



PROJECT PROFILE ON COLD STORAGE SERVICE



NOVEMBER 13, 2022

ADDIS ABEBA CITY ADMINISTRATION INVESTMENT COMMISSION
A.A

PROJECT PROFILE ON COLD STORAGE SERVICE

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I. Executive summary

This project profile is prepared to assess the viability of cold storage service business, 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 Cold storage service 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 Cold storage service. According to the latest data sourced from Ethiopian investment commission there are 4 companies were registered to invest on cold storage service business in Ethiopia and 2 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 materials input, infrastructure namely power, water, transport and telecom to easy access to international market. This service sector investment opportunity brief highlights the investors or Promoters of the project for the establishment of this service delivery. Accordingly, based on the market study and other considerations 4 cold storage rooms (1,500 M² each) with the holding capacity of 25,000 quintals each are considered for this project profile.

The total investment capital including establishing the factory is Birr 1262,982 million. Out of the total investment capital, the owners will cover Birr 78.89 million (30 %) while the remaining balances amounting to Birr 184.08 million (70 %) will be secured from bank in the form of term loan.

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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 28.06 Million in the first year to Birr 40.37 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 420.45 million. 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 208.75 million Birr at 17%D.F. and the benefit-cost ratio of 1.70 at 17% D.F.

Therefore, from the aforementioned overall market technical and financial analysis we can conclude that the cold storage service deliver business is a viable and worthwhile.

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1. BACKGROUND INFORMATION

1.1 Introduction

The objective of this profile is primarily to facilitate potential entrepreneurs in project identification for investment. The project profile may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management. The purpose of this document is to facilitate potential investors in **Cold Storage** business by providing them with a general understanding of the business with the intention of supporting potential investors in crucial investment decisions.

In compiling the report, information has been compiled by visiting the existing cold storage service provider and review of technical documents about the cold storage services.

Presently, in spite of high demand and its crucial importance, number of cold storage service providers in Addis Ababa city is very low compared to the existing demand. Increase in coverage of cold storage service is important to the city present and future demand. In Addis Ababa, the demand for cold storage services are expected to increase considerably in the next few decades as a result of increased population growth, urbanization, and increasing income levels. Therefore, in a city like Addis Ababa, it is important to identify gaps and potential for cold storage services.

1.2 Product Description and Application

All fruits and vegetables require specialized post-harvest treatment, appropriate temperature and relative humidity for their storage. Establishment of cold storage provides refrigerated storage and preservation facilities for different fruits, vegetables as well as flowers. Because of technology

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advancements and logistic strategies, the cold storage of perishable items has become an important stage in the distribution between manufacturers / processors and retail locations. The cold storage will ensure the increased availability and improved quality of high value perishable fruits and vegetables for both export and local sale, which would otherwise perish or deteriorate.

This project is primarily designed for storing of vegetables , fruits and fish and other perishable foods. The major clientele of this business will be the local traders, export houses and growers of fresh fruits and vegetables. Storage capacity utilization of different fruits and vegetable will be primarily determined on seasonal basis; however, this facility also aims to cater the off-season fruits and vegetables storage requirements of the traders. The unit will render storage facility services to fruit and vegetable traders (both local and exporter) and growers on market rates

The cold storage prevents the spoilage of perishable commodities like Potato, Apple & mangoes, etc. and making them available off-season and in places where they are harvested. This also serves the dual purposes: the growers of the perishable produce don't need to sell out their produce in hurry at throwaway price and protect the nation from shortage of commodities due to spoilage of food during off season.

The proposed project contains racking system build up by using good quality steel and wooden logs. These racks provide space for placing different types of vegetables and fruits. Generally, potatoes / vegetables are stored in bags, whereas fruits are in crates.

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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 901'48''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).

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

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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 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

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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.

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.

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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.

1.4.1. The city benefit from the investment

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

- Employment opportunity

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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.

