Project Design Document: Greening of rural value chains for orange cleaning, grading and waxing unit

Project background

Orange Valley Farmers Producer Company Limited is a 308-member farmer-producer organisation (FPO) incorporated in 2020. The details of FPO are mentioned below.

Table 1 Details of FPO

Name of FPO	Orange Valley Farmer Producer Company Limited
Address	At Dehare, Ahmednagar District: Ahmednagar, Maharashtra, India - 414111.
Activity	Trading of agricultural produce
Propose activity	Orange cleaning, grading and waxing unit
Capacity of unit	6 TPH
Produce	Orange
Number of operational days	90
Connected load (kW)	93.21

The raw material is sourced from the member and non-member farmers of FPO in the region. The value chain is as follows:

However, the processing unit will face challenges of high operation costs, a major component of which is electricity cost. This issue will result in low profitability of the unit.

Project description

This project aims at the solarisation of unit by installing solar PV. The specifications of the proposed solar PV system and annual savings are as follows,

Table 2 Details of solar PV system

Solar photovoltaic panel system	80.46 kW
Annual mitigation of CO_2	92.80-ton CO_2 per year
Average savings on annual electricity unit consumption	117472 units
Average saving on annual electricity bill	INR 1498123

*Assumption:

1. Saving per unit electricity consumption INR 10 per KWh
2. Average power generation per KWp= 4 kWh/KWp/day

3. Average daily working of unit = 18 hours

Summary of investments

Total project cost is expected to be close to INR 44.25 lakhs that includes design, engineering, procurement, and installation. Per kW cost of solar PV is considered 50,000 Rs/kW with EE measures of INR 5000 per kW is considered.

Table 3 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	Project Cost*										
	Solar photovoltaic panel system with battery	kW	80.46	1	40,23,000	40,23,000	8,04,600	0	32,18,400		
	Energy-efficient measures			1	4,02,300	4,02,300	80,460		3,21,840		
	Total				44,25,300	44,25,300	8,85,060	0	35,40,240	20::0::80	

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

***Based on discussions held on the ground and their financial conditions, equity share ranges from 5% to 30%, hence has been assumed at 20%*

Financial analysis

A simple cash-flow analysis is below, with the conservative assumption that the equipment has a lifespan of 20 years.

Project cost

The project cost of 44.25 lakh includes solar panel equipment cost and installation cost, other components of project cost are taken as zero as the plant is already proposed.

Means of finance

Regarding the implementation of solar rooftop installations for industrial consumers, no subsidies are accessible for this initiative. Consequently, the funding for the project will be undertaken by the FPO. The financial arrangement for this venture entails a 20% equity investment from the FPO and the remaining 80% through a loan arrangement. Additional specifics concerning the financing breakdown can be referenced in Table 4.

Table 4 Means of Financing

Means of Finance		
Total Financing required	INR lakhs	44.25
Equity	%	20%

Grant	%	0%
Debt	%	80%
Interest Rate (Per Annum)	%	12.00%
Moratorium	Years	1
Annual Instalment	Years	5
Equity Component	INR lakhs	8.85
Grant Component	INR lakhs	0
Debt Component	INR lakhs	35.40

Source: MP Ensystems Research

The financial indicators analysed by discounting cash flow at 10% and the summary is presented in **Table 5**.

Table 5 Estimated Financial Indicators

Financial Indicators	Estimated	Requirement
Net Present Worth	65.03	Should be positive
IRR	39%	> 10%
BCR	2.8	Should be >1.0
Payback period	5.2 years	

Source: MP Ensystems Research

The bank loan with interest is repayable within 5 years with a moratorium of one year.

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 92.80 tonnes of CO_2 emissions every year.