Project Design Document: Greening of Rural value chains for frozen peas

Project Background

Frozen peas are green peas that have been blanched and frozen to preserve their freshness and flavour. Fresh peas can be stored for only 3-4 days, while frozen peas can last 6-8 months, if stored correctly. Fresh green peas start losing their nutrient content mere days post-harvest but when frozen, they can retain their significant nutritional value until consumption. Sausar Farmer Producer Company is a Farmers' Producers organisation in Sausar, Chhindwara, which was formed in 2014. The FPO has 650 shareholders from nearby villages, with plans to further enlarge the reach of the FPOs. It has currently been engaged in activities like procuring seeds and delivering them to farmers, mobilising the farmers to sell their produce collectively. The FPO has also been planning to set up an integrated plant for processing peas, which can be available quite easily as Chhindwara is a major district in terms of crop production. The FPO intends to procure peas from farmers locally and embark into secondary processing to prepare marketable products like frozen peas. The FPC is currently looking for financing options to set up the plant.

Project Description

This project aims at increasing the scale of operations of the processing unit, diversification of its products, decarbonisation of the energy vector with renewable energy assets and the electric vehicles included in the logistical requirements and support for market linkages by enabling the branding of the manufactured products. The project envisages the accomplishment of these objectives through following equipment:

1. **38 kW solar photovoltaic panels systems and battery storage equipment** - Cumulative total savings on energy consumption amount to 52250 units annually, which equals to 42 tonnes of CO_2 emissions mitigated annually, assuming 6 hours of daily generation for 250 days in a year. The initial investment is compensated for by savings in electricity bills to be incurred regularly for the operation of the plant at an average variable electricity cost of INR 10/kWh, while also accommodating the operation of expanded activities like bakery, packaging and branding.
2. **Electric hauler for micro-logistical services** with a payload capacity of 500kg – cumulative total savings on using electric vehicle as compared to diesel-powered vehicle is INR 1,25,000 annually, along with 1 tonnes of CO_2 emissions mitigated.
3. **Extension of scope of operations with additional equipment** for further value addition to fetch better prices, including equipment for bakery unit, packaging unit for packaging and branding.
4. **Supporting the FPO in certification of their products** which would further improve the marketability of the product.

5. **Overall annual savings/benefits from the investments include:** INR 2,87,375 from energy vector, INR 13,74,000 from additional sales in the first year itself, with further increment in sales in the upcoming years and INR 1,25,000 from fuel switch in good carriage.

Summary of Investments

Total cost for plant and machinery is expected to be close to INR 55 lakhs that includes design, engineering, procurement, installation, first year operations and support in packaging and branding. Table below summarizes the project components and the investment requirements.

Table 1: Capital Costs for the project

S.No	Technology	Unit	Capacity	Qty (Nos.)	Cost (Rs/unit)	Value (Rs.)	Cost sharing			Sharing (%)	Relevant schemes
							FPO equity**	Govt subsidy	Loan		
1											
2	**Electric Hauler (Mahindra Treo Zor)**	kg	500	1	400000	400000	40,000	74,000	286,000	10:18.5:71.5	FAME II
3	**Frozen Peas Processing Unit**				6759000	6759000	675,932	1000000	5,083,388	10:15:75	PMFME, point iii and iv
	Product Feeding Conveyor	kg/hr	100	1	141600						
	Continues online washer	kg/hr	100	1	531000						
	Pea Podder	kg/hr	100	1	418900						
	Continues Online blancher	kg/hr	100	1	590000						
	Sorting/ manual inspection conveyor	kg/hr	100	1	165200						

	Product Elevator Conveyor	kg/hr	100	1	106200						
	Vibratory screen Conveyor	kg/hr	100		177000	380000					
	Blast Freezer			4	1003000						
	Metal Detector			1	41300						
	Control Panel				40120						
	Branding and Packaging			1	225000	225000					
	Packaging machine			1	200000						
	Bar Coding Machine				25000						
	Land and Buildings				1850000						
	Solar photovoltaic rooftop system	kW	38	1	1720000	1720000					
	Total*					**7,409,320**	**715,932**	**1,074,000**	**5,619,388**	**10::14::76**	

Source: MP Ensystems Research

*Project cost includes all costs (plant and machinery, solar photovoltaic panel costs, et al)

**Based on discussions held on ground and their financial conditions, equity share ranges from 5% to 15%, hence has been assumed at 10%

Barriers addressed in the project implementation:

The FPO has been aspiring to work for improving the income levels of farmers in the region through procurement of their produce locally at remunerative prices and distribute the profits generated through the operations of the plant as dividend at a later stage. It aims to achieve these targets through a low carbon pathway, which would further improve its sustainability in the long run and doesn't add to the widespread land and air pollution in

Singrauli through its operations. The key barriers addressed through the proposed project implementation are listed below.

