33. PROFILE ON THE PRODUCTION OF CAR PAINT

TABLE OF CONTENTS

I. SUMMARY

This profile envisages the establishment of a plant for the production of car paint with a capacity of 150 tons per annum. Car paint is used to protect color or provide texture to car-bodies.

The demand for automotive/car paint in the country is met through imports. The present (2012) demand for Car paint is estimated at 272 tons. The demand for Car paint is projected to reach 348 tons and 443 tons by the year 2017 and 2022, respectively.

The principal raw materials required by the envisaged plant are pigment -titanium dioxide, solvents benzol (thinner), natural resin, synthetic resins, additives, calcium carbonate and plastic can. All the raw materials have to be imported except plastic which is locally available.

The total investment cost of the project including working capital is estimated at Birr 20.45 million. From the total investment cost, the highest share (Birr 10.47 million or 51.20%) is accounted by fixed investment cost followed by initial working capital (8.05 million or 39.34%) and pre operation cost (Birr 1.93 million or 9.46%). From the total investment cost Birr 3.70 million or 18.09% is required in foreign currency.

The project is financially viable with an internal rate of return (IRR) of 27.46%% and a net present value (NPV) of Birr 20.46 million, discounted at 10%.

The project can create employment for 28 persons. The project will generate Birr 9.74 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 sub sector and also generate income for the Government in terms of payroll tax.

II. PRODUCT DESCRIPTION AND APPLICATION DESCRIPTION

Car Paint is liquid, liquefiable, or mastic composition which, after application to a substrate in a thin layer, is converted to a solid film. It is most commonly used to protect color or provide texture to car-bodies. Usually sprayed on top of a colored basecoat, clear coat is a glossy and transparent coating that forms the final interface with the environment. For this reason, clear-coat must be durable enough to resist abrasion and chemically stable enough to withstand UV light. Clear coat can be either solvent or water-borne.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for automotive/car paint in the country is met through imports. However, since import figures in the External Trade Statistics are lumped with other type of paints and related products, it is difficult to find the required car paint separately from the trade statistics. Therefore, the approach used to estimate present demand in this study has been based on establishing the present stock of vehicles in the country in order to determine the derived demand using consumption coefficients. Accordingly, data obtained from the Ethiopian Transport Authority and other relevant sources have been analyzed for this purpose as given in Table 3.1.

Table 3.1

REGISTERED AND INSPECTED VEHICLES (YEAR 2000-2010)

Vehicle Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Private cars	42767	42586	47564	50087	50090	53330	54609	53517	54052	55187	57562
Station wagons	6282	6984	7001	7054	9231	17038	17242	16932	17632	18021	18023
Taxi<5 seats	4130	4547	5006	5457	6003	7380	7526	7601	7753	7799	8033
Taxi 5-12 seats	5716	5764	6414	7055	7902	8587	9291	9960	10687	11168	11425
Bus <30 seats	7745	9416	9015	9232	9015	13389	12972	13361	13628	13792	13930
Bus > 30 seats	2173	2551	2903	3309	3805	4228	4617	5125	5535	6144	6593
Pick-ups& trucks(<=100 qtls)	24423	27069	25332	25608	22747	26736	27832	28723	29326	31144	31518
Trucks(100-150 qqtls)	5061	5364	6583	6234	5324	5100	6542	6754	6889	7034	7280
Trucks (Above 150 qtls)	5052	5154	6324	6829	7184	5029	6842	7150	7300	7523	7752
Tankers (<10000 lts)	1235	1278	1396	1515	1345	1241	1423	1579	1752	1917	2009
Tanker(>10000lts)	1211	1453	1480	1509	1467	1308	1576	1632	1687	1745	1808
Tota1	105795	112166	119020	123889	123113	143366	150472	152334	156241	161474	165933

Source: *Ethiopian Transport Authority.*

As could be seen from Table 3.1, though there is a fluctuating trend in some individual vehicle type and a slight decline in year 2004 in the total number of vehicles, the overall vehicle stock data shows an increasing trend. According to the information obtained from knowledgeable people in the area, the major reason for the indicated fluctuation is that not all registered vehicles show up for annual inspection regularly. Therefore, the 2010 figure from the data set for each vehicle type has been considered as reasonable approximation of the present fleet size. The current operational vehicle stock in the country is, hence estimated to a total of about165, 900 with a breakdown as shown in Table 3. 2.