1.5. Why are cold storage businesses required?

Around the globe, the wastage of fresh fruits and vegetables is quite high. Generally, countries which have higher produce of food crops are the ones which hold the maximum share in wastage of food. Hence, in these countries, cold storage is quite necessary for extending the marketing period, shelf life, post-harvesting, avoiding gluten, and reducing transporting bottleneck during the higher production of food items and maintaining the product quality.

Additionally, cold storages are also important in decreasing perishable commodity wastage. Further, it helps offer remunerative costs to farmers and make farm products readily available to consumers in fresh condition at affordable and competitive prices. Demand for packaged and processed foods and changing lifestyle habits are also creating the need for cold storage business globally.

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2. Marketing study

2.1 Market analysis

The current drive and emphasis by the government to expand cold storage services in the country requires adequate cold storage. Having undertaken a thorough and comprehensive research of the market we realized that there was a vast opportunity for cold storage services. 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 stakeholders to sustain the market. In so doing the owner intend to ensure that the service they provide are of good quality.

The growing trade of perishable products is also anticipated to help boost the demand for cold storage solutions over the next few years. The global cold storage market was worth USD 94 billion in 2018 and is expected to develop at a CAGR of 12.2% over the next 10 years. This strict regulation regulating the manufacturer and delivery of temperature sensitive goods have benefited the industry significantly.

An increasing need for temperature regulation to avoid possible health hazards is one of the major drivers of the cold storage industry. Increasing government funding for infrastructure construction to minimize post-harvest and processed food waste is generating opportunities for the cold storage sector to expand over the coming years. The market is likely to highlight untapped market opportunities as well as rising user awareness. The rise of foreign trade as a result of trade liberalization has fueled the cold storage industry. Trade liberalization, advance in transportation infrastructure and communication technology, and the rise of Multinational Corporation in the food retail sector have all led to increased globalization. It has boosted international trade in perishable

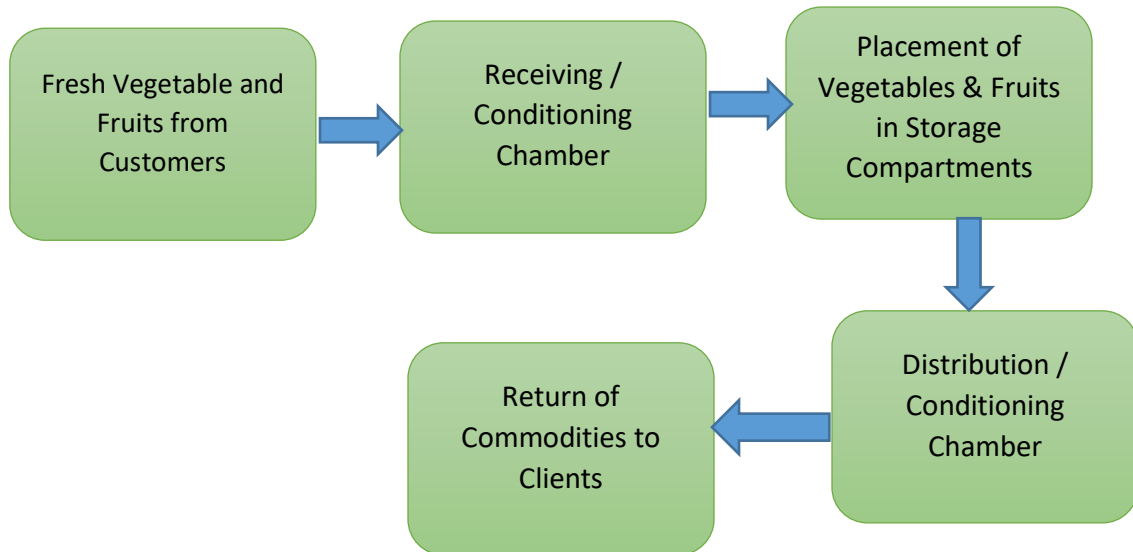
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foods like dairy and frozen desserts, fruits and vegetables, meat, fish, and seafood, as well as bakery and confectionery products.

