

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER
MANUFACTURING



PROJECT PROFILE ON DISTRIBUTION
TRANSFORMER MANUFACTURING



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ADDIS ABEBA CITY ADMINISTRATION INVESTMENT COMMISSION

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

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I. Executive summary

This project profile is prepared to assess the viability of running Distribution transformer manufacturing factory, in Addis Abeba city administration. Hence Market, Technical, Organizational and Financial study was made to investigate the viability of the envisaged project.

This project profile on manufacturing of Distribution transformer factory has been developed to support the decision –making process based on a cost benefit analysis of the actual project viability.

This profile includes marketing study, production and financial analysis, which are utilized to assist the decision-makers when determining if the business concept is viable. Ethiopia has a private sector driven Distribution transformer manufacturing industry. According to the latest data sourced from Ethiopian investment commission there are more than 63 companies were registered to invest on manufacturing of distribution transformer business in Ethiopia and 16 companies are on operational stage while others are on implementation and pre-implementation stages

The location of the plant will be decided on the basis of access to raw materials, infrastructure namely power, water, transport and telecom to easy access to international market. The most locally available raw materials for Distribution transformer factory are sheet metal, insulating materials, transformer oil, copper and etc.

The factory at full capacity operation can produce 1,000 pcs of transformer, per year based on 260 working days and their shifts of 24 hours per day.

The total investment capital including establishing the factory is Birr 167.415 million. Out of the total investment capital, the owners will cover Birr 50.22 million (30 %) while the remaining

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balances amounting to Birr 117.19 million (70 %) will be secured from bank in the form of term loan.

As indicated in the financial study, the cash flow projection of the project shows surplus from the first year on. The net cash flows of the project range from Birr 86.86 Million in the first year to Birr 127.58 million at the end of the 10th year of operation. At the end of the 10th year of operation period the cumulative cash balance reaches Birr 1.22 billion birr. The Benefit-cost ratio and Net present value (NPV) have been calculated at 17% discount factor (D.F) for 10 years of the project activity. Accordingly, the project has NPV of 790 million Birr at 17%D.F. and the benefit-cost ratio of 2.16 at 17% D.F.

Therefore, from the aforementioned overall market technical and financial analysis we can conclude that the Distribution transformer manufacturing business is a viable and worthwhile.

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1. Background information

1.1. Introduction

This document was undertaken to show distribution transformer production investment profile in Addis Ababa. In compiling the report, information from Addis Ababa investment commission, Addis Ababa trade and industry development, Ethiopian custom commission and published sources have been augmented.

Presently, in spite of high demand and its crucial importance, distribution transformers are in short supply and also significant amounts are imported from abroad. This causes freight transportation costs from the supplier to the Djibouti Port to the users to be high and in some cases inefficient and unreliable.

The provision of adequate distribution transformer is fundamental importance to Ethiopia's present and future demand of many industries. In Ethiopia, the demand for distribution transformer is expected to increase considerably in the next few decades as a result of increased industrialization, population growth, urbanization and increasing income levels. Thus, identifying potential of local distribution transformer production is crucial in a country like Ethiopia.

1.2. Product description

A transformer is a static device that works on the principle of electromagnetic induction. When an alternating current flows in the primary winding of a transformer, a varying electromagnetic field is generated which induces EMF in the secondary winding. The magnitude of the induced EMF is proportional to the turns ratio. A distribution transformer is the type of transformer that performs the

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last voltage transformation in a distribution grid. It converts the voltage used in the transmission lines to one suitable for household and commercial use.

1.3. Project location and justification

1.3.1. Location of Addis Ababa

Addis Ababa is the seat of the Ethiopian federal government. It is located on the central highlands of Ethiopia in the middle of Oromia Region. The absolute location is around the intersection point of 9°1'48''N latitude and 38°44'24"E longitudes. This is very near to the geographical center of the country. It is, therefore, equidistant to the peripheral areas or is equally accessible to almost all parts of Ethiopia. Addis Ababa is located on a well-watered plateau surrounded by hills and mountains. The city is in the highlands on the edge of the Ethiopian rift valley or the eastern slopes of the Entoto Mountain ranges bordering the Great Rift Valley. The total area of Addis Ababa is about 540 km² of which 18.2 km² are rural. Addis Ababa's built-up urban area spans 474 km². It is also the largest city in the world located in a landlocked country.

1.3.2. Demography of Addis Ababa

According to the CSA (2013) population projection, Ethiopia's total population reaches about 105 million people in 2022. Of the total population 22.9% (24 million people) live in urban areas. Ethiopia's urban population is expected to triple by 2037 (World Bank, 2015). Addis Ababa hosts an estimated 3,859,638 people. Currently, Addis Ababa is experiencing an annual growth rate of 3.8% and is estimated to reach 4,696,629 inhabitants by 2032 (CSA, 2015).

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1.3.3. Economic activity of Addis Ababa

The transformation of Addis Ababa has especially been rapid since 1991. According to the data from the city's Bureau of Finance and Economic Development (2006), per capital income of Addis Ababa has grown from USD 788.48 in 2010 to USD 1,359 in 2015. The city also achieved a decline in the poverty index from a high of 29.6 in 2012 to 22.0 in 2014. Moreover, the current poverty headcount index for Addis Ababa is estimated at 18.9 while the poverty severity account for 5 and 1.8 index points respectively. Even though, the poverty status of Addis Ababa has an improvement over previous years, there is still much work to be done to curb both the incidence and severity of poverty.

The major contributor to the economic growth of the city is the implementation of publicly financed mega urban projects like condominium housing, the Light Rail Transit, the international airport and industrial zone development (The state of Addis Ababa, 2017). The existence of international large and medium-size enterprises in and around Addis Ababa have also significant role in creating huge opportunity for employment and technology transfer. Furthermore, there are strong demand for goods and services following the existence of many embassies and inter-governmental organizations like the African Union, the United Nations Economic Commission for Africa.

The manufacturing sector's contribution to Addis Ababa's GDP is high. Despite the fact that 86% of the industries in the city are micro and small scale (cottage and handicrafts, and small-scale), the majority of the country's large and medium scale industries are found in the city. Noticeable increases are also registered currently in other aspects of industrial growth.

The service sector is both the largest contributor to the city's economy and the largest employer. It contributes to 76.4% of the city's GDP while industry's share makes up (almost all) the rest. This

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sector is dominated by three major sub-sectors: Transport and communication; Real estate, Renting and Business services; and Trade, Hotel and Restaurants. According to the state of Ethiopian Cities 2015 report, the service sector has also been responsible for more than 50% of the growth in the estimated annual growth of the city's GDP. Although 75% of employment in the city is also generated in the service sector, a large proportion of the employed work in low skill and low paying jobs as shop salespersons, petty and 'gullit' traders, sales workers in small shops, domestic helpers or doorkeepers and restaurant service workers.

Analysis of the economic structure of Addis Ababa reveals that the services sectors (63%) dominates with industry (36%) in second place indicating that these sectors account for almost all of the Addis Ababa's GDP (The State of Addis Ababa, 2017).

Addis Ababa has a great share in the economy of the country due to its attractiveness to businesses, companies, individuals and foreign direct investment. Overall primacy index of the city is 24.8 based on urban employment and unemployment survey (CSA 2015). According to the State of Addis Ababa 2017 report, the simultaneous high rates of economic growth and urbanization in Addis Ababa indicates a likely further rising dominance of the city in Ethiopia's economy as well as growing agglomeration of economic activities in and around the city.

