Model Project Report

Integrated Cold Chain

Scheme for Cold Chain, Value Addition and Preservation Infrastructure
Ministry of Food Processing Industries,
Government of India

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Scheme for Cold Chain, Value Addition and Preservation Infrastructure

Ministry of Food Processing Industries through its Scheme for Cold Chain, Value Addition and Preservation Infrastructure is promoting integrated cold chain projects in the country with an aim to:

- Provide integrated and complete cold chain and preservation infrastructure facilities without any break, from the farm gate to the Consumer
- Enable linking of groups of producers to the processors and market through well equipped supply chain
- Establish value addition with infrastructural facilities like sorting, grading, packaging and processing for horticulture including organic produce, marine, dairy, poultry, etc.

The Scheme aims to establish value addition with infrastructural facilities like sorting, grading, storing, associated processing and packaging for a variety of products such as fruit and vegetable, marine, dairy, poultry, etc.

The eligible components under the Scheme are as follows:

- Minimal Processing Centre at the farm level and this centre is to have facility for weighing, sorting, grading waxing, packing, pre-cooling, Controlled Atmosphere (CA) / Modified Atmosphere (MA) cold storage, normal storage and IQF.
- Mobile pre-cooling vans and reefer trucks.
- Distribution hubs with multi product and multi CA /MA chambers cold storage /Variable Humidity Chambers, Packing facility, CIP Fog treatment, IQF and blast freezing.
- Irradiation facility.

To avail financial assistance, any two of the components, from (a), (b) or (c) above will have to be set-up by the units. Considering the functional nature of the facility, Irradiation facility can be treated as a standalone one for the purpose of availing grant. Since the aim of the Scheme is to facilitate establishment of cold chain, value addition and preservation along the supply chain which would integrate and streamline forward and backward linkages of food processors, stand alone facilities, except irradiation facility, are not considered for assistance under the Scheme.

The assistance under the Scheme includes financial assistance (grant-in-aid) of 50% the total cost of plant and machinery and technical civil works in General areas and 75% for NE region and difficult areas (North East including Sikkim and J&K, Himachal Pradesh and Uttarakhand) subject to a maximum of Rs 10 Crore.

Model Project Report

The model project report would assist in understanding of the type of projects which are being supported under the Scheme and would also showcase a typical integrated cold chain project along with the eligible components, revenues, expenditures, etc.

As the approved integrated cold chain projects under the Scheme have many different types of cold chain and related components/facilities, the components/facilities for the model project have been selected in a way so that it would a typical representative integrated cold chain. It has been envisaged that the project would undertake procurement (from the farm proximate collection centres), storage, value addition to frozen fresh products (Central Processing Hub) and distribution of fresh and processed foods in the consumption centres.

The components/facilities envisaged for the model project are as follows:

A) A Central Processing/Distribution Hub consisting of:

- A multi-chambered multi-commodity cold storage having both plus (5000 MT) and minus (2000 MT) temperature chambers as per the requirement of various products handled
- Individual Quick Freeze (2 MT/Hr) line for production of value added products from excess produce available during glut season
- Air cooled grading, sorting and packaging hall for handling of raw material both for IQF line and for storage.
- Refrigerated Vehicles (4 No. of 10 MT capacity each)
- Weigh Bridge, etc.

B) Five farm proximate Collection Centres each consisting of:

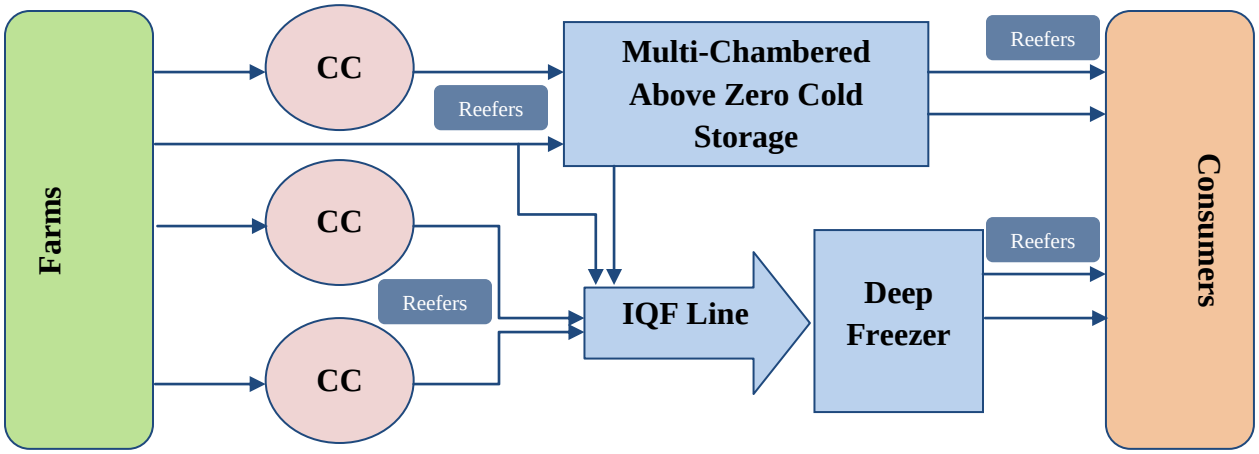
- Shed and platform for aggregation of produce from farm and their primary sorting/grading
- Weigh Bridge

The capacities of the components/facilities have been decided in way to present a standard set of components/facilities which may be replicated in various locations across most of the regions of the country with the locally available fruits and vegetables. A brief description of the process envisaged for the project is as follows:

Fruits and vegetables from the catchment area will be aggregated at the collection centres where primary sorting/grading will be done. The produce will be then weighed and sent to the central processing hub by refrigerated vehicles to reduce wastages. Some produce will also be directly

procured from the farms. At the central processing hub, the produce will be either stored in the plus temperature chambers of the cold storage or would be processed in the IQF line as per the requirement. The produce stored in plus cold storage chambers will be either eventually processed in the IQF line or will be directly sold to the wholesalers for fresh market. The IQF processed products will be stored in the minus temperature chambers of the cold storage for future distribution. From the storage the produce will be sent to the end users (such as organized retail chains, hotels, caterers, wholesalers, etc.) by refrigerated vehicles and hence maintaining the cold chain from the farm to the consumers.

The Process Flow of the Model Project



It is assumed that the project will put in place a process that will deliver high quality and safe products to its customers. Standard operating procedure manuals will be prepared for quality assurance. Further, the project will get the facility and processes certified for HACCP and ISO standards to assure safe and quality products to its esteemed customers.

Brief descriptions of the major components/facilities proposed in the project are as follows:

1) Multi-chambered Cold store with above zero and sub-zero temperature control:

The project envisages is to set up 12 chambered, 5000 MT above zero temperature multi commodity cold storage and 4 chambered 2000 MT sub zero temperature cold storage. Strategic placement of key components to build reliability and efficiency is the key to success of such facility. The technology that will be used will result in accurate monitoring of equipments, tighter temperature control and faster recovery. Pre-fabricated insulated metal laminated panels with insulation of Poly Urethane Foam (PUF) having a thickness of 100 mm will be used for construction of cold room chambers. Joinery will be achieved through cam locks and finished with Silicone Sealant.

For the above zero cold storage motorized sliding doors made of high density PUF as per the required specifications will be provided for zero degree application and up to 90% humidity. For

the multi commodity cold storage the suggested cooling system comprises of open drive single screw compressor unit with liquid pumping system integrated to forced air circulation evaporators.

For the sub-zero temperature cold storage air cooled condensation system with Freon based coolant will be used for creating chilling and freezing temperatures. Vibration eliminators will be used in refrigeration piping to achieve greater efficiency in temperature control. Safety systems like high and low pressure cut outs, microprocessor based thermo controls, pressure relief valves for deep freezers, etc. will be used appropriately to ensure high efficiency and low loss in the system. The major produces which will be processed in the IQF are potato, green peas, sweet corn and other vegetables and fruits such as apple, mango, etc.