Table 3.2

PRESENT VEHICLE STOCK IN ETHIOPIA

Vehicle Category	Current Estimated Stock (No)
Private cars	58,000
Station wagons	18,000
Taxi<5 seats	8,000
Taxi 5-12 seats	11,000
Bus <30 seats	13,000
Bus > 30 seats	7,000
Pick-ups & trucks(<=100 seats)	32,000
Trucks(100-150 quintal)	7,300
Trucks (Above 150 quintal)	7,800
Tankers (<10000 liters)	2,000
Tankers (>10000 liters)	1,800
Total	165900

In addition to imported vehicles, there are heavy duty truck and body manufacturing enterprises in Ethiopia. These are:-

- Maru Tefera
- Ayele Getaneh
- Mesfin Engineerg
- Techale Haile, and
- OCCFA

These five heavy duty truck and body manufacturing workshops as indicated in pervious studies, have a total annual production capacity of 2,000 trucks and bus body. According tothe knowledgeable persons in the area, it is assumed that currently they are operating at 50% capacity and hence, the present production would amount about 1,000 truck and bus body.

As could be seen from table 3.3 below, current consumption per type of vehicle has been estimated as follows.

-The total average annual consumption is about 262 tons. (See Table 3.3)

-The average growth rate of the vehicle stock in Ethiopia over the past 11 years (2000 -2010) was about 4%.

Based on the above parameters the current effective demand for car paint has been estimated at 272 tons.

The car paint requirement (in kg) for each type of vehicle depends on the body condition of the vehicle, such as damage of the body of the vehicle. Hence, an estimated average paint/ kg for each type of vehicle have been taken.

Table 3.3

CURRENT CONSUMPTION OF CAR PAINT BY TYPE OF VEHICLE

Vehicle Type	No. of Vehicles (1)	Paint Requirement in Five Years (KG) (2)	Total annual Consumption Tones (1x2) 5x1000
Private cars	58,000	5	58.0
Station wagons	18,000	6	21.6
Taxi<5 seats	8,000	5	8.0
Taxi 5-12 seats	11,000	6	13.2
Bus <30 seats	13,000	12	31.2
Bus > 30 seats	7,000	16	22.4
Pick-ups & trucks(<=100 seats)	32,000	6	38.4
Trucks(100-150 qtls)	7,300	16	23.4
Trucks (Above 150 qtls)	7,800	18	28.1
Tankers (<10000ltrs)	2,000	18	7.2
Tankers(>10000 ltrs	1,800	18	6.5
Domestically assembled trucks and buses	1000	18	3.6
Total	**166900**		**261.6**

3. Demand Projection

The future demand for car paint depends on the growth of the fleet size of vehicles of various classifications in the country which in turn depends on population growth, income as well as the overall economic growth of the country. Hence, considering these combined factors those influences the demand for car paint, it is assumed to grow annually by 5%.

Table 3.4

PROJECTED DEMAND FOR CAR- PAINT (TONS)

Year	Car Paint Demand
2013	286
2014	300
2015	315
2016	331
2017	348
2018	365
2019	383
2020	402
2021	422
2022	443
2023	465
2024	488
2025	512
2026	538

3. Pricing and Distribution

According to the information obtained from some car paint selling shops, car paints are categorized as:

- Metallic ,and
- Non Metallic.

Currently, the price of imported metallic car paint (auto color) is 350 Birr/kg, while the price of non-metallic paint mixed with hardener ranges from Birr 500 to Birr 750 Birr/kg. Therefore, a

factory gate price of Birr 275/ kg for metallic car paint and Birr 600 / kg for non metallic paint is recommended for the envisaged plant.

Regarding distribution, the new plant can sell its product to car paint distributing enterprises and also directly to shops selling the product.