1.4. Why is it beneficial to invest in Addis Ababa?

Addis Ababa is the largest and most economically significant city in the country. Ethiopia's urban population share is only 17 percent (as of 2012, World Bank 2015). The city is the only urban area in Ethiopia capable of delivering scale economies in terms of concentrated demand, specialization, diversity and depth of skills, innovation, and technology transfers. Thus, investors will be benefited in getting capable human power from the market.

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The capital is the country's main industrial hub. The city dominates industrial capacity in almost all the branches of light manufacturing that Ethiopia prioritizes. As a result Addis Ababa completely dominates production in various subsectors. This can be taken as the political and social stability of the city.

Overall, the city has a beautiful environment, favorable location, and strong industrial base. Its advantage as an economic powerhouse of the country and human resource center are the most attractive features for local and overseas investors.

Moreover, investors will be getting a comprehensive set of incentives for priority sectors. These include:

- Customs duty free privilege on capital goods and construction materials, and on spare parts whose value is not greater than 15% of the imported capital goods' total value.
- Investors have the right to redeem a refund of customs duty paid on inputs (raw materials and components) when buying capital goods or construction materials from local manufacturing industries.
- Income tax exemption of up to 6 years for manufacturing and agro-processing, and up to 9 years for agricultural investment.
- Additional 2-4 years income tax exemption for exporting investors located within industrial parks and 10-15 years exemption for industrial park developers.
- Loss Carry forward for half of the tax holiday period. Several export incentives, including Duty Draw-Back, Voucher, Bonded Factory, and Manufacturing Warehouse, and Export Credit Guarantee schemes.

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1.4.1. The city benefit from the investment

The city will be benefited from investment. These are discussed below.

- **Employment opportunity**

Investment is expected to provide direct and indirect employment. These range from unskilled casual workers, semi-skilled and skilled employees.

- **Improving growth of the economy**

Through the use of locally available materials and exporting products, the investment contributes towards growth of the economy by contributing to the growth of domestic product. These eventually attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of local materials will be payable directly to the producers. In addition, domestic products save foreign exchange and exports also bring money to the country.

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2. Marketing study

2.1. Market analysis summary

The current drive and emphasis by the government on the diversification of the industrial base away from the other sector presents an opportunity for production industry to a valuable contribution towards achieving goal. Having undertaken a thorough and comprehensive research of the market we realized that there was a vast opportunity for domestic products. Aware of the fact operating in such a market is largely dependent on good networking, the promoter intends to establish networks and strategic relationships with various wholesalers and retailers to ensure a steady stream of orders. In so doing the owner intend to ensure that the products they produce are of extremely high quality and fully serve the customers purpose.

2.2. The Supply of Distribution transformer

2.2.1. Local Distribution Transformer Supply

In Ethiopia there are large scales, medium and household level Distribution transformer manufacturing factory. According to EIC there are 16 operational small scale and medium scale transformer manufacture and repair enterprises. However, their design and actual current manufacturing capacity is not known.

The estimated design and operational capacity of these enterprises is shown in table 1.

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Table 1 Lists of transformer manufacturing company in Ethiopia

S/No	Company name	
1.	Ejegu beyene asefaw	Total supply of estimated quantity per year is 1,500pcs of transformer
2.	Abay Transformers Plc	
3.	Azenaw woldemaryam debesay	
4.	Adorn Transformer PLC	
5.	Binyam lemesa werdofa	
6.	Abel Teklu Wenh	
7.	Zizhong Zhang	
8.	Meatsh engineering trading plc	
9.	Nicolaos simatos nicolaos	
10.	Star Light Engineering Industry plc	
11.	Etone Power Manufacture plc	
12.	YASART ENGINEERING PLC	
13.	Leiluo Chen	
14.	Vayo generator manufacturing plc	
15.	Nileco Electric equipment Manufacturing plc	
16.	Max Transformer Manufacturing plc	

Sources: - EIC,2022

2.2.2. Import

The supply of Distribution transformer has been met both through import and domestic production.

Although there is no apparent trend in the growth of imported transformer.

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Table 2 Volume of imported Distribution transformer from 2012 to 2020 in kg

Year	Gross weight (in Kg)	Net weight (in Kg)	CIF value in (ETB)	CIF value in USD	Total TAX in ETB	Quantity
2012	9,498,170	8,958,978	1,332,197,316	74,567,734	313,614,862	125,373
2013	8,178,222	7,499,770	972,327,676	51,719,282	26,814,259	355,042
2014	6,433,572	5,913,661	1,157,149,363	57,445,013	30,249,901	683,012
2015	8,979,662	8,575,936	3,203,244,995	154,135,550	50,627,656	129,059
2016	2,390,596	2,154,527	646,268,812	29,921,930	6,276,090	83,435
2017	8,638,121	8,157,718	2,111,646,390	87,197,221	15,512,547	332,760
2018	2,373,165	2,246,612	559,283,561	20,212,633	8,872,876	184,796
2019	2,880	2,880	944,024	32,319	6,468	20
2020	1,708	1,607	391,848	11,212	127,116	4
Average	5,166,233	4,834,632	1,109,272,665	52,804,766	50,233,530	210,389

Source: ERCA and compiled by consultant

As it has been shown in table 2 import of Distribution transformer which was 125,373 at the beginning of the period (2012) has decreased to 4 pcs by the end of, 2020. A closer observation at the data set reveals that imported Distribution transformer over the study period has shown varying patterns. Based on the data obtained from Ethiopia customs Authority, the annual average quantity of imported Distribution transformer is 210,389 pcs from 2012 through 2020.

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2.2.2.1. Forecasted future import of Distribution transformer

Table 3 Future forecast of import of Distribution transformer by single exponential smoothing method

Year	Imported Distribution transformer from 2012 to 2020 in pcs.	Single exponential smoothing method
2012	125,373	
2013	355,042	
2014	683,012	
2015	129,059	
2016	83,435	
2017	332,760	
2018	184,796	
2019	20	
2020	4	
2021		55,741
2022		55,741
2023		55,741
2024		55,741
2025		55,741
2026		55,741
2027		55,741
2028		55,741
2029		55,741
2030		55,741
2031		55,741
2032		55,741

Compiled: - by consultant

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2.2.2.2. Distribution transformer Demand Projection

The demand for Distribution transformer be influenced by a number of factors. The demand for Distribution transformer is a function of industrialization, the availability of high tension power, investment expansion, and other exogenous factors. From production point of view, distribution transformer production is essentially a conversion of different materials input into assembled transformer which dictates the level of production and product quality and safety. for the purpose of this study, attempts have been made to forecast the likely future demand for Distribution transformer on the basis of the following assumptions:

- i. Local supply of Distribution transformer assumed to be increased by 2.5% every year
- i. Effective demand = Consumption of domestic manufactured transformer + Average per imported transformer = 1,500 pcs + 210,389 pcs = 211,889 pcs /year
- ii. Effective demand will increase by 10% every year

Therefore, in order to estimate the demand for animal feed, the consumption approach is considered.