3. Production Technology and engineering

3.1 Technology

3.1.1 Production process flow



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3.1.2 Environmental and Social Impact Assessment

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 of the envisaged cold storage services. Potential environmental and social 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. Social responsibility cost estimated to be 1% of fixed investment costs.

3.1.3 Service capacity

From the market study, it is observed that there is a great demand gap between the demand and supply of cold storage service. Therefore, taking in to account the market study and economic scale of service provision the envisaged cold storage service will have capacities as shown below :

3.1.4 Service program

At the initial stage of the provision period, the cold storage service would require some years to penetrate into the market and capture a significant market share. Therefore, in the first year of service the capacity utilization rate will be 70% and progressively increase by 10%. Full service provision shall be attained in the fourth year and then after. The proposed service provision program is shown in Table 1.

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Table 1: Service provision program in (m2)

S/No.	Service	Service year			
		1	2	3	4-10
1	Amount of cold storage (m2)	4,200	4,800	5,400	6,000

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 cold storage is shown in Table 2. A total area ready for the cold storage is 10,000m² out of which 9,300m² is to be covered by building while uncovered area of 700 m² is left open green area. 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 179.10 million. Therefore, the total cost of land lease and construction of buildings and civil works is estimated at Birr 182.98 million.

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The proposed plant layout comprises the following buildings and structures.

Table 2 Building costs

S/No	Descriptions	Total area M ²	Estimated cost per square meter (in Birr)	Total estimated cost (in Birr)
1	Four Cold Storage Rooms	6,000	20,000.00	120,000,000.00
2	Machine room	500	20,000.00	10,000,000.00
3	Warehouse for Goods Arrival and Packaging	2,000	20,000.00	40,000,000.00
4	Overhead Water Tank	100	20,000.00	2,000,000.00
5	Generator room	20	20,000.00	100,000.00
6	Power station room	20	20,000.00	100,000.00
7	Administration office	300	20,000.00	1,500,000.00
8	Production and technical office	200	20,000.00	1,000,000.00
9	Toilet and shower for female	40	20,000.00	100,000.00
10	Room for cloth changing for female	40	20,000.00	100,000.00
11	Toilet and shower for male	40	20,000.00	100,000.00
12	Room for cloth changing for male	40	20,000.00	100,000.00
13	Fence	LS		4,000,000.00
	Total Amount			179,100,000.00

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Table 3 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 4 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

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3.2.2. Machinery and equipment

Plant, machinery and equipment required for the proposed project are stated below:

Table 5 Lists of Equipment Requirements

Description	Unit of measure	Quantity	Unit prices	Total Costs
Ammonia Compressor (with Electric Motor, Gauges, Oil Separator, Liquid Receiver, Product Cooler, Section Separator, Electric Motor & Pipes Fitting)	Pcs	1	150,000.00	150,000.00
Cold Storage Insulation (Thermo pore)	Pcs	1	10,000,000.00	10,000,000.00
Hinged Doors Size (7* 4)	pcs	8	150,000.00	1,200,000.00
Other Supporting Equipment's for Machinery				
Wooden palate	Pcs	60,000	500	3,000,000.00
Steel Racks (180 tons)	Pcs	180	250,000.00	45,000,000.00
Refrigerant Ammonia and Lube	Pcs	1	1,000,000.00	1,000,000.00
GI Ducting for Four Rooms	Pcs	4	250,000.00	1,000,000.00
Generator set (350 KVA) Caterpillar	Pcs	1	2,500,000.00	2,500,000.00
Total Amount				63,850,000.00

3.2.3. Lists of machinery suppliers

Pakistan Air Conditioning Engineering Co. (Pvt) Ltd.
Garden trust building, Naiper
road, Lahore Factory: Bund
road, Lahore
Tel: (042) 37226261-37358497