B. PLANT CAPACITY AND PRODUCION PROGRAM

1. Plant Capacity

Considering the economic scale of production, available technology and production management, the annual total production capacity of the plant is set to be 150 tones car paint of different grade. The envisaged plant will operate in single shift eight hours per day for three hundred days within a year considering 13 holidays and 52 Sunday per year and assuming that maintenance activities will be performed during off hours and Sunday

2. Production Program

The nature of production of car paint is mainly a chemical process and it requires the producer to take little time until the market is fully convinced with the quality of its product. Therefore, the envisaged plant will run in full load after two years of its implementation period

Table 3.3

PRODUCTION PROGRAM

Sr. No.	Description	Production Year		
		1	2	3
1	Capacity utilization rate (%)	75	85	100
2	Car paint (tons)	113	128	150

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

Paint is composed of pigments, solvents, resins, and various additives. The pigments give the paint color; solvents make it easier to apply; resins help it dry; and additives serve as everything from fillers to ant fungicidal agents. The direct and auxiliary raw materials required for annual plant production capacity with their quantity with their total cost of Birr 31,782.35 million is shown below in Table 4.1.

Table 4.1

ANNUAL RAW MATERIAL REQUIREMENT & COST

Sr.No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Cost ("000) Birr		
					LC	FC	Total (Birr)
1	Pigment -titanium dioxide	137	ton	165,000.00	-	22,605.00	22,605.00
2	Solvents benzol, thinner	20	ton	90,000.00	-	1,800.00	1,800.00
3	Natural resin	6.83	ton	175,000.00	-	1,195.25	1,195.25
4	Synthetic resins	1.4	ton	28,500.00	-	39.90	39.90
5	Additives calcium carbonate	6.83	ton	41,400.00	-	282.56	282.56
6	Plastic can	150,000	pcs	4.50	675.00		675.00
Total FOB						**25,922.71**	**26,597.71**
7	CIF (20%)				5184.54		5,184.54
Total Raw material Annual cost					**5,859.54**	**25,922.71**	**31,782.25**

B. UTILITES

The annual utilities requirements such as electricity as a source of energy and water as cleaning agent are estimated at a total of Birr 69,750.00 as shown below in Table 4.2.

Table 4.2

UTILITIES CONSUMPTION & COST

Sr.No.	Description	Annual Consumption	UOM	Unit Cost (Birr)	Total Cost ("000) Birr
1	Electricity	90,000	kWh	0.65	58.50
2	Water	1,125	m^3	10.00	11.25
Total Annual Cost					**69.75**

V. TECHNOLOGY AND ENGINNERING

A. TECHNOLOGY

1. Production Process

The production process of car paint and paints in general involves the following major production steps.

Making the Paste:

Fine grain pigment is premixed with resin (a wetting agent that assists in moistening the pigment), one or more solvents, and additives to form a paste.

Dispersing the Pigment:

The paste mixture for most industrial and some consumer paints is now routed into a sand mill, a large cylinder that agitates tiny particles of sand or silica to grind the pigment particles, making them smaller and dispersing them throughout the mixture. The mixture is then filtered to remove the sand particles .The premixed paste is subjected to high-speed agitation by a circular, toothed blade attached to a rotating shaft. This process blends the pigment into the solvent.

Thinning the Paste:

Whether created by a sand mill or a dispersion tank, the paste must now be thinned to produce the final product. Transferred to large kettles, it is agitated with the proper amount of solvent for the type of paint desired.

Canning the Paint:

The finished paint product is then pumped into the canning room. Empty cans are first rolled horizontally onto labels, and then set upright so that the paint can be pumped into them. A machine places lids onto the filled cans, and a second machine presses on the lids to seal them. A certain number of cans (usually four) are then boxed and stacked before being sent to the warehouse.

2. Environmental Impact

Paints have been identified as significant sources of volatile organic compounds (VOCs). In combination with nitrogen oxides, VOCs are responsible for the buildup of ground-level ozone. This ozone causes respiratory problems, vegetation damage and material degradation. So there will be an estimated investment cost of Birr 500,000 for mechanization of waste treatment and disposal to the environment.

B. ENGINNERING

1. Machinery and Equipment

Total estimated cost of machinery, tools and equipments is Birr 4.311 million. The list of direct and auxiliary machinery, tools and equipments required for the plant and their corresponding cost is shown in Table 5.1.