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Table 4 Projected Demand for Distribution transformer in Ethiopia

Year	Demand projection
2021	231,428
2022	254,571
2023	280,028
2024	308,031
2025	338,834
2026	372,717
2027	409,989
2028	450,988
2029	496,087
2030	545,696
2031	600,266
2032	660,293

As it is indicated above the effective demand for Distribution transformer in 2022 is 254,571 pcs.

This volume will increase to 660,293pcs in the year 2032.

2.2.2.3. Demand-Supply Gap Analysis

When we see the historical supply volume of Distribution transformer in Ethiopia there is no apparent trend in the growth. Because both the import and domestic production data are found to be erratic. Hence, it is found difficult to objectively forecast the future supply volume. Single exponential smoothing method was used, for forecasting purposes. A 2.5% growth rate, is also assumed for local production increase, for new as well as expansion projects for domestic manufacturers though most of the existing Distribution transformer factories.

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Table 5 Demand supply gap Analysis

Year	Domestic production in (in pcs)	Import in (kg)	Demand (in kg)	Excess demand(kg)
2022	1,500	55,741	254,571	197,330
2023	1,538	55,741	280,028	222,749
2024	1,576	55,741	308,031	250,714
2025	1,615	55,741	338,834	281,478
2026	1,656	55,741	372,717	315,320
2027	1,697	55,741	409,989	352,551
2028	1,740	55,741	450,988	393,507
2029	1,783	55,741	496,087	438,563
2030	1,828	55,741	545,696	488,127
2031	1,873	55,741	600,266	542,652
2032	1,920	55,741	660,293	602,632

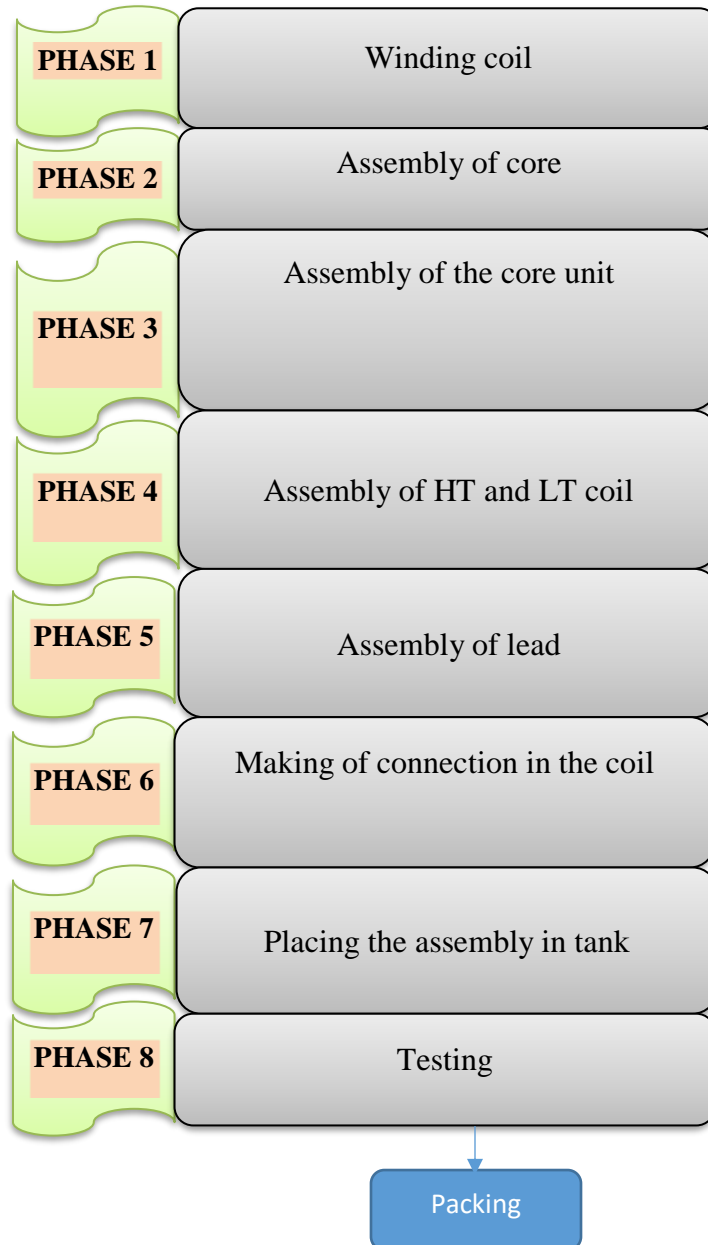
As shown in the above table, the project will have unsatisfied demand for the coming 10 years' period. The projected demand will continue to be positive until 2032. It can be clearly noted that there is a huge gap between supply and demand figures, which can really be taken as the apparent demand-supply gap for Distribution transformer in Ethiopia. This is really the actual unsatisfied demand as imports continue in the previous trend. The unsatisfied demand for Distribution transformer for the year 2032 estimated at 602,632 pcs.

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3. Technology and engineering

3.1. Technology

3.1.1. Transformer production process



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The manufacture of distribution Transformers can be sub-divided into following operations:

- (a) Assembly of the core unit H.T. & L.T. coils.
- (b) Assembly of leads and making of connections in the coils.
- (c) Placing the assembly in the tank.
- (d) Testing.
 - I) **First Stage:** The H.T. & L.T. coils are wound on the coil winding machines and assembled on the core limbs out of silicon steel sheet.
 - II) **Second Stage:** The connections of L.T. & H.T. coils are made and the assembly is put in a hot chamber of drying impregnation with insulating compound is carried out and the assembly is dried again.
 - III) **Third Stage:** the fittings and accessories are mounted on the M.S. Tank fabricated in the factory. The core coil assembly is fitted in the Tank and the Tank is then filled with oil.
 - IV) **Fourth Stage:** The transformer is tested in the testing section as per relevant IS: Specifications

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3.1.2. Environmental and social impact assessment of the project

Typically, any developmental projects also trigger a set of environmental and social impacts. These environmental and social due to development projects occur in different forms. An Environmental and Social Impact Assessment (ESIA) has to be carried out to study the potential environmental and social impacts due to the production distribution transformer. Potential environmental and social impacts due to the production of distribution transformer on attributes like air quality, noise, water quality, soil, flora, socio-economic, etc. have to be assessed as part of the ESIA study. Appropriate mitigation measures to help minimize/avoid impacts from the development have to be recommended in the study. The measures include avoidance measures, mitigation measures and environmental enhancement measures. For the purpose of including environmental costs, the costs of wastewater treatment plant and solid waste incineration systems are included in the cost of machinery and equipment. Social responsibility cost estimated to be 1% of fixed investment costs.

3.1.3. Production Capacity and Production Program

3.1.3.1. Plant capacity

The annual production capacity of the plant in full capacity is 1,000 pcs of distribution transformer. The production capacity is based on projected demand and realistic market share that could be captured. The production commences three shift and 260 working days a year. The production program does not include Sundays and national and public holidays. It was also considered that the plant would conduct annual maintenance on May when the supply of raw materials is low.

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3.1.3.2. Production program

The plant initially produces 70 % of its annual rated capacity bound to initial operating problems such as machine set up and marketing. The production capacity will increase by 10 % and attain its full capacity by the fourth year of its commencement.