2) Individually Quick Frozen Line (IQF):

IQF is a food preservation technology where fresh food passes through the low temperature zone very quickly, leaving very low and safe microbial counts. This type of freezing results in the product free rolling and not clotting into lumps. Through the IQF process it is possible to offer 'fresh picked' flavors (fruit, vegetable, sea foods, meat, and other fresh foods) all year round, in packaging convenient for the busy consumer. IQF foods lock in the essential nutrients and flavour, with optimum colour, taste and texture. The appeal of IQF foods is that it closely resembles the much-sought-after appearance, flavour and nutrition of the fresh versions. The project envisages to install a 2000 kg per hour IQF Line capable of handling a variety of products. The suggested system for achieving the sub zero temperature temperatures is ammonia liquid pumping system. The major produces which will be processed in the IQF are green peas, mixed vegetables, sweet corn and other vegetables and fruits.

3) Air cooled Sorting, Grading, Processing and Packaging Hall:

It is envisaged to undertake handling of IQF and stored produce by establishing an air cooled processing hall/room to carry out the various operations before and after processing. A prefabricated air-cooled sorting, grading, processing and repackaging hall will be constructed to handle a variety of operations. The facilities will include a sorting grading line of 2 MT/hour capacity.

4) Material Storage and Handling equipment

Proper handling of produce is critical to ensure that the product is not damaged during the physical handling and storage operations. Further, proper utilisation of space and cost effective movement of produce within the cold storage and distribution can be achieved by user appropriate storage and handling equipment. It is envisaged to procure plastic pallets, plastic crates, electric forklifts and crate washing system for the same.

5) Refrigerated Vehicles:

Transportation through owned reefer vehicle will ensures temperature reliability and prompt delivery. Reefer vehicles will be used to ensure delivery of products from the collection centres to central processing hub and delivery of processed products further from the processing hub to retail outlets and other customers. The project envisages to procure and operate a fleet of 4 vehicles with capacity 10 MT each.

Project Cost

The estimated capital cost for the project is Rs 2444.55 lakhs. The margin money for working capital Rs. 58.83 lakhs has been capitalised to the project cost. Hence the total project cost comes to Rs. 2503.38 lakhs. The component wise cost has been estimated on the basis of quotations received for plant and machinery from various manufacturers and on the basis of industry and engineering estimates for civil work. The Project cost details are provided in table below.

Description	Amount (Lakh Rs)	Share (%)
Land	66.88	2.67
Land & Infrastructure Development	50.00	2.00
Buildings	703.00	28.08
Plant & Machinery	1374.04	54.89
Utilities & other fixed assets	55.00	2.20
Preliminary and Pre-Operative Expenses	86.53	3.46
Contingencies	109.10	4.36
Total Project Cost (Capex)	**2444.55**	**100.00**
Margin Money for Working Capital	58.83	
Total Project Cost	**2503.38**	

The components wise detail of project cost is as below:

Land

The total land area for the project has been estimated at 2.5 acres by assuming 45% builtup area. A breakup of the builtup areas for the components is as follows:

Sr. No.	Components	Built Up (In Sq.m)
1	Cold Storage plus Deep freezer	2400
2	IQF hall	1500
3	Collection Centre Sheds (5 No.s)	500

4	Administration Block	100
	Total	**4500**

The cost of land has been taken at Rs 25.0 lakhs per acre (excluding land registration fee). The land registration fee is assumed as 7.0% *(6% towards stamp duty and 1% towards various legal expenses)* of value of land. Hence, the total cost of land for the project is estimated at Rs 66.88 lakhs (including registration fee).

Land development and Support Infrastructure

The estimated cost for development of land and construction of basic enabling infrastructure/utilities such as boundary wall, gate, security cabin at gates, green area development, roads, water treatment & supply, storm water drains, sewage collection and treatment, ETP/STP, electrical supply and distribution system, parking etc. is Rs. 50 lakhs @ Rs. 20 lakhs per acre. The estimated cost is based on standard market rates.

