00	30,000
	Total				378,282

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

The selected size of bare wire is released from the drum to the coating extruder. The coated (covered) wire is pulled through cooling water to the automatic winding device for storing on the wire storing spool.

Bare conductors are stranded in the wire stranding machine for producing various sizes of wire which are ready to be fed to the coating machine.

The coated wires are stranded to be pre coated to prepare for secondary coating of the cables. The pre coated cable is further fed to coating machine. The coated cable is pulled through cooling water and printed; after which it is transferred to the cable storing spool.

2. Environmental Impact.

The Production activity of the plant involves drawing and twisting of the conducting wires and also melting of the plastic material for coating on the wires. This process does not have any effect on the surrounding. Thus the plant is free from any negative impact on the environment.

B. ENGINEERING

1. Machinery and Equipment.

Total cost of machinery and equipment is Birr 31.62 million. All the necessary machinery and equipment with corresponding cost are given in Table 5.1.

Table 5.1**LIST OF MACHINERY AND EQUIPMENT AND COST**

No.	Description	Qty	Cost (Birr)		
			Foreign	Local	Total
1	800 Kgs Pot type Vacuum Bright Annealing Furnace unit	1	1,186,900	296,725	1,483,625
2	Medium wire drawing with continuous annealing line	1	2,099,900	524,975	2,624,875
3	High speed fine wire drawing with continuous annealing line	3	3,122,460	780,615	3,903,075
4	630 mm High Speed Double Twist Bunching Line	2	2,994,640	748,660	3,743,300
5	800 mm diameter High Speed Double Twist Bunching Line	1	1,734,700	433,675	2,168,375
6	70 +32 mm Extruder with Dual Bobbin Spooler Insulation Line	1	2,008,600	502,150	2,510,750
7	90 mm diameter High Speed Insulation or Sheathing Extruder Line	1	3,378,100	844,525	4,222,625
8	Rewinding & Auto-coiling Line	2	4,820,640	1,205,160	6,025,800
9	Accessories	1	2,629,440	657,360	3,286,800
10	Quality Control Equipment:	1	627,231	156,808	784,039
11	Two Years Spare parts		697,532	174,383	871,915
	Total		25,300,143	6,325,036	31,625,179

2. Land, Building and Civil Works

The plant requires a total of 2500 m² area of land out of which 1,500 m² is built-up area which includes processing area, raw material stock area, offices etc. Assuming construction rate of Birr 5,000 per m², the total investment cost for building and civil works is estimated at Birr 7.5 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 m², the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m², the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases. Moreover, the Addis Ababa City Administration has recently adopted a new land lease floor price for plots in the city. The new

prices will be used as a benchmark for plots that are going to be auctioned by the city government or transferred under the new “Urban Lands Lease Holding Proclamation.”

The new regulation classified the city into three zones. The first Zone is Central Market District Zone, which is classified in five levels and the floor land lease price ranges from Birr 1,686 to Birr 894 per m². The rate for Central Market District Zone will be applicable in most areas of the city that are considered to be main business areas that entertain high level of business activities.

The second zone, Transitional Zone, will also have five levels and the floor land lease price ranges from Birr 1,035 to Birr 555 per m². This zone includes places that are surrounding the city and are occupied by mainly residential units and industries.

The last and the third zone, Expansion Zone, is classified into four levels and covers areas that are considered to be in the outskirts of the city, where the city is expected to expand in the future. The floor land lease price in the Expansion Zone ranges from Birr 355 to Birr 191 per m² (see Table 5.2).

Table 5.2

NEW LAND LEASE FLOOR PRICE FOR PLOTS IN ADDIS ABABA

Zone	Level	Floor Price/m²
Central Market District	1 st	1686
	2 nd	1535
	3 rd	1323
	4 th	1085
	5 th	894
Transitional zone	1 st	1035
	2 nd	935
	3 rd	809
	4 th	685
	5 th	555
Expansion zone	1 st	355
	2 nd	299
	3 rd	217
	4 th	191

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all new manufacturing projects will be located in industrial zones located in expansion zones. Therefore, for the profile a land lease rate of Birr 266 per m² which is equivalent to the average floor price of plots located in expansion zone is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.3 shows incentives for lease payment.

Table 5.3

INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS

Scored Point	Grace Period	Payment Completion Period	Down Payment
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile, the average i.e. five years grace period, 28 years payment completion period and 10% down payment is used. The land lease period for industry is 60 years.

Accordingly, the total land lease cost at a rate of Birr 266 per m² is estimated at Birr 665,000 of which 10% or Birr 66,500 will be paid in advance. The remaining Birr 598,500 will be paid in equal installments with in 28 years i.e. Birr 21,375 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENT

A. HUMAN RESOURCE REQUIREMENT

A total of 23 persons are required out of which 14 are technical workers. Annual cost of labour is estimated at Birr 613,700. Details of human resource required and the monthly and annual salary is given on Table 6.1.

