

DETAILED PROJECT REPORT (DPR)

2 MW Solar Power Generation System

For Supplying Power to Manufacturing Companies

1. Executive Summary

This project proposes the establishment of a **2 MW Grid-Connected Solar Photovoltaic (PV) Power Plant** to supply clean and cost-effective electricity to **manufacturing companies** through **captive, group captive, or open-access models**.

The project aims to:

- Reduce industrial power costs
- Ensure uninterrupted energy supply
- Support sustainability and ESG compliance
- Generate stable long-term returns for investors

Project Capacity: 2 MW

Project Life: 25 Years

Estimated Investment: ₹8.6 – ₹9.2 Crores

2. Project Objectives

- Supply affordable renewable power to manufacturing units
 - Reduce dependence on grid & diesel power
 - Hedge against future tariff hikes
 - Reduce carbon footprint of industries
 - Create long-term sustainable infrastructure
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3. Industry Need & Market Potential

3.1 Power Challenges for Manufacturing Companies

- High electricity tariffs (₹7–₹10/unit)
- Demand & peak load penalties
- Power fluctuations affecting production
- Increasing ESG & carbon compliance pressure

3.2 Solar as a Solution

- Solar tariff: ₹3.5–₹5/unit
 - Fixed cost for 25 years
 - Minimal maintenance
 - Strong policy & financing support
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4. Project Description

4.1 Type of Project

- **Grid-Connected Ground-Mounted Solar PV Power Plant**
- Power evacuation at **11 KV / 33 KV**

4.2 Business Models

1. Captive Power Plant
 2. Group Captive Model
 3. Third-Party PPA (Open Access)
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5. Location & Land Requirement

5.1 Land Requirement

- **8–10 acres** for 2 MW
- Flat land with minimal shading

5.2 Ideal Location Characteristics

- Near industrial cluster
 - Close to grid substation
 - High solar irradiation (Tamil Nadu / South India preferred)
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6. Technical Specifications

6.1 Solar Modules

- Type: Mono PERC / TOPCon
- Rating: 540–600 Wp
- Quantity: ~3,400–3,700 modules
- Efficiency: 21%+
- Warranty:

- Performance: 25 years
- Product: 12 years

6.2 Inverters

- Type: String / Central Inverters
- Total capacity: 2 MW
- Efficiency: >98%
- Remote SCADA monitoring

6.3 Balance of System (BOS)

- Hot-dip galvanized mounting structures
- DC & AC cables
- LT & HT panels
- SCADA & weather monitoring station
- Lightning arrestor & earthing

7. Power Generation Estimation

7.1 Expected Generation

- CUF: 19–21%
- Annual Generation: **32–36 lakh units (kWh)**

7.2 Energy Utilization

- Direct industrial consumption
- Banking facility (subject to DISCOM rules)

8. Project Cost Estimate (2 MW)

Component	Cost (₹ Lakhs)
Solar Modules	420
Inverters	90
Mounting Structures	70
Electrical BOS	100
Land Development	40
Evacuation & Grid Connectivity	50
Engineering, Installation & Commissioning	60
Contingency & Miscellaneous	30
Total Project Cost	860 – 920 Lakhs

9. Operating & Maintenance Cost (Annual)

Expense	Cost (₹ Lakhs/Year)
O&M Contract	16–18
Insurance	4
Land Lease	8
Administration	5
Total OPEX	33–35

10. Revenue & Financial Analysis

10.1 Cost of Power

- Solar power cost: ₹3.5–₹4.5/unit
- Industrial grid tariff offset: ₹7–₹9/unit

10.2 Annual Financial Benefit

- Units Generated: 34 lakh units
- Average Savings: ₹4/unit
- **Annual Savings / Revenue: ₹1.36 Crores**

10.3 Key Financial Indicators

- Payback Period: **5–6 years**
- Project Life: **25 years**
- IRR: **15–18%**
- ROI: **Strong & Stable**

11. Funding & Financing Structure

11.1 Capital Structure

- Term Loan: 65–70%
- Promoter Equity: 30–35%

11.2 Available Incentives

- Accelerated Depreciation (40%)
- GST Input Credit (subject to structure)
- Green energy loans at reduced interest

- Carbon credit potential

12. Legal & Regulatory Approvals

- DISCOM Grid Connectivity Approval
 - Open Access / Captive Approval
 - CEIG / Electrical Inspectorate Approval
 - Pollution Control Board – NOC
 - MNRE Compliance
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13. Environmental Impact

- CO₂ reduction: **~2,400 tons/year**
 - Zero water consumption
 - Supports CSR & ESG objectives
 - Improves green branding of industries
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14. Risk Analysis & Mitigation

Risk	Mitigation Strategy
Policy changes	Long-term PPA
Grid curtailment	Proper evacuation planning
Equipment failure	Tier-1 OEM suppliers
Weather risk	Comprehensive insurance

15. Implementation Timeline

Phase	Duration
Land & Approvals	1–2 months
Procurement	1 month
Construction & Installation	2 months
Testing & Commissioning	2 weeks
Total Duration	4–5 months

16. Conclusion

The **2 MW Solar Power Generation Project** is a **technically feasible, financially attractive, and environmentally sustainable** solution for supplying power to manufacturing companies. It ensures **long-term cost savings, energy security, and green compliance**, making it an ideal infrastructure investment.