Civil Construction – Buildings

The civil construction involves construction of multi chamber cold storage and deep freezer, IQF Hall, Collection Centre Sheds and Administrative Block. The component wise civil work is given in the below table.

Sr. No.	Components	Built Up (In Sq.m)	Rate (Rs./Sq.m)	Civil Cost (Rs. In Lacs)
1	Multi Product Cold Storage (PEB)	1400	9,000	126.00
2	Multi Product Cold Storage (Insulation)			185.00
3	Deep Freeze (PEB)	1000	9,000	90.00
4	Deep Freeze (Insulation)			125.00
5	IQF hall	1500	9,000	135.00
6	Collection Centre Sheds	500	6,000	30.00
	Total (1)	***4400***		***691.00***
1	Administration Block	100	12,000	12.00
	Total (2)	***100***		***12.00***
	Sub Total (A = 1+2)	**4500**		**703.00**

The total cost of civil work for buildings is estimated to be about Rs 703.00 lakhs. The construction rates are as per industry standards and for some components such as puff panels, doors, insulation materials, etc, estimates have been made based on quotations received from suppliers.

Plant and Machinery

The total estimated costs of plant and machinery is Rs 1374.04 lakhs. Major components include refrigeration systems for cold storage & deep freezer, IQF, Sorting/grading/packing line, Refrigerated Vehicles, Weigh bridges etc. The cost of plant & machinery is based on the

quotation received from reputed suppliers. The quotations indicate only base prices of the equipments by excluding CST, transit insurance, VAT, transportation and any other taxes. The final cost of P&M is estimated by adding 15.3% as taxes etc to the base cost of the plant & Machinery. The component wise details of the plant and machinery are provided in the table below:

Sr. No.	Components	Capacity	Base Cost (Rs. In Lacs)	Taxes @ 15.3% (Rs. In Lacs)	Amount (Rs. In Lacs)
1	Cold Storage	5000 MT	300.00	45.90	345.90
2	Deep Freeze Store	2000 MT	175.00	26.78	201.78
3	IQF	2000 Kg/Hr	492.00	75.28	567.28
4	Reefer Vehicles (Nos.)	4	88.00	13.46	101.46
5	Sorting Grading Line		20.00	3.06	23.06
6	Other equipments	LS	76.71	11.74	88.45
7	Weighbridges at CCs	5 x 40 MT	40.00	6.12	46.12
	Total (1)		***1191.71***	***182.33***	***1374.04***

Utilities & Other Fixed Assets

The cost of misc fixed assets for the project is estimated at Rs 55.00 lakhs. The major components included under "Utilities & Other Fixed Assets" are IT system, software, office equipments and furniture, power backup, etc. For power back up, 2 DG sets of 500 KVA each have been envisaged, which will be able to supply power to all the components during power cuts. The component wise cost details are given as below:

Sr. No.	Components	Capacity	Amount (Rs. In Lacs)
1	IT System, Software and office equipments	LS	5.00
2	Furniture fixtures etc.	LS	2.00
3	Power Backup	Ls	48.00
	Total		***55.00***

Preliminary and Pre-operative Expenses

The provision towards preliminary and pre-operative expenses includes broadly expenditure towards administrative expenses and interest during construction period. It is envisaged that the project will be completed over a period of 18 months and the interest during construction period of 18 months is capitalized in the project cost. The total estimated preliminary pre-operative expense is Rs 86.53 lakhs and the details are given as below:

Particulars	Unit	Amount (Lakh Rs)	Basis
A. Adminstrative			

Salaries & Wages	LS	2.00	2 Lakh p.a.
Traveling	LS	1.00	1 lakh p.a.
Power & Fuel Cost	LS	1.00	0.5 lakh p.a.
Insurance etc.	0.50%	7.15	of equipments
Bank Processing & Upfront fees	0.50%	4.39	of loan amount
Business Development Expenses	LS	2.00	
Trial Runs Expenses	LS	2.00	
Sub Total (B)		***19.53***	
C. Interest During Construction			
Quarter-1		1.88	
Quarter-2		3.76	
Quarter-3		5.64	
Quarter-4		7.52	
Quarter-5		18.57	
Quarter-6		29.62	
Sub Total (C)		***67.00***	
Grand Total (A+B+C)		**86.53**	

Contingencies

Contingencies have been assumed at 5% of the cost of buildings, plant & machinery and utilities and other fixed assets.

