

168. PROFILE ON ELEVATOR ASSEMBLY

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I. SUMMARY

This profile envisages the establishment of a plant for the production of elevator assembly with a capacity of 30 sets per annum. Elevator assembly are a motor driven cage like programmable device built commonly in high story buildings to move people and goods from one floor to another in upward and down ward direction.

The demand for elevator assembly is met entirely through import and domestic production. The present (2012) demand for elevator assembly is estimated at 1,012 units. The demand for elevator assembly is projected to reach 1,630 units and 2,625 units by the year 2017 and 2022, respectively.

The principal raw materials required are semi finished steel plate, shape steel, cast iron, wire ropes and motor which have to be imported.

The total investment cost of the project including working capital is estimated at Birr 7.06 million. From the total investment cost the highest share (Birr 5.64 million or 79.89%) is accounted by fixed investment cost followed by pre operation cost (Birr 855.80 thousand or 12.12%) and initial working capital (Birr 563.79 thousand or 7.99%). From the total investment cost Birr 720 thousand or 10.20% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 23.37% and a net present value (NPV) of Birr 4.92 million discounted at 10%.

The project can create employment for 28 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 automotive and construction sub sector and also generates income for the Government in terms of tax revenue and payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION

Elevators are a motor driven cage like programmable device built commonly in high story buildings to move people and goods from one floor to another in upward and down ward direction. It is assumed that buildings with five storeys or above are required to install at least one permanent elevator. Most of the elevators installed in these buildings are imported and assembled by domestic companies.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The construction boom, especially the commercial and residential building, in the past few years had increased the demand for elevator (lift) of different capacity. It is assumed that buildings with five storeys or above are required to install at least one permanent elevator. Most of the elevators installed in these buildings are imported and assembled by domestic companies. Though there is no available data on the number and type of elevator assemblers in Ethiopia, the popular domestic Elevator (lift) assembly companies in Ethiopia are:

- Dan Technocraft,
- Equatorial Business Group,
- Tana Engineering,
- Agents of Otis, Schindler ,and
- Some others that assemble less popular brands on residential buildings .

However, no data are available on the aggregate supply of these assembly units, hence, for this project purpose end-user side data have been used to estimate the demand for elevators.

According to CSA report, between the years 2003 and 2009, construction permits have been issued for 1,628 buildings with five-and-above storey in Addis Ababa. With further assumption that those seven-and-above storey buildings require more than one elevator, the total elevator requirement had been 2,125 for the period under consideration (see Table 3.1).

Table 3.1
ESTIMATED NUMBER OF ELEVATORS INSTALLED IN ADDIS ABABA,
2003 – 2009

Year	No. of Buildings	No. of Elevators Used
2003	28	36
2004	22	30
2005	27	32
2006	102	130
2007	159	209
2008	1031	1342
2009	259	346
Total	1628	2125

Since 2006, permits for relatively giant buildings had risen fourfold compared to previous years, on average, 388 permits had been issued annually for the five-and-above story buildings until 2009 in Addis Ababa and approximately 507 elevators were supplied per annum, assuming that all buildings were constructed.

Even though the number of construction permit issued for commercial and residential buildings and hence, the demand for elevators had shown a considerably large growth rate during these periods, a conservative assumption of 10% annual growth rate had been applied on the base average of 507 elevators to estimate the subsequent years demand. Hence the 2012 demand of elevators in Addis Ababa is estimated to be 674.

Though construction of new buildings is also on the rise in regional capitals and major towns (Nazereth, Awassa, Bahir Dar, Dire Dawa, Mekelle, etc.) data on this activity outside Addis Ababa, however, are not available. Hence, a conservative assumption is made that the five-and-above storey building construction activities in all the remaining regions and city administration

would be half of that of Addis Ababa. Accordingly, the number of elevators demanded in year 2012 at national level is estimated to be 1,012 units of various capacities.

2. Projected Demand

In the coming years, with the assumption of growing economic performance and urbanization, the construction of commercial and residential building will grow at an increasing rate, we expect there prevails shortage of urban land as a result increase in lease price of land. Thus, there will be a tendency to rise the construction of long buildings than those quarters consuming wide plots of land. With this presumption, by a very conservative assumption, the demand for elevator (lift) shall increase by 10% every year in the coming ten years. The Table 3.2 shows the projected demand for elevator and unsatisfied demand for the years 2013- 2022.