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4. 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 6 Annual manpower costs

s/no	Description	Number of persons	Salary in birr	
			monthly	annually
1	Cold store manager	1	30,000.00	360,000.00
2	executive secretary	1	15,000.00	180,000.00
3	Manager- admin. and finance	1	25,000.00	300,000.00
4	Shift in charge	3	10,000.00	360,000.00
5	Accountant	1	15,000.00	180,000.00
6	cashier	1	10,000.00	120,000.00
7	Security guards	5	3,000.00	180,000.00
8	driver ii	1	10,000.00	120,000.00
	total	16		1,800,000.00

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5. Financial Analysis

5.1. General

The financial analysis evaluation, under consideration has been carried out for cold storage service cost estimates of the envisaged project 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

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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 7 Initial Fixed investment costs

S/No	Fixed investment type	Unit of measurement	Quantity	Unit price	Total Amount	Remarks
1	Land	Square meter	1,000	3,885 birr/M ²	3,885,000.00	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	1,000	lump sum	179,100,000.00	
	Sub total				182,985,000	
3	Machinery	set	2	Lump sum	63,850,000.00	
4	Transformer	set	1	Lump sum	2,000,000.00	
5	Vehicles	Pcs	1		6,000,000.00	
6	Furniture and fixture	Pcs			500,000.00	
	SUB TOTAL				72,350,000.00	
	Fixed capital investment costs				255,335,000.00	
8	pre-operational expenses				2,000,000.00	
	Working capital				5,647,000.00	
	TOTAL INVESTMENT COSTS				262,982,000.00	

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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, for purchase of machineries, for purchase of truck and vehicles (and for purchase of office furniture and pre operation expense 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 (30%) that of the total investment costs will be expected to be covered by equity contribution of the project promoter.

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5.5. Production costs

As it is depicted in Annex Table 12 major categories of the total production costs are assembled into the following cost elements.

5.5.1. 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 1.76 million.

Table 8 Utilities of the factory'000''Birr

Utility''000''Birr		Start-up			Full Capacity
		70 %	80 %	90 %	100 %
Capacity utilization		70 %	80 %	90 %	100 %
Project year		1	2	3	4
Item description	Unit of measurement				
Fuel					
Gasoline for transport truck	(100km*300days* 57Birr/LIT*5km/Li)	239	274	308	342
Change of oil and lubricant	10% of the fuel consumption	24	27	31	34
Sub-Total		263	301	339	376
Electricity	260days*24 hr. *150kwh* 0.69Birr/kwh	907	907	907	907
Sub- Total		907	907	907	907
Water	365days*100m ³ /day*10 Birr/m ³	255.50	292.00	328.50	365.00
Sub -Total		1,426	1,500	1,575	1,648
Telecommunication					
Telephone	5 lines* 500Birr/month/line+18Birr/line/mon	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		1,542	1,616	1,691	1,764

PROJECT PROFILE ON COLD STORAGE SERVICE

5.5.2. 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).

5.5.3. 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 1.80 Million.

5.5.4. 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 COLD STORAGE SERVICE

Table 9 Overhead costs

Direct Overhead*000*Birr		Year 1	Year 2	Year 3	Year 4
Annual land lease Payment		3,885	3,885	3,885	3,885
Insurance					
Building and Civil works	0.10%	179	179	179	179
Motor vehicle and Truck	1%	60	60	60	60
Vehicles annual inspection and registration	25,000 Birr per annum per vehicle	25	25	25	25
Work cloth	Two times per annum per workers at 1,500 Birr	23	23	23	23
Cleaning and sanitation	Lump sum	100.00	100.00	100.00	100.00
Sub Total		4,272	4,272	4,272	4,272
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		4,380	4,380	4,380	4,380

5.5.5. 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 COLD STORAGE SERVICE

5.5.6. 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 20.33 million.