Means of finance

The cost of the project is proposed to be financed through a mix of equity, grant from MoFPI under the Scheme for Cold Chain, Value Addition and Preservation Infrastructure and term loan from Bank. The promoters would contribute about 25% of the capital cost of project as equity contribution which is estimated at Rs 625.84 lakhs. The grant from MoFPI would be either 50% of Technical Civil Work (TCW) and Plant & Machinery (P&M) cost, or Rs. 1000 lakh whichever is lower. In, this case the estimated grant amount is Rs 1000.00 lakhs. The remaining funds (Rs 877.53 lakhs) would be arranged as term Loan from Bank.

Particulars	Share	Amount (Lakh Rs)
Equity	25.00%	625.84
Grant from MoFPI	39.95%	1,000.00
Debt	35.05%	877.53
Total	**100.00%**	**2,503.38**

Business Plan

The business plan for the model project has been envisaged keeping in mind the most commonly used business plan for these types of facilities. The business plan may however be modified by

the promoters depending on the location, raw materials available, financial capability of the promoters and other factors. The business plan for the model project is as follow:

- Most of the space in the above zero temperature storage would be given out on rent to farmers, traders, etc, although some space may be utilized by the project promoters for storing raw material for the IQF process.

- The IQF processing line will be operated by the promoters and deep freezers would be used to store IQF processed products.

- The refrigerated vehicles would be used to transport raw material from farm to the facilities and from the facilities to forward buyers. In off-season, the refer vehicles will also be rented out to other users.

- The sorting, grading and packing line will be used by the promoters for the IQF operations. It will be rented out to other users also depending on the availability.

Operating Assumptions

The key operating assumptions underlying the business plan are described below:

Operating Cost Assumptions

Power Cost

The total connected load of the project is estimated at about 1.2 MW. The power tariff has been assumed equivalent to the currently prevalent tariff of Rs 5.5 per unit (Rs 4.2 per unit, time charges of Rs 0.75 per unit and fix charges of Rs 0.55 per unit) for industries with HT connection. The table below explains the annual power consumption cost at full capacity:

Rate/KW (Rs)	5.5
Load (MW)	1.2
Proportion-running on power	80%
Avg. Load Factor (%)	70%
Annual Consumption (KWH)	5886720
Annual cost of Power (Lakhs Rs)	**323.77**

It is expected that in the base year the power consumption cost would be about Rs 323.77 lakhs if the project runs at full capacity though the actual consumption would depends on the utilization of the facilities.

Fuel Cost

Fuel cost for DG set has been calculated on the basis of per unit cost of production of power by DG sets. It is estimated that the average running of DG set would be for 5 hrs/ day throughout the year. The cost of power generation by using diesel as fuel has been taken at Rs 10 per unit and thus the annual power cost comes to around Rs 131.40 lakhs at full capacity utilization.

Employee Cost

The employee cost has been estimated based the present scenario of man power requirement by such scale of facilities and the present market salaries. The details of calculation are given below:

Grade/ Employee	Number	Salary/month (Rs)	Total/ Month (Rs)
Manager Operations	2	60000	120000
Managers Commercial (Finance, Account etc.)	2	60000	120000
Operator	6	17500	105000
Account Assistant	2	15000	30000
Support Staff	10	7000	70000
Total	**22**		**445000**

Manpower planning for the proposed project has been done after analyzing business operations of similar units. Other than the above list of employees, about 100-125 more people will be employed as unskilled labour on daily wages basis for loading/ unloading purpose.

Cost of Maintenance

The annual cost of maintenance has been assumed at 1.0% of the value of buildings, plant & machinery and infrastructure.