Table 2: Barriers addressed through the project

Barriers	**How the proposed project will address barriers through net-zero carbon solutions**
Frequent power outages, reliance on diesel generator sets as backup, high operation expenses	Installation of a rooftop solar panels which eliminates carbon emissions while ensuring continued power availability at minimal costs
High cost of fuel for transport and logistics	Use of electric hauler for local transportation to bring-in produce from the individual farms to the central processing facility
Limited scope of operations	Addition of bakery unit and further processing to produce more value-added products, which have greater visibility and fetch better prices
Market Access	The packaging machine helps shape the brand identity of the products which improves market access.

Source: MP Ensystems Research

Financial Analysis

A simple cash-flow analysis is below, with the conservative assumption that the equipment has a lifespan of 10 years.

Project Cost

The major components of a small-scale fruit processing unit are land, building and civil works. A project cost of **INR 74.09 Lakhs** has been estimated. The details of project cost are given in **Table 3**

Table 3: *Total Project Cost*

Project Cost					
S. No.	**Particulars**	**Unit**	**Qty.**	**Rate (Rs.)**	**Amount (Rs. Lakh)**
1	Land	acre	0.5	500000	2.5
2	Land Development				5
3	Civil Work				5

4	Storage Area	Sq ft	1000	200	2
5	Plant and Machinery				55.5932
6	Miscellaneous fixed assets				2
7	Preliminary and Preoperative expenses				2
	Total				74.0932

Source: MP Ensystems Research

Operational Expenses

The operational expenditure incurred under different heads is as specified in Table 4. The operational expenditure is expected to grow at an annual rate of 5%.

Table 4: Operational expenditure

Manpower Requirement				
S. no.	**Personnel**	**Number**	**Salary (Per Month)**	**Total (Rs. Lakh/year)**
1	Plant manager	1	20000	2.4
2	Workers	3	12000	4.32
3	Accountant	1	15000	1.8
	Total			8.52
Other Costs				
S. No.	**Cost Head**	**Annual Cost(INR)**		
1	Administrative Costs	50000		
2	Utility Costs	50000		
3	Marketing and advertising	50000		
	Annual Increase in wages, administrative and utility costs	5%	(Assumed)	

Source: MP Ensystems Research

Means of Finance

Financing to food processing falls under priority sector lending. The loans to units meeting the criteria of MSME are classified under MSME sector. Such units can be financed by any scheduled commercial banks, Regional Rural Banks and Cooperative Banks. Important terms and conditions of financing such units are discussed in this section.

Table 5: Means of Financing

Means of Finance		
Total Financing required	INR lakhs	74.0932
Equity	%	10%
Grant	%	14%
Debt	%	76%
Interest Rate (Per Annum)	%	12.00%
Moratorium	Years	1
Annual Installments	Years	9
Equity Component	INR lakhs	7.1532
Grant Component	INR lakhs	10.74
Debt Component	INR lakhs	56.20

Source: MP Ensystems Research

Based on the assumptions on input and output parameters, an Income Expenditure statement (Cash Flow Statement) prepared. The financial indicators like Net Present Worth (NPW), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR) etc. analysed by discounting cash flow @10% discounting rate are given in **Annexure II** and summary is presented in **Table 6**.

Table: 6 Estimated Financial Indicators

Financial Indicators	**Estimated**	**Requirement**
Net Present Worth	68.55	Should be +ve
IRR	34%	> 10%
BCR	1.17	Should be >1.0
DSCR	2.80	Should be >1.5

Source: MP Ensystems Research

The repayment period has been drawn by considering net surplus available for repayment. The bank loan with interest is repayable within 9 years with a moratorium of one year. The debt service coverage ratio based on assumed techno economic parameters is found satisfactory.

The following specific attributes of ESG can further be achieved through the implementation of this project:

- There are a number of environmental opportunities including mitigation of carbon emissions, reduction of resource depletion. There are direct climate benefits to the project. The installation of roof-top solar results in the mitigation of 22 tonnes of CO_2 emissions every year, while the usage of EVs leads to the prevention of 1 tonne of CO_2 annually.
- There is a strong integration of gender-diverse leadership as most of the members of the FPO, including in decision-making positions, are women. The project will increase

social opportunities and strengthen existing community relations by generating local employment and increasing income opportunities.

Annexure I: Catalogue of processed products

Types of processed Products	**Selling Price (Rs/kg)**	**Packaging Cost (INR/kg)**
Frozen Peas	100	2
Wastage of peas during processing (including cover)	%	30%
Rate of peas	INR/kg	50

Annexure II: Calculation of financial indicators

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Capital Cost	74.0932	0	0	0	0	0	0	0	0	0
Recurring Cost	58	67	75	84	93	93	94	94	95	96
Total Cost	132	67	75	84	93	93	94	94	95	96
Benefits	72	84	96	108	120	120	120	120	120	120
Net Benefits	-60	17	21	24	27	27	26	26	25	24
Discounting Factor	10%									
Net Present Worth	68.55									
IRR	34%									
BCR	1.17									