Table 6 Production program

	Period		Start-up			Full Capacity	
	Capacity utilization		70%	80%	90%	100%	100%
	Project year		1	2	3	4	5
1	Distribution transformer	Pcs	700	800	900	1,000	1,000

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3.2. Engineering

3.2.1. Land, buildings and civil works

The required area (m²) and construction cost for the production facilities essential for the successful operation of the processing plant is shown in Table 7. A total area ready for the processing plant is 5,000m² out of which 2,300m² is to be covered by building while uncovered area of 2,700m² is left open for parking, storage of waste materials and future expansions. In order to estimate the land lease cost of the project profiles it is assumed that all the project will be located in different land level from level 1/1 to level 4/3, their current market lease price is from 39,073.31 birr per M² to 2,800.71 birr per M² respectively. Therefore, for the profile a land lease rate of birr 3,885 per M² have been taken, which is between the ranges.

The cost of construction of building should be appropriate to the size and expected profitability of business, costs of building generally differs by the type of construction materials used, the type of foundation, wall height and location. The current building cost for simple storage and processing room is from 1,800.00 Birr per m² to 25,000 Birr per m². The total construction cost of buildings and civil works, at a rate of Birr 20,000 per m² is estimated at Birr 76.35 million. Therefore, the total cost of land lease and construction of buildings and civil works is estimated at Birr 95.80 million.

The proposed plant layout comprises the following buildings and structures.

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Table 7 Building costs

S/No	Descriptions	Total area	Estimated cost per square meter (in Birr)	Total estimated cost (in Birr)
1	Raw materials store	1,000	20,000.00	20,000,000.00
2	Transformer production Room	1,000	20,000.00	20,000,000.00
3	Main product store	5,00	20,000.00	10,000,000.00
4	Laboratory room	200	20,000.00	4,000,000.00
5	packing materials store	500	20,000.00	10,000,000.00
6	Office and toilet	200	20,000.00	4,000,000.00
7	Canteen	160	20,000.00	3,200,000.00
8	Guard house	6	20,000.00	120,000.00
9	parking	600	2,000	1,200,000.00
10	Green area and for expansion	834	1,000	834,000.00
11	Fence	1,200		3,000,000.00
	TOTAL	5,000		76,354,000.00

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Table 8 Land lease period in Addis Abeba

Sector of development activity	Period of lease	Down payment
Education, health, culture and sports	90	10%
Industry (manufacturing)	70	10%
commerce	60	10%
For urban agriculture	15	10%
For others	60	10%

Sources: - city government of Addis Abeba land development and management bureau

Table 9 Land lease floor price in Addis Abeba

S/No	Land level	Current land lease floor price per M ²	Current lease price per M ² (Market price)
1	1/1	2,213.25	39,073.31
2	1/2	2,165.47	36,825.73
3	1/3	1,900.19	34,578.15
4	¼	1,552.93	31,119.21
5	1/5	1,531.91	29,096.45
6	2/1	1327.39	27,073.71
7	2/2	1,221.18	25,050.96
8	2/3	1,191.17	23,028.21
9	2/4	1,074.39	21,005.46
10	2/5	1,027.84	18,982.71
11	3/1	994.71	16,959.96
12	3/2	960.21	14,937.21
13	3/3	927.84	12,914.46
14	¾	904.77	10,891.71
15	3/5	873.74	8,868.96
16	4/1	814.06	6,846.21
17	4/2	786.45	4,823.46
18	4/3	748.80	2,800.71

Sources: - city government of Addis Abeba land development and management bureau

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

3.2.2. Machinery and equipment

The main plant and machinery consists Production Unit, Testing Equipment, Maintenance Machinery. Major part of the machinery will be imported.

Table 10 Lists of Equipment Requirements for distribution transformer manufacturing

S/No	Particulars	Quantity	Total Amount
	<u>Production Unit</u>		
1	Guillotine Shear Machine complete with motors and accessories	1	25,000,000.00
2	Sheet Bending Press 150 Ton cap. Heavy Duty complete with motor	1	
3	Welding Transformers 300 Amps	1	
4	Welding Equipment Generator type 400 Amps	1	
5	Tube bending Machine gear type bending size ½“ to 2’ X 16 SWG	1	
6	Flexible shaft grinder 8” wheel diameter	2	
7	Gas Cutting Set	1	
8	Power Hacksaw	1	
9	Drilling Machine Pillar Type Cap.1½”	1	
10	Radial Drill Machine Bench Type ½“ Cap.	1	
11	Drilling Machine Bench type ½“Cap.	2	
12	Portable Drill Heavy Duty ½“	2	
13	Spray Painting Equipment Complete with Compressor, Spray Gun etc. Heavy Duty	1	
14	HT Automatic Coil Winding Machine 14 SWZ to 30 SWZ. Complete with accessories		
15	L.T. Coil Winding Machines, Heavy suitable for coil size up to 25’ complete with counter		
16	Paper Cutting Machine		
17	Electric Baking Oven temp. range up to 105C. Size 96”X72”x72”		

**PROJECT PROFILE ON DISTRIBUTION TRANSFORMER
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18	Vacuum Impregnation Plant with Tank size 45'X56"		
19	Oil Filtering Equipment's 250 GPH		

(b)	Testing Equipment such as -	Total Amount
	<ul style="list-style-type: none"> ✓ H.V. Testing Transformers with Penal 66 KV/230V. 10 KVA ✓ Double frequency Generator ✓ Variable Transformer, 30 Amps 3 phase 50 HZ ✓ Turn Ratio Test Kit ✓ Power Factor Meter ✓ Oil Test Kit ✓ Kelvin Bridge ✓ Wheat Stone Bridge ✓ Control Personnel with standard Voltmeter, Watt Meter, Ammeters, Current, Transformers, P.T. frequency Meter etc. ✓ Tong Tester ✓ AVO Meters ✓ Meggar 500 V. 1000 Volts ✓ Variac Single Phase 5 Amps 	LUMP SUM
	Total:	7,950,000.00

(c)	Maintenance Machinery	Total Amount
1	<ul style="list-style-type: none"> ✓ Lathe geared 6 feet ✓ Shaper 24" Stroke ✓ D.F. Grinder Wheel diameter 12" 	
	Total:	1,500,000.00
(d)	Other Fixed Assets:	Total Amount

**PROJECT PROFILE ON DISTRIBUTION TRANSFORMER
MANUFACTURING**

1	<ul style="list-style-type: none"> ✓ Oil Storage Tank ✓ Installation and Electrification charges @ 10% ✓ Hand Tools jigs, dies Fixtures etc. ✓ Office furniture and Equipment's, Work Benches, Rocks etc. 	
	Total:	2,500,000.00

(e)	Pollution control Equipment, if required: Exhaust Fan		954,000.00
(f)	Energy Conservation Facilities/ Equipment, if used: Furnace should have heat resistant fire bricks to avoid wastage of heat energy CFT Tubes Fluorescent tubes with electronic chokes		965,000.00
(g)	Cost of Transformers & Electrification(If load more than 15KW)		2,385,000.00
	Total cost of Machinery & Equipment's (A+B+C+D+E+F+G)		41,254,000.00

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING




3.2.3. Lists of machinery suppliers

RAJASTHAN POWERGEN TRANSFORMER PVT. LTD.

Registered Works & Office

Khasra No. 911 – 914,
Karola – Bhinmal Road, Karola, Sanchore,
Rajasthan – 343041 (INDIA)

For further business information, or queries, feel free to call or email us on given below.

