DETAILED PROJECT REPORT (DPR)

Project Title: 500KWp Solar PV Grid-Connected Plant

(RESCO Model)

PART A – General Details of the Project

1. Project Title:

500KWp Solar PV Grid-Connected Plant

2. Executive Summary

The proposed **500KWp Solar PV Grid-Connected Plant** aims to provide clean and sustainable energy to **XYZ Facility**, reducing reliance on conventional power sources. The facility currently consumes an estimated **200,000 kWh annually**, which is expected to rise to **650,000 kWh** within the next year.

The solar plant will operate in a **net-metering mode**, enabling energy savings of up to **85%** of total consumption. The system will be **grid-connected** without battery storage, and excess power will be injected into the grid via a **bi-directional net meter**.

- **Location:** XYZ Facility, City, Country
- **Rooftop Area Available:** 4500 sq. meters
- **Estimated Annual Generation:** 750,000 kWh
- **Grid Voltage Level:** 415V LT Side
- **Expected CO_2 Reduction:** 500 metric tons per year

3. Socio-Economic Justification

- **Reduced Carbon Footprint:** The project contributes to **reducing greenhouse gas emissions**.
- **Economic Savings:** Reduces **electricity costs** and ensures long-term sustainability.
- **Job Creation:** Involves **local workforce** in installation and maintenance.

4. Benefits from the Project

- Reduces dependency on **fossil fuels**.
- **Lower electricity bills** through net metering.
- Promotes **clean energy adoption** in commercial facilities.

PART B – Technical Details

5. Technical Details of the Project

The system comprises:

- **Solar PV Modules: 540Wp Mono-PERC** panels with 25-year warranty.
- **Inverter: 100KW Grid-Tied Inverter** (4 units).
- **Mounting Structure:** Hot-dip galvanized steel for durability.
- **Net-Metering System:** Integrated for grid export.

6. Operation and Maintenance

- **Warranty:** 25 years for modules, 5 years for inverters.
- **Preventive Maintenance:** Monthly inspections, performance monitoring, and cleaning.

7. Performance Monitoring Mechanism

- **Real-time monitoring** using IoT-based data loggers.
- **Automated alerts** for system faults or efficiency drops.

8. Expected Energy Generation

- **Annual Generation:** 750,000 kWh
- **Efficiency Factors:**
    - **Solar Panel Efficiency:** 18%
    - **Inverter Efficiency:** 98%
    - **Grid Availability:** 95%

PART C – Financial and Implementation Plan

9. Project Cost Estimate

Component	Specifications	Quantity	Estimated Cost (USD)
Solar Panels	540Wp Mono-PERC	926 units	$250,000
Inverters	100KW Grid-Tied	4 units	$40,000
Mounting Structure	Hot-Dip Galvanized	As Required	$30,000

Cabling & Wiring	Copper, XLPE	As Required	$15,000
Net-Metering System	Bi-Directional Meter	1 unit	$5,000
Installation & Labor	Civil & Electrical Works	-	$50,000
Total Estimated Cost	-	-	**$390,000**

10. Project Timeline

- **Phase 1 (Planning & Approvals):** 1 Month
- **Phase 2 (Procurement & Delivery):** 2 Months
- **Phase 3 (Installation & Testing):** 2 Months
- **Phase 4 (Commissioning & Handover):** 1 Month

Conclusion

The **500KWp Solar PV Grid-Connected Plant** is a financially viable and environmentally sustainable solution that aligns with **global renewable energy goals**. The project ensures **long-term energy security** while significantly **reducing carbon emissions**.