

Pre-Feasibility Study

COMPARTMENTALIZED COLD STORAGE



Small and Medium Enterprise Development Authority Government of Pakistan

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1 INTRODUCTION

1.1 Project Brief

All fruits and vegetables require specialized post harvest treatment, appropriate temperature and relative humidity for their storage, which most of the existing cold stores in Pakistan lack. In this proposed “Compartmentalized Cold Storage” project storage will be done according to the modern technology and on scientific lines. The project 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. The project is designed in such a way that it will be able to store multiple products, stored in different compartments of the unit, where relative temperatures for respective products will be maintained. The major clientele of this business will be the export houses and the local trading and marketing units of fruits and vegetables. The project will further aim at storing fruits & vegetables even during off-seasons. The project will ultimately assist the clientele in maintaining market price equilibrium throughout the year for fruits and vegetables. The location of the Cold Storage will be near major cities. However, for the purpose of estimation, the project is based on a location in the diocese of Lahore.

1.2 Opportunity Rationale

Securing an adequate food supply has been the fundamental concern of mankind and so has been the preservation of food. The loss of food in the post-harvest system is not new; it has always been a problem for man, even in the highly scientific and technological world of today. Among all the major problems persistent in the world regarding the fulfillment of the basic needs of people, food requirement stands at the top, as without ensuring satisfactory diets, people cannot lead healthy and productive lives.

In these present times of high population growth rates, food supply has become diminutive. For filling this gap between demand and supply, there is a need to conserve the food supply, in order to meet the growing and existing food requirements, especially fruits and vegetables, as these are more perishable.

The problem related with food loss is more prevalent in the less developed world as compared to the developed world. The developed countries have curbed the loss of food to a great extent by adopting new technologies and ways of storing food. Some examples of such measures are adoption and development of better harvesting equipment; establishment of collection centers at strategic points in major crop producing areas; remodeling of containers to add more protection to the produce; and more importantly the development of commercial storage plants/cold storages.

In comparison, this problem prevails in the less developed countries because modern storage, packaging, transporting and handling technologies for perishable crops like fruits and vegetables are practically non-existent. Thus, there is a dire need of establishing such systems in the less developed part of the world in order to meet their food requirements. A major step in overcoming the food loss problems in

Pakistan especially in fruits & vegetables, would be the establishment of Compartmentalized Cold Storage units, where perishable commodities can be stored for a longer duration of time period to obtain a year-round supply and to reduce post-harvest losses.

As far as the scenario of food losses in Pakistan is concerned, Pakistan produces a variety of fruits and vegetables like apples, mangoes, dates, banana, cherries, apricots, pomegranates, peas, carrots, potatoes, etc. Pakistan's total annual production of fruits amounts to nearly 6 million tons and that of vegetables to approximately 5.3 million tons. However, it is estimated that in Pakistan 25% of fruits & vegetables produced each year are lost because of poor harvest conditions. This loss if calculated approximately amounts to 2.7 million metric tons and its estimated local market value reaches somewhere near US \$ 522 million. The major reasons for this loss are careless harvesting, rough handling, inadequate transportation, and storage facilities. If we only look at the losses due to lack of storage facilities, it alone reaches 1.24 million metric tons, which values to nearly US \$ 239 million¹.

Furthermore, the purpose of storage of vegetables and fruits is to preserve and maintain the edible quality characteristics until they are consumed in the fresh state, which the “Compartmentalized Cold Storage” serves. Hence, a Compartmentalized Cold Storage can be defined as a facility, which can store different commodities at their respective optimal storage temperatures. It comprises of different compartments, and the temperature of each individual chamber/compartment can be controlled individually. Some of the benefits of cold storage of vegetables and fruits are that it retards the decay development in fruits and vegetables because fresh fruits and vegetables are living tissues and they carry on respiration even after harvesting, which ultimately produces heat. Through control temperature respiration rate can be reduced, which is directly beneficial in slowing down the degradation of sugar and carbohydrates stored in the cells of these fruits & vegetables.

1.3 Proposed Capacity

The proposed Cold Storage facility has a maximum storage capacity of 53,760 cubic feet at any given time.