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8376-8429

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

4. Distribution transformer organizational structure

The selection of structure of the envisaged project is made based on the existing structure of manufacturing plants operating in the country, the capacity, complexity and technology mix of the plant. Organizational structure principles such as specialization, coordination, and departmentalization are also considered for design of structure that best suits the envisaged project

4.1. Manpower Requirement and Estimated Annual manpower costs

Table 11 Annual manpower costs

s/no	Description	Number of persons	Salary in birr	
			monthly	annually
1	General manager	1	45,000.00	540,000.00
2	executive secretary	1	15,000.00	180,000.00
3	Manager- admin. and finance	1	25,000.00	300,000.00
4	assistance manager- finance	1	20,000.00	240,000.00
5	accountant	1	15,000.00	180,000.00
6	cashier	1	10,000.00	120,000.00
7	personnel and general service	1	10,000.00	120,000.00
8	guards	5	3,000.00	180,000.00
9	driver ii	4	10,000.00	160,000.00
10	manager-production and technical	1	20,000.00	240,000.00
11	production clerk	1	4,000.00	48,000.00
12	chief quality controller	3	12,000.00	432,000.00
13	chief miller	1	10,000.00	120,000.00
14	machine operator	3	5,000.00	180,000.00
15	assistant machine operator	3	3,000.00	108,000.00
16	senior mechanics	3	12,000.00	432,000.00
17	senior electrician	3	12,000.00	432,000.00
18	store keeper	1	10,000.00	120,000.00
19	manager- commercial	1	20,000.00	240,000.00
20	purchaser	1	10,000.00	120,000.00
21	sales- manager	1	15,000.00	180,000.00
	total	38		4,672,000.00

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5. Financial Analysis

5.1. General

The financial analysis evaluation, under consideration has been carried out for Distribution Transformer Manufacturing cost estimates of the envisaged factory are mainly consisted of capital investment as well as operating and maintenance costs. The capital investment costs include fixed investment costs (initial fixed investment and replacement costs) and working capital, while operating and maintenance costs comprise current expenses related to material inputs, labour, utility, repair and maintenance costs, spare parts, Overheads, Sales and distribution, interest and depreciation expenses.

The financial analysis and evaluation has been conducted taking assumptions:

1. It is assumed that about 70% of the total capital investment costs including the working capital requirement could be covered through development bank loans of short and long-term credits. The remaining balance 30% will be covered by equity capital contribution of the project owner.
2. Even though the project might secure loans under different term and conditions as well as from different financial sources, for the purpose of calculation of debt service scheduling, the current development bank of Ethiopia credit terms and conditions have been used. Consequently. It is assumed that the project will secure loan facility on the basis of 11.5 % annual interest rate, and 10 years' equal installments.
3. Even though the estimated project production life is more 10 years, the financial analysis has been undertaken for a period interval covering the first 10 years only, during which time

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

most of the capital assets are assumed to be depreciated, debts recovered and pay-back period accomplished.

4. It is assumed that the project will be start up production activity at 70 % capacity. During years 2 & year 3 the projects is anticipated to gradually increase capacity utilization to reach 100% in year 4. Therefore, starting from year 4 the project will be operational at full capacity.
5. For the project under reference promotional, sales and distribution expenses have been estimated at 3% of the sales revenue.
6. Maintenance and spare parts costs are 1.5% of the fixed investment costs.

5.2. Initial Fixed investment costs

Table 12 Initial Fixed investment costs

S/No	Fixed investment type	Unit of measurement	Quantity	Unit price	Total Amount	Remarks
1	Land	Square meter	5,000	3,885 birr/M ²	19,425,000.00	The period of land lease will be 70 years and 10% of the total lease amount will be paid in the first year
2	Buildings and civil works	Square meter	5,100	lump sum	76,354,000.00	
	Sub total				95,779,000.00	
3	Machineries	set	2	Lump sum	41,254,000.00	
4	Transformer	set	1	Lump sum	2,000,000.00	
5	Weighbridge	Set	1	Lump sum	4,000,000.00	
6	Truck and vehicles	Pcs	2	Lump sum	6,000,000.00	
7	Furniture and fixture	Pcs			500,000.00	
	SUB TOTAL				53,754,000.00	
	Fixed capital investment costs				149,533,000.00	
8	pre-operational expenses				2,000,000.00	
	Working capital				15,882,000.00	
	TOTAL INVESTMENT COSTS				167,415,000.00	

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5.3. Working capital

Working capital is the financial means required for smooth operation and maintenance of a project mathematically, it is a difference between current assets and current liabilities. In the particular case of the project under consideration, the current assets comprise receivables, inventories (local and imported material inputs, spare parts, work in progress, and products ready for delivery) and cash in hand, while current liabilities comprise accounts payable to creditors.

5.4. Project Financing

Fixed capital investment costs and working capital requirements are assumed to be financed by equity capital of the owner and through loans of short and long-term credits.

As stated earlier even though the company obtains loans under different terms and condition as well as from different sources, for the purpose of calculation of debt service scheduling the current development bank of Ethiopia credit terms and conditions have been used. Accordingly it is assumed that the company will be able to obtain loan 70% of the total investment costs for construction of different buildings (about 76.35 million Birr) for purchase of machineries (about 41.25 million Birr), for purchase of truck and vehicles (about 6 million Birr), for working capital 15.88 million and for purchase of office furniture and pre operation expense which are 0.5million and 2 million respectively will be covered through bank loans that will have to be repaid back within 10 years, during which time interest will be paid on the loan. The remaining balance that of the total investment costs will be expected to be covered by equity contribution of the project promoter.

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.5. Production costs

As it is depicted in Annex Table 18 major categories of the total production costs are assembled into the following cost elements.

5.5.1. Material inputs

In the project under study the basic material inputs are sheet metal, copper, transformer oil insulating materials and etc. Therefore, the current prevailing local and international market prices have been used for estimation of material inputs costs. At full capacity operation the material inputs costs are estimated at Birr 100 million per annum.

Table 13 Raw materials input in Birr for 1000pcs ‘000’

	Period	U/M	Quantity at full Capacity	Unit price	Start-up			Full Capacity
	Capacity utilization				70% Year 1	80% Year 2	90% Year 3	100% Year 4
1	M.S.B.P. Sheet (8 to 16 SWG)	MT	90	45,000	2,835	3,240	3,645	4,050
2	CRGO Lamination (Transformer grade)	MT	204	150,000	21,420	24,480	27,540	30,600
3	DPC Aluminum Strip	MT	30	247,500	5,198	5,940	6,683	7,425
4	Super Enamelled DPC winding wire	MT	48	712,500	23,940	27,360	30,780	34,200
5	Transformer Oil	Liter	204,000	75	10,710	12,240	13,770	15,300
6	M.S. Channels 75X4mm to 100X50mm	MT	48	42,750	1,436	1,642	1,847	2,052
7	M.S. Flat (25X6mm to 75X12mm) MS Angles (35X35 to 75x75x7mm)	MT	30	45,000	945	1,080	1,215	1,350
8	Insulating Materials viz; Graft paper, PP paper, Press Board, Bamelite Sheet, PVC Cotton Tape etc.	MT	30	45,000	945	1,080	1,215	1,350
9	Hardware Materials, M.S. Nuts, Bolts, G.I. Pipe, Valve etc.	MT	18	55,500	699	799	899	999
10	HV/LV bushings (Set of 9 Nos.)	Set	1,500	1,200	1,260	1,440	1,620	1,800
11	Paint/Varnish/Thinner etc.	liter	3,900	180	491	562	632	702
12	Copper/Brass Fittings viz Nuts bolts	set	6,600	75	347	396	446	495
13	Radiator/Radiator tubes	pcs	3,000	75	158	180	203	225
	Total				70,384	80,438	90,493	100,548

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.5.2. Utilities

In estimating costs of utility expenses for operation and maintenance of the project, Costs of fuel, oil and lubricant, electricity and water consumptions have been taken in to consideration, the rates of which have been estimated on the basis of the proposed capacity utilization program of the project and at the current official charging rates. At full capacity operation the project will have the following utility expense per annum which amounts to Birr 4.66million.