Table 3.2
PROJECT DEMAND FOR ELEVATOR (UNITS)

Year	Projected demand	Unsatisfied Demand
2013	1,113	101
2014	1,225	213
2015	1,347	335
2016	1,482	470
2017	1,630	618
2018	1,793	781
2019	1,972	960
2020	2,169	1,157
2021	2,386	1,374
2022	2,625	1,613

3. Pricing and Distribution

Based on current market price of the product, the factory gate price of Birr 190,000 for average size elevator shall be considered for financial analysis purpose.

The plant can sell its product either directly to end users or through agents that distribute similar products throughout the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAM

1. Plant Capacity

Taking into consideration only to cover about 14% of the demand gap for the year 2014, the capacity of the assembly plant is to assemble 30 sets of elevator per annum. The plant operation is on the basis of 8 working hours per day and 300 days per year. The working days are set by excluding 13 holidays and 52 Sundays per annum and assuming that maintenance & repair of machinery will be carried out during off working hours.

2. Production Program

Considering the fact that the production equipment are new and operators usually take sometimes to develop the specific skill and know-how the production build –up program is made to start at relatively lower level (75%) and gradually rise to full capacity. Accordingly, the plant will start operation at 75% & 85% of its capacity at first and second year of operation and at the third year the plant will run at full capacity.

IV. MATERIAL AND INPUTS

A. RAW MATERIAL

The total cost of raw materials/ components at full capacity operation is estimated at Birr 2.10 million. The list of raw materials/ components required and the corresponding cost is shown in Table 4.1.

Table 4.1

LIST AND COST OF THE REQUIRED RAW MATERIALS/ COMPONENTS AT FULL CAPACITY OPERATION

No	Raw Materials/ components	Annual Requirement (pcs)	Cost (in Birr)		
			F.C	L.C	Total
1	Car/cabin	30	237,391.3	35,608.7	273,000.0
2	Hoist way	30	203,478.3	30,521.7	234,000.0
3	Machine/ drive system	30	390,000.0	58,500.0	448,500.0
4	Control system	30	423,913.0	63,587.0	487,500.0
5	Safety system	30	440,869.6	66,130.4	507,000.0
6	Miscellaneous (paints, bolts and nuts, switches etc)	Lump sum		150,000.0	150,000.0
	Total		1,695,652.2	404,347.8	2,100,000.0

B. UTILITIES

The major utilities required by the plant are electricity and water. Annual cost of utilities during full capacity operation is estimated at Birr 108,000 (see Table 4.2).

Table 4.2

ANNUAL UTILITY REQUIREMENTS

No	Utility	Unit	Quantity	Cost (Birr)
1	Electricity	Kwh	150,000	87,000
2	Water	Meter cube	2,100	21,000
	Total			108,000

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The major parts of the processes are manufacturing of cage, hoist wag, tractor machines. The cage has three major parts. These are the wall, frame and safety of the car. The wall of the car is manufactured by shearing, bending, drilling of shape steel. After successive processes of machining, the frame of the car is prepared from steel plate. The car frame and the wall together with the safety of car will be welded together to complete the cage assembly.

This part includes the rail and wire rope. The rail is manufactured through a different machining process of shape steel. The wire rope will be supplied as the height of the building.

The traction machine consists of worm gear assembly and motor. The worm gear and the motor will be assembled & installed in the beam. After assembling together these parts the controlling system, indicator & the operating system will be fitted to complete the process.

2. Environmental Impact

The processes involved in elevator assembly are shearing, bending, drilling, welding and assembly which do not discharge or emit any pollutant to the environment and hence, the project is environmental friendly.

B. ENGINEERING

1. Machinery and Equipment

The total cost of machinery and equipment is Birr 1,464,000. The machinery and equipment required for the plant are listed in Table 5.1.

Table 5.1
LIST OF MACHINERY AND EQUIPMENT

No.	Description	Qty
1	Milling machine	1
2	Drilling & tapping m/c	1
3	Bending machine	1
4	Shearing machine	1
5	Press	1
6	Boring machine	1
7	Welding machine	5
8	Grinding machine	1

2. Land, Building and Civil Works

The plant requires a total of 1,000 m² area of land out of which 600 m² is built-up area which includes manufacturing area, raw material stock area, offices etc. Assuming construction rate of Birr 5,000 per m², the total cost of construction is estimated to be Birr 3 million.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 721/2004) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in

installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided. However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa, the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 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/m ²
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 266,000 of which 10% or Birr 26,600 will be paid in advance. The remaining Birr 239,400 will be paid in equal installments with in 28 years i.e. Birr 8,550 annually.