B. TRAINING REQUIREMENT

On the job training of the operators would be enough for workers with technical background. On the job training for two weeks would cost 20,000 Birr for 12 workers.

Table 6.1
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	Foreman/	1	2,500	30,000
9	Machinery Operators	7	2,000	168,000
10	Assistant Operators	1	1,500	6,000
11	Quality controller & Chemical technicians	2	2,000	48,000
12	Electrician	1	2,000	24,000
13	Laborers	2	800	19,200
Sub- Total		14	-	295,200
TOTAL				516,000
Employee's Benefit (25% Of Basic Salary)		-	-	97,700
Total		23	-	613,700

VII. FINANCIAL ANALYSIS

The financial analysis of the electrical wire and low voltage (LV) cables project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity and 70% loan
Tax holidays	3 years
Bank interest	10%
Discount cash flow	10%
Accounts receivable	30 days
Raw material imported	120 days
Work in progress	1 day
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 62.55 million (see Table 7.1). From the total investment cost the highest share (Birr 40.34 million or 64.49%) is accounted by fixed investment cost followed by initial working capital (Birr 16.82 million or 26.89%) and pre operation cost (Birr 5.39 million or 8.62%). From the total investment cost Birr 25.30 million or 40.45% 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	66.50		66.50	0.11
1.2	Building and civil work	7,500.00		7,500.00	11.99
1.3	Machinery and equipment	6,325.04	25,300.14	31,625.18	50.56
1.4	Vehicles	900.00		900.00	1.44
1.5	Office furniture and equipment	250.00		250.00	0.40
	Sub total	15,041.54	25,300.14	40,341.68	64.49
2	Pre operating cost *				
2.1	Pre operating cost	1,298.76		1,298.76	2.08
2.2	Interest during construction	4,092.09		4,092.09	6.54
	Sub total	5,390.85		5,390.85	8.62
3	Working capital **	16,818.05		16,818.05	26.89
	Grand Total	37,250.44	25,300.14	62,550.58	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 24.11 million. However, only the initial working capital of Birr 16.81 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 85.75 million (see Table 7.2). The cost of raw material account for 83.30% of the production cost. The other major components of the production cost are depreciation, financial cost, repair and maintenance, and cost of marketing and distribution which account for 8.27%, 4.59%, 1.11%, and 1.17% respectively. The remaining 1.56% is the share of utility, direct labor, 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	71,434	83.30
Utilities	378	0.44
Maintenance and repair	949	1.11
Labor direct	516	0.60
Labor overheads	98	0.11
Administration Costs	350	0.41
Land lease cost	0	0.00
Cost of marketing and distribution	1,000	1.17
Total Operating Costs	74,725	87.14
Depreciation	7,090	8.27
Cost of Finance	3,939	4.59
Total Production Cost	85,753	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 8.10 million to Birr 15.18 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 133.30 million. For profit and loss statement and cash flow projection see Appendix 7.A.3 and 7.A.4, respectively.

2. Ratios

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by dividing net income by revenue,

return on assets (operating income divided by assets), return on equity (net profit divided by equity) and return on total investment (net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point for capacity utilization and sales value estimated by using income statement projection are computed as followed.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 40,640,880$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 35.11\%$$

4. Pay-back Period

The pay- back period, also called pay – off period is defined as the period required for recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 4 years.

5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money in a bank account. Accordingly, the IRR of this project is computed to be 26.32% 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 55.90 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 23 persons. The project will generate Birr 37.96 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 energy and telecommunication sub sectors and also generates other income for the Government.

Appendix 7.A

FINANCIAL ANALYSES SUPPORTING TABLES

Appendix 7.A.2
PRODUCTION COST (in 000 Birr)

Item	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Raw Material and Inputs	50,004	64,291	71,434	71,434	71,434	71,434	71,434	71,434	71,434	71,434
Utilities	265	340	378	378	378	378	378	378	378	378
Maintenance and repair	664	854	949	949	949	949	949	949	949	949
Labour direct	361	464	516	516	516	516	516	516	516	516
Labour overheads	69	88	98	98	98	98	98	98	98	98
Administration Costs	245	315	350	350	350	350	350	350	350	350
Land lease cost	0	0	0	0	21	21	21	21	21	21
Cost of marketing and distribution	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Operating Costs	52,608	67,353	74,725	74,725	74,746	74,746	74,746	74,746	74,746	74,746
Depreciation	7,090	7,090	7,090	7,090	7,090	325	325	325	325	325
Cost of Finance	0	4,501	3,939	3,376	2,813	2,251	1,688	1,125	563	0
Total Production Cost	59,697	78,944	85,753	85,191	84,649	77,322	76,759	76,197	75,634	75,071