Table 14 Utilities of the factory'000''Birr

Utility''000''Birr		Start-up			Full Capacity
		70 %	80 %	90 %	100 %
Capacity utilization		1	2	3	4
Project year					
Item description	Unit of measurement				
Fuel					
Gasoline for service vehicle	100km*260days*37Birr/LIT*8km/Li	84.18	96.20	108.1	120.25
Gasoline for transport truck	(200km*300days*37Birr/LIT*5km/Li)*3	932	1,066	1,199	1,332
Sub-Total		1016	1162	1307	1452
Change of oil and lubricant	10% of the fuel consumption	102	116	131	145
Sub-Total		1,118	1,278	1,438	1,597
Electricity	260days*24 hrs*600kwh* 0.69Birr/kwh	1,808	2,066	2,325	2,583
Sub- Total		1,808	2,066	2,325	2,583
Water	365days*100m ³ /day*10 Birr/m ³	255.50	292.00	328.50	365.00
Sub -Total		255.50	292.00	328.50	365.00
Telecommunication					
Telephone	5 lines* 500Birr/month/line+18Birr/line/month	31.08	31.08	31.08	31.08
Mobile	5 lines*500 Birr/month/line	30.00	30.00	30.00	30.00
Fax	2line*1,000Birr/month + 17 Birr/line/month	24.40	24.40	24.40	24.40
Internet	2,500 Birr/month	30.00	30.00	30.00	30.00
Sub-Total		115.48	115.48	115.48	115.48
TOTAL		<u>3,297.00</u>	<u>3,752.00</u>	<u>4,207.00</u>	<u>4,661.00</u>

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.5.3. Repair and maintenance

In the expenses under this title have been considered cost estimates required for annual repair and maintenance works including spare parts expenses. These costs include the annual repair expenses of structures and civil works as well as repair and maintenance expenses of machinery and equipment including accessory and general service facilities. The repair and maintenance and spare parts costs have been assumed to be (1.5% of fixed costs and spare part costs).

5.5.4. Salaries and wages

The costs of salaries have been calculated in accordance with the manning list proposed under the “organization and Management” section of this study. In the estimation of salaries and wages, the official minimum wage has been taken in to account. At full capacity operation the costs of salaries and wages will amount to Birr 4.67 Million.

5.5.5. Over heads

In the expenses under this title have been included land and building taxes, buildings, vehicles as well as machinery and equipment insurance, vehicles annual inspection; postage, telephone and e. mail, stationery and office supplies; printing and copying; audit fee; cash indemnity etc. The overhead costs and divided in to direct overheads and administration overheads.

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

Table 15 Overhead costs

Direct Overhead"000" Birr		Year 1	Year 2	Year 3	Year 4
Annual land lease Payment		2,775	2,775	2,775	2,775
Insurance					
Building and Civil works	0.10%	76	76	76	76
Machinery and Equipment	0.20%	83	83	83	83
Motor vehicle and Truck	1%	60.00	60.00	60.00	60.00
Vehicles annual inspection and registration	25,000 Birr per annum per vehicle	50.00	50.00	50.00	50.00
Work cloth	Two times per annum per workers at 800 Birr	78.40	78.40	78.40	78.40
Cleaning and sanitation	An estimate of 300 Birr/day	78.00	78.00	78.00	78.00
Sub Total		3,200	3,200	3,200	3,200
Administration Overhead "000' Birr					
Audit fee	40,000 Birr per annum	40.00	40.00	40.00	40.00
Office cleaning and sanitation	2,000 Birr per month	24.00	24.00	24.00	24.00
Stationery and office supplies	2,000 Birr per month	20.00	20.00	20.00	20.00
Printing and Copy	2,000 Birr per month	24.00	24.00	24.00	24.00
Sub Total		108.00	108.00	108.00	108.00
GRAND TOTAL		3,308	3,308	3,308	3,308

5.5.6. Financial costs

As it has been outlined earlier under "project Financing" the current Development Bank of Ethiopia credit terms and conditions for newly establishing projects have been used to compute the financial costs, estimated to be incurred in connection with that of the total investment costs assumed to be covered through loan financing. The amount of the loan capital to be obtained and the financial costs to be incurred thereof have been determined depending on the amount of fixed investment cost and pre-production expenses.

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.5.7. Depreciation

Depreciation charges should be taken in to account as part of the total production costs in order to calculate the total production costs, the net working capital and the gross or net-profit. For the given project under reference, the fixed assets and the pre-production capital expenditures have been depreciated and amortized respectively on “a straight line” depreciation method basis using the following rates of the original acquisition costs of the assets:

The rationale uses for the estimation of the depreciation and the amortization rates is based on the expected service life of the assets and repayment capacity of the project under consideration. Based on the above charging rates and consideration of the above facts, the total annual depreciation cost at full capacity operation have been estimated at Birr 12.40 million.

Table 16 Depreciation in Birr"000"

Period			Start-up			
			70 %	80 %	90 %	100 %
Capacity utilization			70 %	80 %	90 %	100 %
Project year			1	2	3	4
Item description	Original Value					
Structure and civil works	76,354,000.00	5% of original value	3,818.00	3,818.00	3,818.00	3,818.00
Machinery and equipment	41,254,000.00	15 % of original value	6,188.00	6,188.00	6,188.00	6,188.00
Transformer	2,000,000.00	15 % of original value	300.00	300.00	300.00	300.00
Motor vehicles and trucks	6,000,000.00	15 % of original value	900.00	900.00	900.00	900.00
Weighbridge	4,000,000.00	15 % of original value	600.00	600.00	600.00	600.00
Office equipment and furniture	500,000.00	20% of original value	100.00	100.00	100.00	100.00
Pre-operation expense	2,000,000.00	25% of original value	500.00	500.00	500.00	500.00
Total			12,406	12,406	12,406	12,406

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.6. Break Even point and ROI

5.6.1. Break Even point (BEP)

Three kinds of break-even point

- A. BEP Sales Revenue(BR)
- B. BEP production (Volume)
- C. BEP Percentage (%)

A. Break-even point(BEP) Sales

To determine BEP Annual Sales, multiply annual sales found in income statement by the annual fixed cost, and divided by Annual sales less Annual variable cost.

$$\text{BEP (sales)} = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}}$$

Annual sales = 245,000,000 Birr

Unit selling price = 350,000 Birr/kg

$$\text{BEP (sales)} = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}} = \frac{245,000,000 \times 33,862,000}{245,000,000 - 82,983,000}$$

BEP (Sales) = 51,205,676 Birr

B. BEP production

To determine BEP production volume, divided BEP sales by the unit selling price (USP)

$$\text{BEP production} = 51,205,676 / 350,000 = 146$$

$$\begin{aligned} \text{c. BEP percentage} &= \frac{\text{Annual fixed costs} \times 100\%}{\text{Annual sales} - \text{Annual variables costs}} \\ &= \frac{33,862,000 \times 100\%}{245,000,000 - 82,983,000} \\ &= 21\% \end{aligned}$$

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.6.2. Return on investment

Return on investment = Net profit /Total capital requirement

$$= 83,301,000/167,415,000$$

$$= 50\%$$

The return on owners' investment (ROOI)

= Annual net profit /owners' investment

$$= 83,301,000/50,224,500$$

$$= 166\%$$

5.7. Project costs

Project capital investment costs are the sum of fixed capital investment (fixed investment plus pre-production capital expenses) and net working capital at full capacity, with fixed capital constituting the resources required for constructions and civil works, importation and installation of production machinery and equipment and general service facilities, whereas, the working capital corresponding to the resources needed for operation of the project totally and partially.