Table 10 Depreciation in Birr"000"

Period			Start-up			
Capacity utilization			70 %	80 %	90 %	100 %
Project year			1	2	3	4
Item description	Original Value					
Structure and civil works	179,100,000.00	5% of original value	8,955.00	8,955.00	8,955.00	8,955.00
Machinery	63,850,000.00	15% of the original	9,578.00	9,578.00	9,578.00	9,578.00
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
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			20,333.00	20,333.00	20,333.00	20,333.00

PROJECT PROFILE ON COLD STORAGE SERVICE

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 = 84,000,000 Birr

Unit selling price = 20,000 Birr/M³

$$\text{BEP (sales)} = \frac{\text{Annual sales} \times \text{Annual fixed costs}}{\text{Annual sales} - \text{Annual variables costs}} = \frac{84,000,000 \times 6,180,000}{84,000,000 - 7,892,000}$$

BEP (Sales) = 6,820,834 Birr

B. BEP production

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

BEP production = 6,820,834/20,000= 683

$$\begin{aligned} \text{c. BEP percentage} &= \frac{\text{Annual fixed costs} \times 100\%}{\text{Annual sales} - \text{Annual variables costs}} \\ &= \frac{6,180,000 \times 100\%}{84,000,000 - 7,892,000} \\ &= 8\% \end{aligned}$$

PROJECT PROFILE ON COLD STORAGE SERVICE

5.6.2. Return on investment

Return on investment = Net profit /Total capital requirement

$$= 43,727,000/262,982,000$$

$$= 16.62\%$$

The return on owners' investment (ROOI)

= Annual net profit /owners' investment

$$= 43,727,000/78,894,600$$

$$= 55\%$$

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 vacuum truck 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 12 the total annual operating costs excluding depreciation and interest are estimated to range from 14.07 million Birr in year 1 to 15.37 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 55.57 million Birr in year 1 to 52.72 million Birr in year 4 then starts declining until it reaches 27.62 million Birr in year 10.

PROJECT PROFILE ON COLD STORAGE SERVICE

5.8. Project benefits

For financial analysis and evaluation of the given project, the current service delivery 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 11 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	Cold storage	M ²	20,000	84,000	96,000	108,000	120,000	120,000
	Total			84,000	96,000	108,000	120,000	120,000

Thus, according to the computation in Annex Table 14 and Annex Table 16, 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 69 million Birr per annum. The corresponding Annex Table 14 of "Net Income Statement" shows a steady growth of gross profit starting from 28.42 million Birr in year 1 reaching the peak of 92.38 million Birr in year 10. In its 10 years of manufacturing activities, the project is expected to generate a total net profit of 440 million Birr and contribute 237 million Birr to the government treasury in form of 35% income tax.

PROJECT PROFILE ON COLD STORAGE SERVICE

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 16 of “Cash Flow Statement” shows the positive cumulative cash balance of Birr 420 million 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 21 indicates that the project will be able to reimburse itself from its net cash-income within five years after commencement of production activities, the period which is considered to be very good for the project of this nature.

In Annex Table 22 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 208.75 million Birr at 17%D.F. and the benefit-cost ratio of 1.70 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 8% operation of the estimated full capacity. In addition to this, finally, summary of financial efficiency tests have been conducted in Annex table 20, 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 COLD STORAGE SERVICE

ANNEX II

CALCULATION OF ANNUAL PRODUCTION COSTS

Table 12 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
II. Labor	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
III. Utility	1,542	1,616	1,691	1,764	1,764	1,764	1,764	1,764	1,764	1,764
IV. Repair and Maintenance and spare parts (1.5 % of fixed costs)	3,830	3,830	3,830	3,830	3,830	3,830	3,830	3,830	3,830	3,830
VI Direct overheads	4,272	4,272	4,272	4,272	4,272	4,272	4,272	4,272	4,272	4,272
A. Direct Production costs	11,444	11,518	11,593	11,666	11,666	11,666	11,666	11,666	11,666	11,666
VII. Administration over head	108	108	108	108	108	108	108	108	108	108
VIII. Marketing and Promotional expense 3 % of sales revenue	2,520	2,880	3,240	3,600	3,600	3,600	3,600	3,600	3,600	3,600
B. Operating costs	14,072	14,506	14,941	15,374	15,374	15,374	15,374	15,374	15,374	15,374
Interest	21,170	19,934	18,556	17,020	15,307	13,396	11,267	8,892	6,244	3,291
Depreciation	20,333	20,333	20,333	20,333	19,833	19,733	16,144	8,955	8,955	8,955
C. Total production costs	55,575	54,773	53,830	52,727	50,514	48,503	42,785	33,221	30,573	27,620