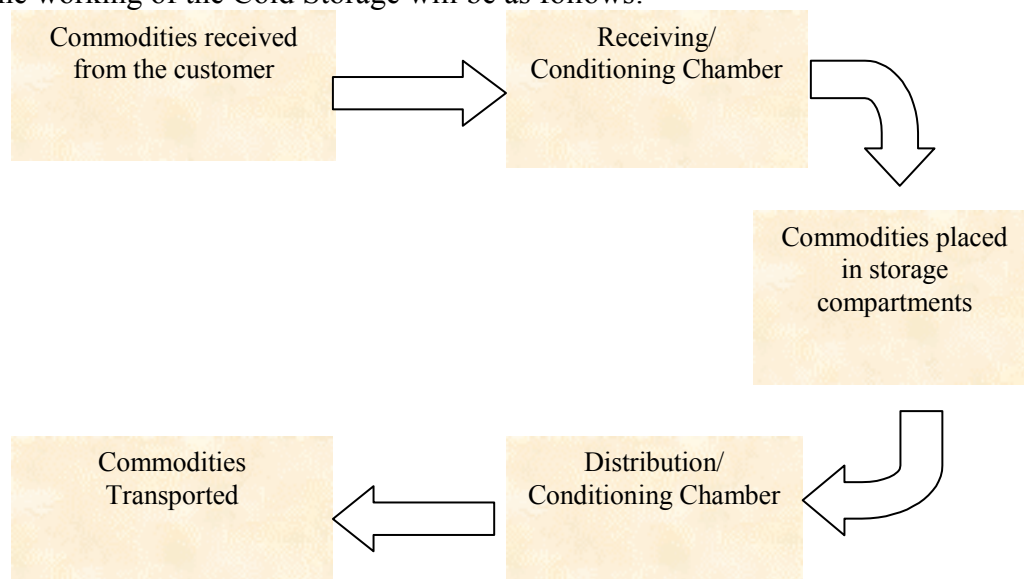
1.4 Total Project Cost

The proposed project of Cold Storage needs a capital investment of about Rs.12.78 million, which includes machinery, equipment as well as infrastructure. In addition to this, a sum of Rs.0.6 million is required as working capital, mostly for meeting the pre-operational expenses. The total project cost amounts to Rs.13.38 million.

¹ Source: FBS and FAO

2 PROCESS FLOW

The working of the Cold Storage will be as follows:



2.1 Receiving/Conditioning Chamber

The commodities to be stored will be received from the clients. These received commodities will be placed for some time in the receiving chamber of the cold storage. The objective here is to gradually decrease the temperature of the product and make use of the cold air of the main cold room chambers which escape when chamber doors are opened for inward and outward movement of products stored therein. This stage may be called as pre-cooling of product before putting them in the cold room storage compartments.

2.2 Commodities placed in the storage compartments

The received commodities will then be shifted from the receiving chamber to the storage compartments. The temperature of the stored commodity shall be lowered steadily to the desired storage temperature. Air humidity and commodity temperature shall be monitored to avoid condensation.

The optimum storage temperature for most temperate horticultural crops is close to 4°C. If they are cooled slightly below this temperature they freeze and suffer from "freezing injury" and spoil quickly. Most tropical horticulture crops however can be injured even at temperatures above freezing point. This is called "chilling injury" and causes rapid deterioration in quality. The optimum/recommended storage temperature and humidity for some of the fruits & vegetables is given in the following Table:

Table 2-1: Storage Temperature and Humidity for different Fruits²

Commodity	Recommended storage temperature (F) ³ :	Relative Humidity (%)
Apples	30-40 F; (-1 to -4.5 °C)	90
Strawberry	32 F; (0 °C))	90-95
Cabbage	32 F; (0 °C)	95-100
Carrots	32 F; (0 °C)	98-100
Cauliflower	32 F; (0 °C)	95
Onion	32 F; (0 °C)	65-70
Pea	32 F; (0 °C)	95
Potato	50-55 F; (10 to 12.7 °C)	90

Furthermore, while undertaking refrigeration in the storage compartments, the holding temperature will not exceed the recommended temperature. The fan louvers shall be adjusted to maintain the desired level of humidity as higher humidity than recommended promotes root growth/decay and sweating of the commodity stored.