As it has been revealed in Annex Table 18 the total annual operating costs excluding depreciation and interest are estimated to range from 90.96 million Birr in year 1 to 125.64 million Birr in year 4 and then after remain constant for the rest of the project life.

The total annual production costs including depreciation and interest increase from 116 million Birr in year 1 to 148 million Birr in year 4 then starts declining until it reaches 131 million Birr in year 10.

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

5.8. Project benefits

For financial analysis and evaluation of the given project, the current material input price, and packing materials buying price and final packed Distribution transformer price at the project gate has been taken as a basis. As it has been stated earlier the project is envisaged to reach full capacity operation four years after commencement of production activities which are assumed to begin with 70% of the estimated total capacity.

At full capacity operation the project is envisaged to have the following revenue components.

Table 17 Source of revenue in Birr"000"

	Period			Start-up			Full Capacity	
				70%	80%	90%	100%	100%
	Capacity utilization							
	Project year			1	2	3	4	5
	Product type		Unit price					
1	Distribution transformer	PCS	350,000	245,000	280,000	315,000	350,000	350,000
	Total			245,000	280,000	315,000	350,000	350,000

Thus, according to the computation in Annex Table 20 and Annex Table 22, the net income and cash flow statements analysis revealed that at full capacity operation the project will generate a total income (gross revenue) amounting to 350 million Birr per annum. The corresponding Annex Table 20 of “Net Income Statement” shows a steady growth of gross profit starting from 128 million Birr in year 1 reaching the peak of 218 million Birr in year 10. In its 10 years of manufacturing activities, the project is expected to generate a total net profit of 1.2 billion Birr and contribute 673 million Birr to the government treasury in form of 35% income tax.

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

According to the current investment Law, machinery and equipment are anticipated to be imported duty- free. The liquidity position of the project is very strong. The corresponding Annex Table 22 of “Cash Flow Statement” shows the positive cumulative cash balance of Birr 1.22 billion and the project will not face any cash shortage throughout its production life.

The computation of the pay-back period as depicted in Annex table 27 indicates that the project will be able to reimburse itself from its net cash-income within two years after commencement of production activities, the period which is considered to be very good for the project of this nature.

In Annex Table 28 of the Benefit-cost ratio and Net present value (NPV) have been calculated at 17% discount factor (D.F) for 10 years of the project activity. Accordingly, the project has NPV of 790 million Birr at 17%D.F. and the benefit-cost ratio of 2.16 at 17% D.F. These results are most appreciable, especially, when related to the external capital borrowing interest rate which ranges from 8.50% to 18.5 % for newly establishing projects.

The project under study when implemented will have BEP at about 21% operation of the estimated full capacity. In addition to this, finally, summary of financial efficiency tests have been conducted in Annex table 26, Accordingly, all efficiency ratios indicated positive trends and consequently, it can be inferred that the project can operate in the frame work of free market mechanism on commercially and financially viable basis and is remunerative.

ANNEXES

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX II

CALCULATION OF ANNUAL PRODUCTION COSTS

Table 18 Annual total production costs''000''

Period	Start-up			Full capacity						
	70 %	80 %	90 %	100 %	100 %					
Project Year	1	2	3	4	5	6	7	8	9	10
Cost category										
I. Material inputs	70,384	80,438	90,493	100,548	100,548	100,548	100,548	100,548	100,548	100,548
II. Labor	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672	4,672
III. Utility	3,297	3,752	4,207	4,661	4,661	4,661	4,661	4,661	4,661	4,661
IV. Repair and Maintenance and spare parts (1.5 % of fixed costs)	1,952	1,952	1,952	1,952	1,952	1,952	1,952	1,952	1,952	1,952
VI Direct overheads	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
A. Direct Production costs	83,505	94,014	104,524	115,033	115,033	115,033	115,033	115,033	115,033	115,033
VII. Administration over head	108	108	108	108	108	108	108	108	108	108
VIII. Marketing and Promotional expense 3 % of sales revenue	7,350	8,400	9,450	10,500	10,500	10,500	10,500	10,500	10,500	10,500
B. Operating costs	90,963	102,522	114,082	125,641	125,641	125,641	125,641	125,641	125,641	125,641
Interest	13,476	12,690	11,812	10,834	9,744	8,528	7,172	5,661	3,975	2,095
Depreciation	12,406	12,406	12,406	12,406	11,906	11,806	9,146	3,818	3,818	3,818
C. Total production costs	116,845	127,618	138,300	148,881	147,291	145,975	141,959	135,120	133,434	131,554

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX IV CALCULATION OF WORKING CAPITAL REQUIREMENTS

- I. Minimum requirement of current assets and liabilities
- A. Accounts receivable: 30 days at total production costs minus depreciation and interest
 - B. Inventory
 - 1. Material inputs: 30days
 - 2. Spare parts : 90 days
 - 3. Work under process: two days at direct costs
 - 4. Product ready for delivery: 8 days at direct costs plus administration overheads
 - C. Cash on hand : 90 days
 - D. Accounts payable 52 days for material inputs and utilities

ii. Working capital requirement

Table 19 Calculation of working capital

Cost category	Minimum Days of coverage	Coeff-icent of turnover	Project year									
			Start up			Full capacity						
			1	2	3	4	5	6	7	8	9	10
I. Current asset												
A. A/R	26	10	9,096	10,252	11,408	12,564	12,564	12,564	12,564	12,564	12,564	12,564
B. Inventory												
1. Material inputs	26	10	7,038	8,044	9,049	10,055	10,055	10,055	10,055	10,055	10,055	10,055
2. Spare parts	90	4	488	488	488	488	488	488	488	488	488	488
3. Work under process	2	130	642	723	804	885	885	885	885	885	885	885
4. Product ready for delivery	8	32.5	2,677	3,001	3,324	3,647	3,647	3,647	3,647	3,647	3,647	3,647
C. Cash on hand			3,307	3,421	3,535	3,648	3,648	3,648	3,648	3,648	3,648	3,648
D. Current assets			23,250	25,929	28,608	31,287	31,287	31,287	31,287	31,287	31,287	31,287
II. Current liabilities												
A. A/p	26	10	7,368	8,419	9,470	10,521	10,521	10,521	10,521	10,521	10,521	10,521
III. Working capital												
A. Net working capital			15,882	17,510	19,138	20,767	20,767	20,767	20,767	20,767	20,767	20,767
B. Increasing in working capital			15,882	1,628	1,628	1,628	0	0	0	0	0	0