PROJECT PROFILE ON COLD STORAGE SERVICE

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 13 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	1,407	1,451	1,494	1,537	1,537	1,537	1,537	1,537	1,537	1,537
B. Inventory												
1. Material inputs	26	10	0	0	0	0	0	0	0	0	0	0
2. Spare parts	90	4	958	958	958	958	958	958	958	958	958	958
3. Work under process	2	130	88	89	89	90	90	90	90	90	90	90
4. Product ready for delivery	8	32.5	460	462	465	467	467	467	467	467	467	467
C. Cash on hand			2,888	2,907	2,925	2,944	2,944	2,944	2,944	2,944	2,944	2,944
D. Current assets			5,801	5,866	5,931	5,995	5,995	5,995	5,995	5,995	5,995	5,995
II. Current liabilities												
A. A/p	26	10	154	162	169	176	176	176	176	176	176	176
III. Working capital												
A. Net working capital			5,647	5,704	5,762	5,819	5,819	5,819	5,819	5,819	5,819	5,819
B. Increasing in working capital			5,647	57	58	57	0	0	0	0	0	0

PROJECT PROFILE ON COLD STORAGE SERVICE

ANNEX VI

PROJECTED NET INCOME STATEMENT

Table 14 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	84,000	96,000	108,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Less total production costs	55,575	54,773	53,830	52,727	50,514	48,503	42,785	33,221	30,573	27,620
Gross profit	28,425	41,227	54,170	67,273	69,486	71,497	77,215	86,779	89,427	92,380
Tax	9,949	14,429	18,960	23,546	24,320	25,024	27,025	30,373	31,299	32,333
Net profit	18,476	26,798	35,211	43,727	45,166	46,473	50,190	56,406	58,128	60,047
Accumulated undistributed profit	18,476	45,274	80,484	124,212	169,378	215,851	266,040	322,447	380,574	440,621

PROJECT PROFILE ON COLD STORAGE SERVICE

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

Table 15 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	184,087									
2. Outstanding balance at end of year	184,087	173,341	161,359	147,998	133,101	116,492	97,972	77,322	54,297	28,624
a. First year loan										
Total										
A. Debt service										
1. First year Loan										
a. Interest	21,170	19,934	18,556	17,020	15,307	13,396	11,267	8,892	6,244	3,291
b. Repayment of principal	10,746	11,982	13,360	14,896	16,609	18,520	20,649	23,024	25,672	28,624

PROJECT PROFILE ON COLD STORAGE SERVICE

ANNEX VIII CASH-FLOW STATEMENT FOR FINANCIAL PLANING

Table 16 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	347,136	96,065	108,065	120,064	120,000	120,000	120,000	120,000	120,000	120,000
1. Financial resource (total)	263,136	65	65	64						
2. Sales revenue	84,000	96,000	108,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000
B. Cash – outflow	319,073	60,916	65,882	70,900	71,610	72,314	74,315	77,663	78,589	79,622
1. Total assets schedule including replacement	263,136	65	65	64						
2. Operating costs	14,072	14,506	14,941	15,374	15,374	15,374	15,374	15,374	15,374	15,374
3. Debt service (total)										
a. Interest	21,170	19,934	18,556	17,020	15,307	13,396	11,267	8,892	6,244	3,291
b. Repayment	10,746	11,982	13,360	14,896	16,609	18,520	20,649	23,024	25,672	28,624
4. Tax	9,949	14,429	18,960	23,546	24,320	25,024	27,025	30,373	31,299	32,333
C. Surplus (Deficit)	28,063	35,149	42,183	49,164	48,390	47,686	45,685	42,337	41,411	40,378
D. Cumulative cash balance	28,063	63,212	105,395	154,559	202,949	250,635	296,320	338,657	380,068	420,446