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	67,735	87,088	96,764	96,764	96,764	96,764	96,764	96,764	96,764	96,764
Less variable costs	51,608	66,353	73,725	73,725	73,725	73,725	73,725	73,725	73,725	73,725
VARIABLE MARGIN	16,128	20,736	23,039	23,039	23,039	23,039	23,039	23,039	23,039	23,039
in % of sales revenue	23.81	23.81	23.81	23.81	23.81	23.81	23.81	23.81	23.81	23.81
Less fixed costs	8,090	8,090	8,090	8,090	8,111	1,346	1,346	1,346	1,346	1,346
OPERATIONAL MARGIN	8,038	12,646	14,949	14,949	14,928	21,693	21,693	21,693	21,693	21,693
in % of sales revenue	11.87	14.52	15.45	15.45	15.43	22.42	22.42	22.42	22.42	22.42
Financial costs		4,501	3,939	3,376	2,813	2,251	1,688	1,125	563	0
GROSS PROFIT	8,038	8,144	11,011	11,573	12,115	19,442	20,005	20,567	21,130	21,693
in % of sales revenue	11.87	9.35	11.38	11.96	12.52	20.09	20.67	21.26	21.84	22.42
Income (corporate) tax	0	0	0	3,472	3,634	5,833	6,001	6,170	6,339	6,508
NET PROFIT	8,038	8,144	11,011	8,101	8,480	13,609	14,003	14,397	14,791	15,185
in % of sales revenue	11.87	9.35	11.38	8.37	8.76	14.06	14.47	14.88	15.29	15.69

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	41,640	88,731	87,112	96,776	96,764	96,764	96,764	96,764	96,764	96,764	96,764	32,651
Inflow funds	41,640	20,996	24	12	0	0	0	0	0	0	0	0
Inflow operation	0	67,735	87,088	96,764	96,764	96,764	96,764	96,764	96,764	96,764	96,764	0
Other income	0	0	0	0	0	0	0	0	0	0	0	32,651
TOTAL CASH OUTFLOW	41,640	73,603	82,286	86,693	87,200	86,823	88,456	88,062	87,669	87,275	81,254	0
Increase in fixed assets	41,640	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	16,904	4,806	2,403	0	2	0	0	0	0	0	0
Operating costs	0	51,608	66,353	73,725	73,725	73,746	73,746	73,746	73,746	73,746	73,746	0
Marketing and Distribution cost	0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0
Income tax	0	0	0	0	3,472	3,634	5,833	6,001	6,170	6,339	6,508	0
Financial costs	0	4,092	4,501	3,939	3,376	2,813	2,251	1,688	1,125	563	0	0
Loan repayment	0	0	5,627	5,627	5,627	5,627	5,627	5,627	5,627	5,627	0	0
SURPLUS (DEFICIT)	0	15,128	4,826	10,083	9,564	9,941	8,308	8,702	9,095	9,489	15,510	32,651
CUMULATIVE CASH BALANCE	0	15,128	19,954	30,037	39,601	49,542	57,850	66,552	75,647	85,137	100,646	133,297

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	67,735	87,088	96,764	96,764	96,764	96,764	96,764	96,764	96,764	96,764	32,651
Inflow operation	0	67,735	87,088	96,764	96,764	96,764	96,764	96,764	96,764	96,764	96,764	0
Other income	0	0	0	0	0	0	0	0	0	0	0	32,651
TOTAL CASH OUTFLOW	58,458	57,389	69,743	74,725	78,199	78,381	80,579	80,748	80,917	81,085	81,254	0
Increase in fixed assets	41,640	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	16,818	4,781	2,391	0	2	0	0	0	0	0	0	0
Operating costs	0	51,608	66,353	73,725	73,725	73,746	73,746	73,746	73,746	73,746	73,746	0
Marketing and Distribution cost	0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0
Income (corporate) tax		0	0	0	3,472	3,634	5,833	6,001	6,170	6,339	6,508	0
NET CASH FLOW	-58,458	10,346	17,345	22,039	18,565	18,383	16,185	16,016	15,847	15,679	15,510	32,651
CUMULATIVE NET CASH FLOW	-58,458	48,112	-30,768	-8,729	9,836	28,220	44,405	60,421	76,268	91,947	107,457	140,108
Net present value	-58,458	9,406	14,335	16,558	12,680	11,415	9,136	8,219	7,393	6,649	5,980	12,588
Cumulative net present value	-58,458	49,053	-34,718	18,160	-5,480	5,935	15,071	23,289	30,682	37,332	43,311	55,900

NET PRESENT VALUE 55,900
INTERNAL RATE OF RETURN 26.32%
NORMAL PAYBACK 4 years