Table 5.1

LIST OF MACHINERIES, TOOLS & EQUIPMENTS & COST

Sr. No.	Description	Qty.	UOM	Unit Cost (Birr)	Total Cost ("000) Birr		
					LC	FC	Total (Birr)
1	Pigment grinding mill	1.00	pcs	540,000.00	-	540.00	540.00
2	Pigment mixer	1.00	pcs	180,000.00	-	180.00	180.00
3	Pigment blender	1.00	pcs	216,000.00	-	216.00	216.00
4	Dispersion unit	1.00	pcs	144,000.00	-	144.00	144.00
5	Filter and packing	1.00	pcs	630,000.00	-	630.00	630.00
6	Milling machine	1.00	pcs	723,600.00	-	723.60	723.60
7	Mixing tank	2.00	pcs		12.50	390.83	403.33
8	Scales	1.00	pcs		7.00	699.30	706.30
Total					19.50	3,523.73	3,543.23
9	Spare parts (5%)					176.19	176.19
Total Fob Price						3,699.91	3,699.91
10	CIF (15%)				554.99		554.99
Total Machinery Cost					**593.99**	**3,699.91**	**4,431.08**

2. Land, Building and Civil Works

The envisaged plant requires total land area of 1,500 meter square out of which built up are is 750 meter square and the remaining area will be open for various logistic activities. At a unit rate of Birr 5,000 per m^2 the total cost of building and civil work is estimated at Birr 3.75 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 RESOURCEAND TRAINING REQUIREMENTS

A. HUMAN RESOURCE REQUIREMENT

The plant will employ a total of 28 persons. Annual cost of labor is estimated at Birr 655,200.00**.** The list of direct and indirect labor requirement is shown in Table 6.1.

Table 6.1

HUMAN RESOURCEREQUIREMENT & LABOR COST

Sr.No.	Description	No. of Persons	Monthly Salary(Birr)	Annual salary ("000) Birr
1	Plant manager	1	6,000.00	72.0
2	Secretary	1	1,500.00	18.0
3	Administration and finance	1	3,500.00	42.0
4	Accountant	1	2,000.00	24.0
5	Mechanic	2	2,200.00	52.8
6	Electrician	2	2,200.00	52.8
7	operators	5	1,400.00	84.0
8	production foreman	1	3,000.00	36.0
9	Clerk	1	800.00	9.6
10	Cashier	1	1,000.00	12.0
11	Assistant operator	3	700.00	25.2
12	Quality supervisor	2	1,600.00	38.4
13	store keeper	1	1,400.00	16.8
14	time keeper	1	1,200.00	14.4
15	Driver	1	1,200.00	14.4
16	Guards	4	700.00	33.6
Sub-total		**28**	**30,400.00**	**546.0**
17	Employment benefits and allowances 20%		6,080.00	109.2
Total Annual Labor Cost (Direct +Indirect)				**655.2**

B. TRAINING REQUIREMENT

Individual operators will be trained during machinery commissioning and erection about the basic chemical process and specification; so operators will be hired one month before the project implementation so the training will be conducted on job base arrangement focused on the production process parameters. For this training the cost is estimated at Birr 100,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the car 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	5 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 20.45 million (see Table 7.1). From the total investment cost, the highest share (Birr 10.47 million or 51.20%) is accounted by fixed investment cost followed by initial working capital (8.05 million or 39.34%) and pre operation cost (Birr 1.93 million or 9.46%). From the total investment cost Birr 3.70 million or 18.09% 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	3,750.00		3,750.00	18.34
1.3	Machinery and equipment	1,231.17	3,699.91	4,931.08	24.11
1.4	Vehicles	1,500.00		1,500.00	7.33
1.5	Office furniture and equipment	250.00		250.00	1.22
	Sub total	**6,771.07**	**3,699.91**	**10,470.98**	**51.20**
2	**Pre operating cost ***				
2.1	Pre operating cost	596.55		596.55	2.92
2.2	Interest during construction	1,338.00		1,338.00	6.54
	Sub total	**1,934.55**		**1,934.55**	**9.46**
3	**Working capital ****	**8,046.81**		**8,046.81**	**39.34**
	Grand Total	**16,752.44**	**3,699.91**	**20,452.35**	**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 10.74 million. However, only the initial working capital of Birr 8.04 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 36.62 million (see Table 7.2). The cost of raw material account for 86.78% of the production cost. The other major components of the production cost are, depreciation, financial cost, marketing and distribution and labor, which account for 4.32%, 3.52%, 2.05% and 1.49%, respectively. The remaining 1.84% 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	31,782.00	86.78
Utilities	70.00	0.19
Maintenance and repair	247.00	0.67
Labour direct	546.00	1.49
Labour overheads	109.00	0.30
Administration Costs	250.00	0.68
Land lease cost	-	-
Cost of marketing and distribution	750.00	2.05
Total Operating Costs	**33,754.00**	**92.17**
Depreciation	1,580.53	4.32
Cost of Finance	1,287.83	3.52
Total Production Cost	**36,622.35**	**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 will grow from Birr 3.37 million to Birr 5.12 million during the life of the project. Moreover, at the end of the project life the accumulated net cash flow amounts to Birr 48.57 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.