VI. HUMAN RESOURCE AND TRAINING REQUIREMENTS

A. HUMAN RESOURCE REQUIREMENT

The plant requires a total of 28 workers. Annual cost of labor is estimated at Birr 618,000. Details are shown in Table 6.1.

Table 6.1
HUMAN RESOURCE REQUIREMENT AND COST

No.	Description	No.	Monthly salary	Annual Salary
1	Plant manager	1	6,000	72,000
2	Secretary	1	2,500	30,000
3	CAGE Manufacturing (operators)	6	9,000	108,000
4	Hoist Wag (operators)	4	6,000	72,000
5	Traction M/C Part (operators)	2	2,500	30,000
6	Other Assembling Area (operators)	6	6,300	75,600
7	Administration and Finance	1	2,500	30,000
8	Accountant	1	1,500	18,000
9	Clerk	1	850	10,200
10	Cashier	1	1,050	12,600
11	Guards	4	3,000	36,000
	Total	28	41,200	494,400
	Employees benefits (25%)			123,600
	Grand Total	28		618,000

B. TRAINING REQUIREMENT

The assembly plant requires training in the area of controlling system. The training can be carried out locally with an estimated cost of Birr 100,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the elevator assembly 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 7.06 million (see Table 7.1). From the total investment cost the highest share (Birr 5.64 million or 79.89%) is accounted by fixed investment cost followed by pre operation cost (Birr 855.80 thousand or 12.12%) and initial working capital (Birr 563.79 thousand or 7.99%). From the total investment cost Birr 720 thousand or 10.20% is required in foreign currency.

Table 7.1
INITIAL INVESTMENT COST ('000 Birr)

Sr. No	Cost Items	Local Cost	Foreign Cost	Total Cost	% Share
1	Fixed investment				
1.1	Land Lease	26.60		26.60	0.38
1.2	Building and civil work	3,000.00		3,000.00	42.49
1.3	Machinery and equipment	744.00	720.00	1,464.00	20.74
1.4	Vehicles	900.00		900.00	12.75
1.5	Office furniture and equipment	250.00		250.00	3.54
	Sub total	4,920.60	720.00	5,640.60	79.89
2	Pre operating cost *				
2.1	Pre operating cost	393.92		393.92	5.58
2.2	Interest during construction	461.88		461.88	6.54
	Sub total	855.80		855.80	12.12
3	Working capital **	563.79		563.79	7.99
	Grand Total	6,340.19	720.00	7,060.19	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 837.39 thousand. However, only the initial working capital of Birr 563.76 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 4.69 million (see Table 7.2). The cost of raw material account for 44.81% of the production cost. The other major components of the production cost are depreciation, financial cost, direct labor, and cost of marketing and distribution which account for 14.86%, 9.49%, 10.54%, and 10.67% respectively. The remaining 9.55% 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	2,100	44.81
Utilities	83	1.77
Maintenance and repair	44	0.94
Labor direct	494	10.54
Labor overheads	124	2.65
Administration Costs	200	4.27
Land lease cost	0	0.00
Cost of marketing and distribution	500	10.67
Total Operating Costs	3,545	75.65
Depreciation	697	14.86
Cost of Finance	445	9.49
Total Production Cost	4,686	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 754 thousand to Birr 1.40 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 12.45 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.

$$\text{Break Even Sales Value} = \frac{\text{Fixed Cost} + \text{Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 2,394,000$$

$$\text{Break Even Capacity utilization} = \frac{\text{Break even Sales Value}}{\text{Sales revenue}} \times 100 = 45.07\%$$

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 5 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 23.37% 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 4.92 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 28 persons. The project will generate Birr 3.47 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 automotive and construction sub sector 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	1,470	1,890	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100
Utilities	58	75	83	83	83	83	83	83	83	83
Maintenance and repair	31	40	44	44	44	44	44	44	44	44
Labour direct	346	445	494	494	494	494	494	494	494	494
Labour overheads	87	112	124	124	124	124	124	124	124	124
Administration Costs	140	180	200	200	200	200	200	200	200	200
Land lease cost	0	0	0	0	9	9	9	9	9	9
Cost of marketing and distribution	500	500	500	500	500	500	500	500	500	500
Total Operating Costs	2,632	3,241	3,545	3,545	3,554	3,554	3,554	3,554	3,554	3,554
Depreciation	697	697	697	697	697	145	145	145	145	145
Cost of Finance	0	508	445	381	318	254	191	127	64	0
Total Production Cost	3,328	4,445	4,686	4,623	4,568	3,953	3,889	3,826	3,762	3,699