2.3 Distribution/Conditioning Chamber

Before transporting the commodities out of the storage chambers, conditioning of the stored products is necessary. This will be done by holding them in a relatively warm conditioning chamber (which is also used previously as a receiving chamber) before they are packed and moved out for disposal, because there is a danger of water condensation on the surface of the commodity if the outside air has higher moisture contents. During conditioning the temperature of the produce is brought to the required temperature slowly by circulating ventilating air in the conditioning room.

3 CURRENT INDUSTRY STRUCTURE

Most of the existing local Cold Storage's are constructed on locally developed outdated methods, which maintain a uniform temperature for all commodities stored. The goods are not stored at their recommended relative storage temperatures and life, and because of this the quality of stored commodity is badly affected. Fruits & vegetables require specialized post harvest treatment, appropriate temperature and relative humidity control for their proper & optimum storage, which most of the existing local cold stores lack. As such there are no commercially operated compartmentalized cold storage existing in Pakistan.

² Source: United States Department of Agriculture

³The temperatures are taken from international standards documents and are given for an example; however, local varieties of these fruits and vegetables may differ and or bear variance.

4 MARKETING

The marketing of Cold Storage follows the local existing distribution network i.e. storage of fruits & vegetables as well as other commodities such as fruit pulps and pharmaceuticals by middlemen (Artis), exporters, food processors, and pharmaceutical companies. These organizations or people store their commodities in cold storages, for future sales in the local market at better prices or for exports. However, until now the existing Cold Storages are generic in nature i.e. all the commodities are stored at uniform temperatures. There is a dire need of storage facilities, which can facilitate the proper storage of various commodities at their optimum temperatures.

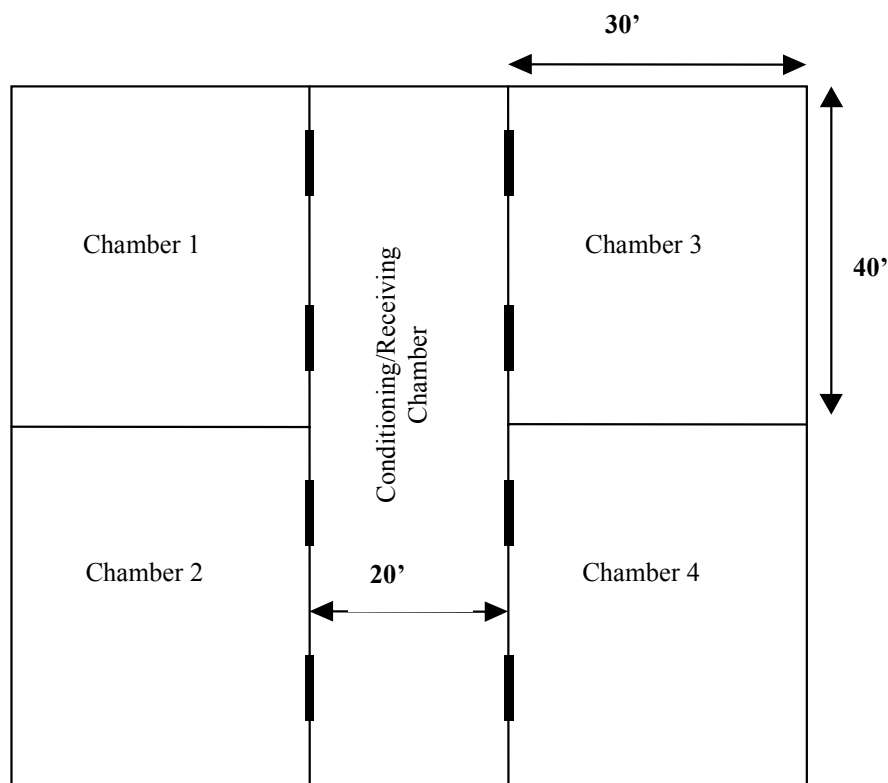
5 COLD STORAGE INFRASTRUCTURE

The infrastructure of the cold storage for the said project will be as follows:

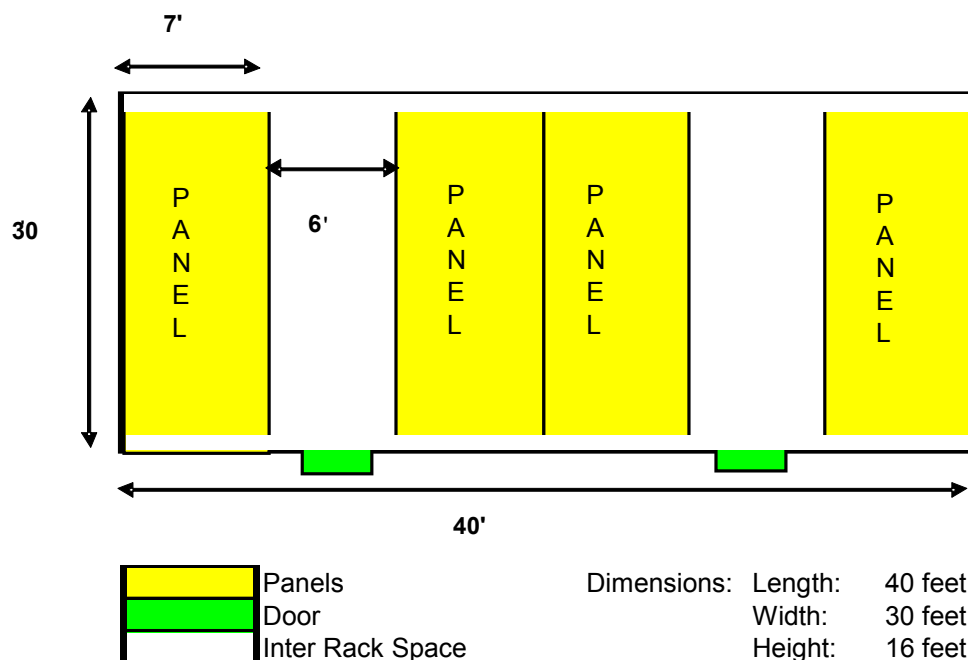
5.1 Cold Storage

Moveable rack and pallet storage system will be adopted as permissible according to the type of commodity. The racks will be adjustable in height and pallets will be placed inside the racks. It is assumed that 70% of the total volume will be availed for storage i.e. 53,760 cubic feet out of the total volume of 76,800 cubic feet, as normally 30% of the space is being spared for mobility of the fork lifter and ventilation of air.

Fork Lifter will be used for stacking the commodities in the racks, which will be placed on pallets. Air exhaust outlets will also be installed near the ceiling of the storage chambers in order to control the humidity and cooling level of the cold store. The outside air intake point will also be installed up in the wall (opposite to the air exhaust outlets) to reduce the uptake of high moisture air present near the ground level. The air exhausts and air intake points will ensure the continuous circulation of air in the storage chambers. Furthermore, appropriate sensors will be fitted in the storage chambers at proper points to maintain and monitor desired temperature and relative humidity. Psychrometric charts will be used to determine moist air properties inside the storage chambers.

Figure 5-1: General Layout of the Compartmentalized Cold Storage

The cold storage building will consist of Pre-fabricated refrigerated (Walk-in type) structure. This type of structure is highly superior to any form of refrigerated storage construction previously available in Pakistan due to its better technology and energy efficiency. Polyurethane insulated panels will be used to erect the building because these panels are metal clad and can be easily dismantled for relocating the cold storage site. The cold storage building will have a roof of insulated corrugated sheet of galvanized mild steel to protect it from direct sun and rain. The floor will have a surface of polyurethane insulated galvanized steel material. The floor will be strong enough to withstand the distributed load. An automatic monitoring system will be installed in the storage compartments for maintaining relative humidity and temperature and to eliminate any chances of human error during the refrigeration period. The cold storage will have five storage chambers/compartments, from which one will be used as both a conditioning and receiving chamber.

Figure 5-2: Layout of a Single Storage Chamber/Compartment

The total volume of the cold storage can be calculated from the diagram representing general layout of the cold storage building. This comes out to be 76,800 Cubic feet (length: 80ft x width: 60 feet x height: 16 feet). It is assumed that only 70% (i.e. 53,760 cubic feet) of this space will be utilized and the remaining 30% is spared due to provision of space in between pallets for fork lifter mobility and air ventilation.