$$\text{Break- Even Sales Value} = \frac{\text{Fixed Cost + Financial Cost}}{\text{Variable Margin ratio (\%)}} = \text{Birr } 17{,}325{,}000$$

$$\text{Break- Even Capacity utilization} = \frac{\text{Break- even Sales Value}}{\text{Sales revenue}} \times 100 = 28.26\ \%$$

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 27.46% 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 20.46 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 13.35 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 sub sector and also generate 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	5,959.13	6,753.68	7,945.50	7,945.50	7,945.50	7,945.50	7,945.50	7,945.50	7,945.50	7,945.50
Accounts receivable	2,125.25	2,400.28	2,812.83	2,812.83	2,813.90	2,813.90	2,813.90	2,813.90	2,813.90	2,813.90
Cash-in-hand	12.00	13.60	16.00	16.00	16.18	16.18	16.18	16.18	16.18	16.18
CURRENT ASSETS	**8,096.38**	**9,167.56**	**10,774.33**	**10,774.33**	**10,775.58**	**10,775.58**	**10,775.58**	**10,775.58**	**10,775.58**	**10,775.58**
Accounts payable	49.56	56.17	66.08	66.08	66.08	66.08	66.08	66.08	66.08	66.08
CURRENT LIABILITIES	**49.56**	**56.17**	**66.08**	**66.08**	**66.08**	**66.08**	**66.08**	**66.08**	**66.08**	**66.08**
TOTAL WORKING CAPITAL	**8,046.81**	**9,111.39**	**10,708.25**	**10,708.25**	**10,709.50**	**10,709.50**	**10,709.50**	**10,709.50**	**10,709.50**	**10,709.50**

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	23,837	27,015	31,782	31,782	31,782	31,782	31,782	31,782	31,782	31,782
Utilities	53	60	70	70	70	70	70	70	70	70
Maintenance and repair	185	210	247	247	247	247	247	247	247	247
Labour direct	410	464	546	546	546	546	546	546	546	546
Labour overheads	82	93	109	109	109	109	109	109	109	109
Administration Costs	188	213	250	250	250	250	250	250	250	250
Land lease cost	0	0	0	0	13	13	13	13	13	13
Cost of marketing and distribution	750	750	750	750	750	750	750	750	750	750
Total Operating Costs	**25,503**	**28,803**	**33,754**	**33,754**	**33,767**	**33,767**	**33,767**	**33,767**	**33,767**	**33,767**
Depreciation	1,581	1,581	1,581	1,581	1,581	175	175	175	175	175
Cost of Finance	0	1,472	1,288	1,104	920	736	552	368	184	0
Total Production Cost	**27,084**	**31,856**	**36,622**	**36,438**	**36,267**	**34,678**	**34,494**	**34,310**	**34,126**	**33,942**

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	30,938	35,063	41,250	41,250	41,250	41,250	41,250	41,250	41,250	41,250
Less variable costs	24,753	28,053	33,004	33,004	33,004	33,004	33,004	33,004	33,004	33,004
VARIABLE MARGIN	**6,185**	**7,010**	**8,246**	**8,246**	**8,246**	**8,246**	**8,246**	**8,246**	**8,246**	**8,246**
in % of sales revenue	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99	19.99
Less fixed costs	2,331	2,331	2,331	2,331	2,343	938	938	938	938	938
OPERATIONAL MARGIN	**3,854**	**4,679**	**5,915**	**5,915**	**5,903**	**7,308**	**7,308**	**7,308**	**7,308**	**7,308**
in % of sales revenue	12.46	13.34	14.34	14.34	14.31	17.72	17.72	17.72	17.72	17.72
Financial costs		1,472	1,288	1,104	920	736	552	368	184	0
GROSS PROFIT	**3,854**	**3,207**	**4,628**	**4,812**	**4,983**	**6,572**	**6,756**	**6,940**	**7,124**	**7,308**
in % of sales revenue	12.46	9.15	11.22	11.66	12.08	15.93	16.38	16.82	17.27	17.72
Income (corporate) tax	0	0	0	1,443	1,495	1,972	2,027	2,082	2,137	2,192
NET PROFIT	**3,854**	**3,207**	**4,628**	**3,368**	**3,488**	**4,601**	**4,729**	**4,858**	**4,987**	**5,116**
in % of sales revenue	12.46	9.15	11.22	8.17	8.46	11.15	11.47	11.78	12.09	12.40