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	3,990	5,130	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700
Less variable costs	2,132	2,741	3,045	3,045	3,045	3,045	3,045	3,045	3,045	3,045
VARIABLE MARGIN	1,859	2,390	2,655	2,655	2,655	2,655	2,655	2,655	2,655	2,655
in % of sales revenue	46.58	46.58	46.58	46.58	46.58	46.58	46.58	46.58	46.58	46.58
Less fixed costs	1,197	1,197	1,197	1,197	1,205	654	654	654	654	654
OPERATIONAL MARGIN	662	1,193	1,458	1,458	1,450	2,001	2,001	2,001	2,001	2,001
in % of sales revenue	16.59	23.25	25.59	25.59	25.44	35.11	35.11	35.11	35.11	35.11
Financial costs		508	445	381	318	254	191	127	64	0
GROSS PROFIT	662	685	1,014	1,077	1,132	1,747	1,811	1,874	1,938	2,001
in % of sales revenue	16.59	13.35	17.79	18.90	19.87	30.66	31.77	32.88	34.00	35.11
Income (corporate) tax	0	0	0	323	340	524	543	562	581	600
NET PROFIT	662	685	1,014	754	793	1,223	1,268	1,312	1,357	1,401
in % of sales revenue	16.59	13.35	17.79	13.23	13.91	21.46	22.24	23.02	23.80	24.58

Appendix 7.A.4
CASH FLOW FOR FINANCIAL MANAGEMENT (in 000 Birr)

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Scrap
TOTAL CASH INFLOW	6,035	5,047	5,139	5,704	5,700	5,700	5,700	5,700	5,700	5,700	5,700	3,077
Inflow funds	6,035	1,057	9	4	0	0	0	0	0	0	0	0
Inflow operation	0	3,990	5,130	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,077
TOTAL CASH OUTFLOW	6,035	3,689	4,542	4,704	4,884	4,847	4,967	4,922	4,878	4,834	4,154	0
Increase in fixed assets	6,035	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	595	158	79	0	1	0	0	0	0	0	0
Operating costs	0	2,132	2,741	3,045	3,045	3,054	3,054	3,054	3,054	3,054	3,054	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income tax	0	0	0	0	323	340	524	543	562	581	600	0
Financial costs	0	462	508	445	381	318	254	191	127	64	0	0
Loan repayment	0	0	635	635	635	635	635	635	635	635	0	0
SURPLUS (DEFICIT)	0	1,359	597	1,001	816	853	733	778	822	866	1,546	3,077
CUMULATIVE CASH BALANCE	0	1,359	1,956	2,956	3,772	4,625	5,358	6,136	6,958	7,825	9,371	12,447

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	3,990	5,130	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	3,077
Inflow operation	0	3,990	5,130	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,700	0
Other income	0	0	0	0	0	0	0	0	0	0	0	3,077
TOTAL CASH OUTFLOW	6,598	2,781	3,315	3,545	3,869	3,893	4,078	4,097	4,116	4,135	4,154	0
Increase in fixed assets	6,035	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	564	149	75	0	1	0	0	0	0	0	0	0
Operating costs	0	2,132	2,741	3,045	3,045	3,054	3,054	3,054	3,054	3,054	3,054	0
Marketing and Distribution cost	0	500	500	500	500	500	500	500	500	500	500	0
Income (corporate) tax		0	0	0	323	340	524	543	562	581	600	0
NET CASH FLOW	-6,598	1,209	1,815	2,155	1,831	1,807	1,622	1,603	1,584	1,565	1,546	3,077
CUMULATIVE NET CASH FLOW	-6,598	-5,389	-3,574	-1,419	412	2,219	3,841	5,444	7,028	8,593	10,139	13,216
Net present value	-6,598	1,099	1,500	1,619	1,251	1,122	916	823	739	664	596	1,186
Cumulative net present value	-6,598	-5,499	-3,999	-2,380	-1,129	-7	908	1,731	2,470	3,134	3,730	4,916

NET PRESENT VALUE 4,916
INTERNAL RATE OF RETURN 23.37%
NORMAL PAYBACK 5 years