6 HUMAN RESOURCE REQUIREMENTS

The project of Cold Storage requires the following Human Resources/Staff:

Table 6-1: Human Resource Requirement

Positions	Required	Salary per Month	Salary per Annum
Store Manager	1	25,000	300,000
Supervisor	1	7,000	84,000
Accountant	1	5,000	60,000
Fork Lifter	1	5,000	60,000
Office Attendant	1	2,500	30,000
Helper	3	2,500	90,000
Technician	1	4,500	54,000
Watchman	2	2,500	60,000
Total	11		738,000

7 MACHINERY/EQUIPMENT DETAILS

The type of equipment needed for the Cold Storage is as under:

Table 7-1: Machinery & Equipment Required

Equipment	No.	Rs/Unit	Rs
Pre fabricated Insulated Building in Panels ready for field erection (8,640 Sq. ft * Rs.400 per Sq. ft.) ⁴	1	3,456,000	3,456,000
Ammonia Compressor/Condenser (7.5 HP)	4	500,000	2,000,000
Evaporators	4	190,000	760,000
Monitoring Equipments & automatic control for temperature, humidity, and ventilation:			
1. Psychrometer	1	14,000	14,000
2. Hydrothermo Graph	1	95,000	95,000
3. Handheld Infrared Thermometer	1	21,000	21,000
4. Set of Sensors	1	65,000	65,000
5. Miscellaneous Accessories (e.g. Two Diffusers, etc.)	1	150,000	150,000
Electric Operated Fork Lifter	1	350,000	350,000
Moveable Racks	16	15,625	250,000
Pallets	500	1,500	750,000
Furniture & Fixtures		100,000	100,000
Standby Generator (20 KVA)	1	235,000	235,000
Computer & other accessories	1	45,000	45,000
Printer & accessories	1	10,000	10,000
Telephone Connection & Fax Machine with apparatus	1	25,000	25,000
Total			8,326,000

⁴ The area of the insulated panels is calculated from the above given general layout diagrams. Four walls of dimension 80 feet length and 16 feet height will be needed. The area of these comes out to be $80' \times 16' \times 4' = 5,120$ Sq.ft. Furthermore, two walls of dimensions 80 feet length and 16 feet height will be needed. The area of these comes out to be $80' \times 16' \times 2' = 2,560$ Sq.ft. Two more walls of dimension 30 feet length and 16 feet height will be needed. The area of these comes out to be $30' \times 16' \times 2' = 960$ Sq.ft. Therefore, by adding up these areas, the total requirement of insulated panels comes out to be $5,120 + 2,560 + 960 = 8,640$ Sq. ft.

8 LAND & BUILDING

8.1 Recommended mode for acquiring Land

It is recommended that the proposed project should be started in an acquired land area of approximately one Acre (8 Kanals). The project can be established near any big city where fruits & vegetables market is present on a large scale.

8.2 Infrastructure requirements

The project will have the following infrastructure components:

Table 8-1: Infrastructure Details

Infrastructure Requirements	Cost (Rs.)
Covered Shed for Cold Storage building made of insulated corrugated mild steel-Galvanized sheets (80ft * 80ft @ Rs.200 per Sq.ft)	1,280,000
Foundation for the pre-fabricated cache and insulated/slotted floor (80ft * 80ft @ Rs.250 per Sq.ft)	1,600,000
Installation of Turbine and Boring Cost	25,000
Land Cost	900,000
Office Block (800 Sq.ft @ Rs.500 per Sq.ft) including water tank	400,000
Guard Room (200 Sq.ft @ Rs.400 per Sq.ft)	80,000
Boundary Wall (836 running Foot @ Rs.200 per running foot)	167,200
Total	4,452,200

9 PROJECT ECONOMICS

9.1 Project Costs

The cost of the project will be as follows:

Head	Cost (Rs.)
Land & Building	4,452,200
Machinery & Equipments	8,326,000
Pre-Operational Expenses ⁵	599,000
Project Cost	13,377,200

9.2 Project Return

Project Internal Rate of Return (IRR)	32.60%
Payback Period (Years)	4.78
Net Present Value (NPV)	10,853,842

9.3 Financing Plan

Financing		Rs.
Equity	50%	6,688,600
Debt	50%	6,688,600

9.4 Estimated time frame for project Completion

The estimated time frame for the completion of the project is six months.