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX VI

PROJECTED NET INCOME STATEMENT

Table 20 Projected Net income statement "000"

Period	Start up			Full capacity						
	70 %	80 %	90 %	100 %						
Project year	1	2	3	4	5	6	7	8	9	10
Item description										
Product sales revenue	245,000	280,000	315,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000
Less total production costs	116,845	127,618	138,300	148,881	147,291	145,975	141,959	135,120	133,434	131,554
Gross profit	128,155	152,382	176,700	201,119	202,709	204,025	208,041	214,880	216,566	218,446
Tax	44,854	53,334	61,845	70,392	70,948	71,409	72,814	75,208	75,798	76,456
Net profit	83,301	99,048	114,855	130,727	131,761	132,616	135,227	139,672	140,768	141,990
Accumulated undistributed profit	83,301	182,349	297,204	427,931	559,692	692,309	827,535	967,207	1,107,975	1,249,965

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX VII DEBT SERVICE SCHEDULE AND COMPUTATION PAYMENT OF EQUAL ANNUAL INSTALLMENTS

Table 21 Debt services schedule and computation

Item description	Project year									
	1	2	3	4	5	6	7	8	9	10
A. Investment and working capital										
1. Investment										
2. Increment working capital										
Total										
B. Loan receipts and balances										
1. Loan receipts	117,190									
2. Outstanding balance at end of year										
a. First year loan	117,190	110,721	102,721	94,216	84,732	74,159	62,369	49,223	34,565	18,222
Total										
A. Debt service										
1. First year Loan										
a. Interest	13,476	12,690	11,812	10,834	9,744	8,528	7,172	5,661	3,975	2,095
b. Repayment of principal	8,841	7,628	8,505	9,483	10,574	11,790	13,146	14,658	16,343	18,222

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX VIII CASH-FLOW STATEMENT FOR FINANCIAL PLANING

Table 22 Projected Cash flow statement

Period	Start up				Full capacity					
	70%	80%	90%	100%						
Project year	1	2	3	4	5	6	7	8	9	10
Item description										
A. Cash - inflow	419,783	282,679	317,679	352,679	350,000	350,000	350,000	350,000	350,000	350,000
1. Financial resource (total)	174,783	2,679	2,679	2,679						
2. Sales revenue	245,000	280,000	315,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000
B. Cash – outflow	332,917	178,853	198,923	219,029	216,907	217,368	218,773	221,168	221,757	222,414
1. Total assets schedule including replacement	174,783	2,679	2,679	2,679						
2. Operating costs	90,963	102,522	114,082	125,641	125,641	125,641	125,641	125,641	125,641	125,641
3. Debt service (total)										
a. Interest	13,476	12,690	11,812	10,834	9,744	8,528	7,172	5,661	3,975	2,095
b. Repayment	8,841	7,628	8,505	9,483	10,574	11,790	13,146	14,658	16,343	18,222
4. Tax	44,854	53,334	61,845	70,392	70,948	71,409	72,814	75,208	75,798	76,456
C. Surplus (Deficit)	86,866	103,826	118,756	133,650	133,093	132,632	131,227	128,832	128,243	127,586
D. Cumulative cash balance	86,866	190,692	309,448	443,098	576,191	708,823	840,050	968,882	1,097,125	1,224,711

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX XII TOTAL INVESTMENT COSTS

Table 23 Total investment costs''000''

Period	Start up			Full capacity							
Project year	1	2	3	4	5	6	7	8	9	10	11
Investment Category											
1. Fixed investment costs											
a. Initial fixed investment costs	149,533										
b. Replacement											
2. Pre-operational capital expenditure	2,000										
3. Working capital increase	15,882	1,628	1,628	1,628							
Total investment costs	167,415	1,628	1,628	1,628							

ANNEX XIII TOTAL ASSETS

Table 24 Total Assets

Period	Start up			Full capacity							
Project year	1	2	3	4	5	6	7	8	9	10	11
Investment Category											
1. Fixed investment costs											
c. Initial fixed investment costs	149,533										
❖ Cost of land											
d. Replacement											
2. Pre-operational capital expenditure	2,000										
3. Current assets increase	23,250	2,679	2,679	2,679							
Total assets	174,783	2,679	2,679	2,679							

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX XIV SOURCES OF FINANCE

Table 25 Sources of finance

Period	Start up			Full capacity							
	1	2	3	4	5	6	7	8	9	10	Total
Sources of finance											
1. Equity capital	50,223	1,628	1,628	1,628							
2. Loan capital	117,191										
3. Current liabilities	7,368	1,051	1,051	1,051							
Total finance	174,782	2,679	2,679	2,679							

ANNEX XI SUMMARY OF FINANCIAL EFFECIENCY TESTS

Table 26 Summary of financial efficiency tests

Project year	Project year									
	1	2	3	4	5	6	7	8	9	10
Capacity utilization	70%	80%	90%	100%						
Financial ratio in %										
1. Gross profit : Revenue	52%	54%	56%	57%	58%	58%	59%	61%	62%	62%
2. Net profit : Revenue	34%	35%	36%	37%	38%	38%	39%	40%	40%	41%
3. Net profit : initial investment	50%	59%	67%	76%	76%	77%	78%	81%	82%	82%
4. Net profit : Equity	166%	191%	215%	237%	239%	241%	245%	253%	255%	258%
5. Gross profit : Initial investment	77%	90%	104%	117%	118%	118%	121%	125%	126%	127%
6. Operating costs : Revenue	37%	37%	36%	36%	36%	36%	36%	36%	36%	36%

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX XV CALCULATIONS OF PAYBACK PERIOD

Table 27 Calculation of payback period”000”

Year	Amount Paid Back			Total investment	End of year
	Net Profit	Depreciation	Total		
1	83,301	12,406	95,707	167,415	-71,708
2	99,048	12,406	111,454	1,628	+38,118

PROJECT PROFILE ON DISTRIBUTION TRANSFORMER MANUFACTURING

ANNEX XVI CALCULATIONS OF NET PRESENT VALUE AT 17% D.F.

Table 28 Calculation of NPV at 17% D.F.

Project year	Gross Revenue	1/(1+i) ⁿ At 17%	Present value at 17%	Project costs			
				Total investment	Operating costs	Total	Present value at 17%
1	245,000	0.854701	209,402	167,415	90,963	258,378	220,836
2	280,000	0.730514	204,544	1,628	102,522	104,150	76,083
3	315,000	0.624371	196,677	1,628	114,082	115,710	72,246
4	350,000	0.53365	186,778	1,628	125,641	127,269	67,917
5	350,000	0.456111	159,639		125,641	125,641	57,306
6	350,000	0.389839	136,444		125,641	125,641	48,980
7	350,000	0.333195	116,618		125,641	125,641	41,863
8	350,000	0.284782	99,674		125,641	125,641	35,780
9	350,000	0.243404	85,191		125,641	125,641	30,582
10	350,000	0.208037	72,813		125,641	125,641	26,138
Total			1,467,779				677,731

A. Benefit- cost ratio At 17% D.F. = 2.16

B. NPV At 17% D.F. = 790,048,000 Birr