PROJECT PROFILE ON COLD STORAGE SERVICE

ANNEX XII TOTAL INVESTMENT COSTS

Table 17 Total investment costs”000”

Period	Start up			Full capacity								
	1	2	3	4	5	6	7	8	9	10	11	
Project year												
Investment Category												
1. Fixed investment costs												
a. Initial fixed investment costs	255,335											
b. Replacement												
2. Pre-operational capital expenditure	2,000											
3. Working capital increase	5,647	57	58	57								
Total investment costs	262,982	57	58	57								

ANNEX XIII TOTAL ASSETS

Table 18 Total Assets

Period	Start up			Full capacity								
	1	2	3	4	5	6	7	8	9	10	11	12
Project year												
Investment Category												
1. Fixed investment costs												
c. Initial fixed investment costs	255,335											
❖ Cost of land												
d. Replacement												
2. Pre-operational capital expenditure	2,000											
3. Current assets increase	5,801	65	65	64								
Total assets	263,136	65	65	64								

PROJECT PROFILE ON COLD STORAGE SERVICE

ANNEX XIV SOURCES OF FINANCE

Table 19 Sources of finance

Period	Start up			Full capacity							Total
	1	2	3	4	5	6	7	8	9	10	
Project year											
Sources of finance											
1. Equity capital	78,895	57	58	57							
2. Loan capital	184,087										
3. Current liabilities	154	8	7	7							
Total finance	263,136	65	65	64							

ANNEX XI SUMMARY OF FINANCIAL EFFECIENCY TESTS

Table 20 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	34%	43%	50%	56%	58%	60%	64%	72%	75%	77%
2. Net profit : Revenue	22%	28%	33%	36%	38%	39%	42%	47%	48%	50%
3. Net profit : initial investment	7%	10%	13%	17%	17%	18%	19%	21%	22%	23%
4. Net profit : Equity	23%	34%	45%	55%	57%	59%	63%	71%	74%	76%
5. Gross profit : Initial investment	11%	16%	21%	26%	26%	27%	29%	33%	34%	35%
6. Operating costs : Revenue	17%	15%	14%	13%	13%	13%	13%	13%	13%	13%

PROJECT PROFILE ON COLD STORAGE SERVICE

ANNEX XV CALCULATIONS OF PAYBACK PERIOD

Table 21 Calculation of payback period”000”

Year	Amount Paid Back			Total investment	End of year
	Net Profit	Depreciation	Total		
1	18,476	20,333	38,809	262,982	-224,173
2	26,798	20,333	47,131	57	-177,099
3	35,211	20,333	55,544	58	-121,613
4	43,727	20,333	64,060	57	-57,610
5	45,166	19,833	64,999	0	+7,389

PROJECT PROFILE ON COLD STORAGE SERVICE

ANNEX XVI

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

Table 22 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	84,000	0.854701	71,795	262,982	14,072	277,054	236,798
2	96,000	0.730514	70,129	57	14,506	14,563	10,638
3	108,000	0.624371	67,432	58	14,941	14,999	9,365
4	120,000	0.53365	64,038	57	15,374	15,431	8,235
5	120,000	0.456111	54,733		15,374	15,374	7,012
6	120,000	0.389839	46,781		15,374	15,374	5,993
7	120,000	0.333195	39,983		15,374	15,374	5,123
8	120,000	0.284782	34,174		15,374	15,374	4,378
9	120,000	0.243404	29,208		15,374	15,374	3,742
10	120,000	0.208037	24,964		15,374	15,374	3,198
Total			503,238				294,483

A. Benefit- cost ratio At 17% D.F. = 1.7

B. NPV At 17% D.F. = 208,755,000 Birr

PROJECT PROFILE ON COLD STORAGE SERVICE