⁵Includes 6 months salaries.

10 KEY SUCCESS FACTORS

Following are some of the major factors, which contribute towards the success of the 'Compartmentalized Cold Storage' project.

- Better technology of compartmentalized cold storage as compared to the rest of the cold storages in Pakistan.
- Energy efficient construction hence low operating/fuel costs.
- Compartmentalization i.e. compartments in which different commodities can be stored at their respective temperatures.

11 THREATS FOR THE BUSINESS

Following may pose threats to the business:

- Irregular government policies e.g., abnormal tax increase.
- Fluctuation or unexpected increase in electricity tariff.
- Failure of crops due to natural calamity.
- Ruthless competition by other business adversaries.

12 FINANCIAL ANALYSIS

12.1 Revenue Calculation

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Capacity Utilization	60%	70%	80%	90%	95%	100%	100%	100%	100%	100%
Average Cubic Feet Occupied per Year	32,256	37,632	43,008	48,384	51,072	53,760	53,760	53,760	53,760	53,760
Total Revenue (in Rs)	5,688,534	7,527,423	9,161,950	10,977,161	12,340,158	13,833,967	14,733,175	15,690,831	16,710,735	17,796,933

12.2 Projected Income Statement

PROJECTED INCOME STATEMENT										in Rs.
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Sales	5,688,534	7,527,423	9,161,950	10,977,161	12,340,158	13,833,967	14,733,175	15,690,831	16,710,735	17,796,933
Cost of Goods Sold										
Machine Maintenance	41,355	44,043	46,906	49,955	53,202	56,660	60,343	64,265	68,442	72,891
Direct Electricity	665,792	939,877	1,181,559	1,462,180	1,697,753	1,965,819	2,162,401	2,378,641	2,616,506	2,878,156
Diesel Expense	112,420	123,662	136,028	149,631	164,594	181,054	199,159	219,075	240,982	265,080
Total	819,567	1,107,582	1,364,493	1,661,765	1,915,549	2,203,533	2,421,903	2,661,981	2,925,930	3,216,128
Gross Profit	4,868,966	6,419,842	7,797,456	9,315,395	10,424,609	11,630,434	12,311,272	13,028,850	13,784,805	14,580,805
Operating Expenses										
Fixed Electricity	30,000	33,000	36,300	39,930	43,923	48,315	53,147	58,462	64,308	70,738
Payroll Administration	738,000	785,970	837,058	891,467	949,412	1,011,124	1,076,847	1,146,842	1,221,387	1,300,777
Amortization of Pre-Operating Expenses	59,900	59,900	59,900	59,900	59,900	59,900	59,900	59,900	59,900	59,900
Promotional Expenses	56,885	67,747	74,212	80,024	80,964	81,688	78,298	75,049	71,934	68,949
Depreciation	1,015,710	1,015,710	1,015,710	1,015,710	1,015,710	1,010,710	1,010,710	1,010,710	1,010,710	1,010,710
Total	1,900,495	1,962,327	2,023,180	2,087,030	2,149,909	2,211,737	2,278,902	2,350,962	2,428,239	2,511,074
Operating Profit	2,968,471	4,457,515	5,774,276	7,228,365	8,274,700	9,418,697	10,032,370	10,677,888	11,356,566	12,069,731
Non Operating Expenses										
Financial Charges on Long Term Loan	1,203,948	1,035,663	837,086	602,766	326,268	-	-	-	-	-
Profit before Tax	1,764,523	3,421,852	4,937,190	6,625,599	7,948,433	9,418,697	10,032,370	10,677,888	11,356,566	12,069,731
Tax	491,583	1,071,648	1,602,017	2,192,960	2,655,951	3,170,544	3,385,329	3,611,261	3,848,798	4,098,406
Profit after Tax	1,272,940	2,350,204	3,335,174	4,432,640	5,292,481	6,248,153	6,647,040	7,066,627	7,507,768	7,971,325
Opening Retained earnings	-	1,272,940	3,623,144	6,958,317	11,390,957	16,683,438	22,931,591	29,578,632	36,645,258	44,153,027
Retained Earning beginning of year	1,272,940	3,623,144	6,958,317	11,390,957	16,683,438	22,931,591	29,578,632	36,645,258	44,153,027	52,124,352