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	**11,068**	**40,372**	**35,070**	**41,260**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**14,337**
Inflow funds	11,068	9,434	7	10	0	0	0	0	0	0	0	0
Inflow operation	0	30,938	35,063	41,250	41,250	41,250	41,250	41,250	41,250	41,250	41,250	0
Other income	0	0	0	0	0	0	0	0	0	0	0	14,337
TOTAL CASH OUTFLOW	**11,068**	**34,937**	**33,186**	**38,488**	**38,141**	**38,023**	**38,314**	**38,185**	**38,057**	**37,928**	**35,959**	**0**
Increase in fixed assets	11,068	0	0	0	0	0	0	0	0	0	0	0
Increase in current assets	0	8,096	1,071	1,607	0	1	0	0	0	0	0	0
Operating costs	0	24,753	28,053	33,004	33,004	33,017	33,017	33,017	33,017	33,017	33,017	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income tax	0	0	0	0	1,443	1,495	1,972	2,027	2,082	2,137	2,192	0
Financial costs	0	1,338	1,472	1,288	1,104	920	736	552	368	184	0	0
Loan repayment	0	0	1,840	1,840	1,840	1,840	1,840	1,840	1,840	1,840	0	0
SURPLUS (DEFICIT)	**0**	**5,435**	**1,883**	**2,772**	**3,109**	**3,227**	**2,936**	**3,065**	**3,193**	**3,322**	**5,291**	**14,337**
CUMULATIVE CASH BALANCE	**0**	**5,435**	**7,318**	**10,090**	**13,199**	**16,426**	**19,362**	**22,427**	**25,620**	**28,942**	**34,233**	**48,571**

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**	**30,938**	**35,063**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**41,250**	**14,337**
Inflow operation	0	30,938	35,063	41,250	41,250	41,250	41,250	41,250	41,250	41,250	41,250	0
Other income	0	0	0	0	0	0	0	0	0	0	0	14,337
TOTAL CASH OUTFLOW	**19,114**	**26,568**	**30,400**	**33,754**	**35,199**	**35,262**	**35,739**	**35,794**	**35,849**	**35,904**	**35,959**	**0**
Increase in fixed assets	11,068	0	0	0	0	0	0	0	0	0	0	0
Increase in net working capital	8,047	1,065	1,597	0	1	0	0	0	0	0	0	0
Operating costs	0	24,753	28,053	33,004	33,004	33,017	33,017	33,017	33,017	33,017	33,017	0
Marketing and Distribution cost	0	750	750	750	750	750	750	750	750	750	750	0
Income (corporate) tax		0	0	0	1,443	1,495	1,972	2,027	2,082	2,137	2,192	0
NET CASH FLOW	**-19,114**	**4,370**	**4,663**	**7,496**	**6,051**	**5,988**	**5,511**	**5,456**	**5,401**	**5,346**	**5,291**	**14,337**
CUMULATIVE NET CASH FLOW	**-19,114**	**-14,744**	**-10,081**	**-2,585**	**3,466**	**9,454**	**14,966**	**20,422**	**25,823**	**31,169**	**36,460**	**50,797**
Net present value	-19,114	3,973	3,854	5,632	4,133	3,718	3,111	2,800	2,520	2,267	2,040	5,528
Cumulative net present value	-19,114	-15,141	-11,288	-5,656	-1,523	2,196	5,307	8,107	10,626	12,893	14,933	20,461

NET PRESENT VALUE	20,461
INTERNAL RATE OF RETURN	27.46%
NORMAL PAYBACK	4 years