Cost of insurance

The cost of insurance has been assumed @ 1% of capital cost of basic enabling infrastructure, plant & machinery, misc fixed assets and buildings.

Admin Overheads

It includes cost towards travelling, communication, stationary and to meet day to day administrative expenses. The detail of administrative overheads is given in table below:

Particulars	Amount (Lakh Rs)	Basis

Security and House Keeping Expenses	10.00	Rs 1.0 Lakh Per Month
Traveling	10.00	1 lakh p.m.
Stationary and Consumables	3.00	0.5 lakh p.m.
Business Development Expenses	7.00	Lakh Rs
Total	**30.00**	**Lakh Rs/ Annum**

Financial Assumptions

Taxes

The income tax has been taken @ 30.9% as per the prevailing rate of income tax for corporate/industry players. The Minimum Alternate Tax (MAT) rate is taken as 18.5% as per the prevailing rate.

Depreciation Rates

Depreciation has been calculated using straight-line method for book purpose, whereas for tax purpose written down value method has been used. The rate of depreciation for plant & machinery, Misc fixed assets, buildings and enabling infrastructure has been given in the table below:

Assets Category			Book Depr	Tax Depr
	One shift	Two shift	Three Shift	
Plant & Machinery	4.75%	7.42%	10.34%	15.00%
Miscellaneous Fixed Assets	4.75%	7.42%	10.34%	15.00%
Buildings	3.34%	3.34%	3.34%	5.00%

Interest

Interest has been calculated @ 13.50% per annum for term Loan and @ 14.00% for working capital loan. The repayment period has been kept at 8.5 years including the moratorium period of ten quarters. The Equated Quarterly Instalment is estimated at Rs 48.94 lakhs for term loan of Rs 877.53 lakhs.

Revenue Assumptions

Multi-chambered Multi-Commodity Cold Store

The rental charges for cold storage facility depend on commodity stored in the chamber. The charges vary due to different volume, density and storage requirements (temperature, humidity etc.) of different commodities. For the model project, a standard rate has been considered which is comparable to prevailing market rates. The cold storage facilities will be able to generate an

income of about Rs 385.00 lakhs at current prices at full capacity utilization. The table below provide details about capacity, rentals and revenue for each location.

Capacity (MT)	Rate/ MT/month (Rs)	Months of operation	Amount (Lakh Rs)
5000	700	11	385.00

IQF Line

As mentioned earlier, it has been assumed that green peas, vegetables, sweet corn and fruits will be processed in the IQF. The operational period of the facility has been assumed to be 9-10 months. It is also assumed the facility will be operational for 16 hrs a day and hence would be able to process about 8600 MT of fruit & vegetables. The table below provides snapshot of revenue calculation for IQF line:

Products	Green Peas	Mixed Veg	Sweet Corn	Other Veg	Fruits
Installed capacity /shift (MT)	16.00	16.00	16.00	16.00	16.00
Rated capacity @ 90% MT	14.40	14.40	14.40	14.40	14.40
Days in Season	90	90	45	30	45
Available shifts of supply in season	180	180	90	60	90
Available capacity MT	2592	2592	1296	864	1296
Sales Rate per ton (Rs)	30,000	25,000	75,000	40,000	50,000
Sales Revenue (Rs. Lakh)	**777.60**	**648.00**	**972.00**	**345.60**	**648.00**

Projected Financial Performance

The projected profitability statement is given below:

(In Lakhs Rs)

Year	1	2	3	4	5	10
Capacity Utilization	40%	50%	70%	90%	90%	90%
Revenue						
CPC						
Cold Storages	154.00	192.50	269.50	346.50	346.50	346.50
IQF	1356.48	1695.60	2373.84	3052.08	3052.08	3052.08
User Charges for Refer Vans	9.60	12.00	16.80	21.60	21.60	21.60
Packhouse	16.20	20.25	28.35	36.45	36.45	36.45
Revenue	**1536.28**	**1920.35**	**2688.49**	**3456.63**	**3456.63**	**3456.63**
Expenses						
Raw Material	916.89	1146.11	1604.55	2063.00	2063.00	2063.00
Packing Material	17.28	21.60	30.24	38.88	38.88	38.88
Power	129.51	161.88	226.64	291.39	291.39	291.39