12.3 Projected Cash Flow Statement

PROJECTED CASH FLOW STATEMENT											in Rs
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating Activities											
Net Profit	-	1,764,523	3,421,852	4,937,190	6,625,599	7,948,433	9,418,697	10,032,370	10,677,888	11,356,566	12,069,731
Pre-Operational Expenses	(599,000)	59,900	59,900	59,900	59,900	59,900	59,900	59,900	59,900	59,900	59,900
Depreciation	-	1,015,710	1,015,710	1,015,710	1,015,710	1,015,710	1,010,710	1,010,710	1,010,710	1,010,710	1,010,710
Account Receivable	-	(474,044)	(153,241)	(136,211)	(151,268)	(113,583)	(124,484)	(74,934)	(79,805)	(84,992)	(90,516)
Raw Material Inventory	-	(4,620)	(462)	(508)	(559)	(615)	(676)	(744)	(818)	(900)	(990)
Income Tax paid	-	(491,583)	(1,071,648)	(1,602,017)	(2,192,960)	(2,655,951)	(3,170,544)	(3,385,329)	(3,611,261)	(3,848,798)	(4,098,406)
Cash provided /Used for Operating Activities	(599,000)	1,869,886	3,272,111	4,274,065	5,356,423	6,253,893	7,193,602	7,641,972	8,056,614	8,492,486	8,950,428
Financing Activities											
Share capital	6,688,600	-	-	-	-	-	-	-	-	-	-
Long Term Loan	6,688,600	-	-	-	-	-	-	-	-	-	-
Long Term Loan Repayments	-	(934,918)	(1,103,203)	(1,301,780)	(1,536,100)	(1,812,598)	-	-	-	-	-
Cash Provided/Used for Financing Activities	13,377,200	(934,918)	(1,103,203)	(1,301,780)	(1,536,100)	(1,812,598)	-	-	-	-	-
Investing Activities											
Capital Expenditure	(12,778,200)	-	-	-	-	-	-	-	-	-	-
Cash Used Provided by Investing Activities	(12,778,200)	-	-	-	-	-	-	-	-	-	-
Net Cash inflow/(outflow)	-	934,967	2,168,908	2,972,285	3,820,323	4,441,295	7,193,602	7,641,972	8,056,614	8,492,486	8,950,428
Cash Balance Brought forward	-	-	934,967	3,103,875	6,076,160	9,896,483	14,337,778	21,531,380	29,173,352	37,229,966	45,722,452
Cash Balance	-	934,967	3,103,875	6,076,160	9,896,483	14,337,778	21,531,380	29,173,352	37,229,966	45,722,452	54,672,880

12.4 Projected Balance Sheet

PROJECTED BALANCE SHEET											in Rs
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Current Assets											
Cash		934,967	3,103,875	6,076,160	9,896,483	14,337,778	21,531,380	29,173,352	37,229,966	45,722,452	54,672,880
Accounts Receivable	-	474,044	627,285	763,496	914,763	1,028,347	1,152,831	1,227,765	1,307,569	1,392,561	1,483,078
Raw Material Inventory		4,620	5,082	5,590	6,149	6,764	7,441	8,185	9,003	9,903	10,894
Total	-	1,413,632	3,736,242	6,845,246	10,817,395	15,372,888	22,691,651	30,409,302	38,546,538	47,124,917	56,166,852
Gross Fixed Assets											
Total Fixed Assets	12,778,200	12,778,200	12,778,200	12,778,200	12,778,200	12,778,200	12,808,200	12,808,200	12,808,200	12,808,200	12,808,200
Less: Accumulated Depreciation	-	1,015,710	2,031,420	3,047,130	4,062,840	5,078,550	6,089,260	7,099,970	8,110,680	9,121,390	10,132,100
Net Fixed Assets	12,778,200	11,762,490	10,746,780	9,731,070	8,715,360	7,699,650	6,718,940	5,708,230	4,697,520	3,686,810	2,676,100
Intangible Assets											
Pre-operational Expenses	599,000	539,100	479,200	419,300	359,400	299,500	239,600	179,700	119,800	59,900	-
Total	599,000	539,100	479,200	419,300	359,400	299,500	239,600	179,700	119,800	59,900	-
Total Assets	13,377,200	13,715,222	14,962,222	16,995,616	19,892,155	23,372,038	29,650,191	36,297,232	43,363,858	50,871,627	58,842,952
Long Term Liabilities											
Long Term Loan	6,688,600	5,753,682	4,650,479	3,348,699	1,812,598	-	-	-	-	-	-
Total	6,688,600	5,753,682	4,650,479	3,348,699	1,812,598	-	-	-	-	-	-
Equity											
Paid-up Capital	6,688,600	6,688,600	6,688,600	6,688,600	6,688,600	6,688,600	6,718,600	6,718,600	6,718,600	6,718,600	6,718,600
Retained Earnings	-	1,272,940	3,623,144	6,958,317	11,390,957	16,683,438	22,931,591	29,578,632	36,645,258	44,153,027	52,124,352
Total	6,688,600	7,961,540	10,311,744	13,646,917	18,079,557	23,372,038	29,650,191	36,297,232	43,363,858	50,871,627	58,842,952
Total Liabilities And Equity	13,377,200	13,715,222	14,962,222	16,995,616	19,892,155	23,372,038	29,650,191	36,297,232	43,363,858	50,871,627	58,842,952

13 KEY ASSUMPTIONS

Table 13-1: Production Assumptions

Electricity cost growth rate per annum	10%
Units consumed of Electricity in 5 Compartments	110,965
Average unit cost of Electricity consumed (Rs.)	10

Table 13-2: Operating Assumptions

Hours Operational per Day	24
Days Operational per year	365

Table 13-3: Sales Assumptions

Total Storage capacity (Cubic feet)	53,760
Capacity Utilization for first year (%age of the total capacity)	60%
Average unit price per cubic feet (Rs.)	0.48
Number of days occupied	365
Sales price growth rate	6.5%

Table 13-4: Average price per cubic feet for compartmentalized cold store at 10% premium

Commodities	Area Occupied	Rate Per Month	Rate per Cubic Ft	Rate per Cubic Ft. per Day
Tomato Paste/Puree	1 Barrel = 16 Cubic Ft.	286/Barrel	17.9	0.60
Strawberry	1 Crate = 2 Cubic Ft.	30/Crate	15	0.50
Soybean Oil	1 Barrel = 16 Cubic Ft.	264/Barrel	16.5	0.55
Tomatoes	1 Crate = 2 Cubic Ft.	28.6/Crate	14.3	0.48
Apples	1 Crate = 2 Cubic Ft.	17.6/Crate	8.8	0.29
Average rate per cubic feet (in Rs)				0.48

Table 13-5: Cash flow Assumptions

Account Receivable Cycle (Days)	30
Raw Material Inventory (Days)	15

Table 13-6: Expense Assumptions

Machine Maintenance per annum (%age of total project cost and compounded on the inflation factor)	0.50%
Diesel Consumption per hour by a 20 KVA generator (in liters)	7.7
Fuel Cost (per liter) (Rs)	20
Average usage of Generator per day (in Hrs)	2
Total usage of generator per year (in Hrs)	730
Fuel price growth rate	10%
Promotional Expense (% of Net Sales)	1%
Rate of Change (Decreasing) in Promotional Expense per Year ⁶	10%
Depreciation Method	Straight Line
Wages Growth Rate	6.5%

Table 13-7: Financial Assumptions

Project Life	10 Years
Debt:Equity	50:50
Interest Rate on debt	18%
Discount Rate	20%
Debt Tenure	5 Years
Debt Payment per year	1

⁶Promotional expenses are changing at a decreasing rate per year because this is an industrial product and has a limited capacity. Therefore, as the capacity is utilized completely the promotional expenses are being reduced.