Fuel	52.56	65.70	91.98	118.26	118.26	118.26
Labour	34.56	45.36	66.68	90.02	94.52	120.63
Employee Cost	53.40	56.07	58.87	61.82	64.91	82.84
Maintenance	21.82	21.82	21.82	21.82	21.82	21.82
Insurance	21.32	21.32	21.32	21.32	21.32	21.32
Admin & Selling Overheads	40.00	40.00	40.00	40.00	40.00	40.00
Total Expenses	**1287.34**	**1579.86**	**2162.11**	**2746.50**	**2754.10**	**2798.14**
EBITDA	**248.94**	**340.49**	**526.38**	**710.13**	**702.53**	**658.49**
Interest Long Term Debt (LTD)	108.89	96.55	82.47	66.39	48.02	0.00
Interest Working Capital borrowing	24.71	30.63	42.44	54.28	54.34	54.73
Depreciation	142.31	142.31	142.31	184.24	184.24	184.24
PBT	**-26.96**	**71.00**	**259.17**	**405.23**	**415.94**	**419.52**
Tax	0.00	13.13	47.95	127.20	137.67	161.97
Net Profit (PAT)	**-26.96**	**57.86**	**211.22**	**278.03**	**278.27**	**257.56**

The above table indicates that the project will be able to achieve profit from 2nd year of operation, which will reach to Rs 278.03 lakhs in the 4th year of operation and to Rs 257.56 lakhs in the 10th year of operation.

Financial Performance indicators

Year	1	2	3	4	5	6	7
EBITDA Margin	16.20%	17.73%	19.58%	20.54%	20.32%	20.09%	19.85%
PAT margin	-1.75%	3.01%	7.86%	8.04%	8.05%	8.13%	8.26%
Return on Capital Employed (ROCE)	-2.00%	4.42%	15.01%	17.87%	16.50%	15.63%	14.34%
Current Ratio	0.96	1.43	2.10	2.72	3.53	4.29	5.25
Debt-Equity Ratio	0.47	0.39	0.29	0.19	0.11	0.03	0.00
Total Liability to Net Worth Ration (TOL/TNW)	1.55	1.33	0.97	0.70	0.46	0.28	0.20
Debt to EBITDA ratio	3.73	2.56	1.60	1.12	0.93	0.69	0.57
Interest Coverage Ratio	1.86	2.68	4.21	5.89	6.86	8.53	11.59
DSCR	1.13	1.50	2.21	2.84	2.81	2.78	4.50
Average DSCR	**2.79**						
Project IRR	**13.86%**						
Equity IRR	**21.37%**						

From the analysis of the above indicators, it is evident that the financial health of the project seems to be good. The project would be earning good returns and profit margins. Annual DSCR is showing an increasing trend and the average DSCR is about 2.79, which indicates that the project will be able to repay its debt liabilities. The project and equity IRRs are 13.86% and 21.37% respectively which are acceptable.

Sensitivity Analysis

To boost the private investment in cold chain infrastructure in the country, assistance from government will have significant effect on the viability of the project. Also, there are some risk factors which are involved which may affect the viability of the projects, especially in terms of fluctuating costs and revenues. Keeping this factor in view the sensitivity analysis has been done.

The sensitivity analysis in terms of 3 scenarios is given below:

Performance Indicators	IRR	DSCR
Present Project Cost and Revenues	13.97%	2.64
Project Cost Increase by 5%	12.93%	2.42
Project Cost Increase by 10%	11.93%	2.23
Revenue Decrease by 5%	8.28%	1.94

The sensitivity analysis shows that even with an increase of 10% in the project cost, the project is still viable with an IRR of 11.93% and DSCR of 2.23. However, if the revenue is decreased by 5% the viability of the project will be affected to certain extent, which indicates that accurate and in-depth revenue assumptions need to be made based on market research to ensure the expected revenues.