DETAILED PROJECT REPORT (DPR)

Project Title: 600KWp Solar PV Grid-Connected Plant

(RESCO Model)

PART A – General Details of the Project

1. Project Title:

600KWp Solar PV Grid-Connected Plant

2. Executive Summary

The proposed **600KWp Solar PV Grid-Connected Plant** is designed to provide **clean, renewable energy** to **Lakeside Industrial Park**, significantly reducing electricity costs and enhancing sustainability efforts. The facility's current electricity consumption is **300,000 kWh annually**, with an expected increase to **800,000 kWh** over the next three years.

The system will be **grid-connected with a net-metering mechanism**, allowing excess energy to be exported back to the grid. The project is expected to **cut electricity expenses by 75%** and reduce carbon emissions considerably.

- **Location:** Lakeside Industrial Park, Springfield, USA
- **Available Rooftop Area:** 5,200 sq. meters
- **Estimated Annual Generation:** 920,000 kWh
- **Grid Voltage Level:** 480V
- **Expected CO_2 Reduction:** 600 metric tons per year

3. Socio-Economic Justification

- **Environmental Benefits:** Reduction of **600 metric tons of CO_2 emissions annually**.
- **Economic Advantages:** Lower energy costs for industrial operations.
- **Community Impact:** Supports **local clean energy initiatives** and job creation.

4. Benefits from the Project

- Supports **renewable energy policies** and **sustainability goals**.
- Promotes **energy independence** by reducing reliance on fossil fuels.
- Encourages **industrial decarbonization** and corporate responsibility.

PART B – Technical Details

5. Technical Details of the Project

The project will be designed with the following components:

- **Solar PV Modules: 550Wp Polycrystalline Panels** with a 25-year warranty.
- **Inverters: 120KW Grid-Tied Inverters** (5 units).
- **Mounting Structure: Aluminum alloy with corrosion resistance**.
- **Net-Metering System:** Integrated with a **real-time energy monitoring interface**.

6. Operation and Maintenance

- **Warranty:** 25 years for modules, 6 years for inverters.
- **Maintenance Schedule:**
    - **Monthly Performance Checks**
    - **Quarterly Panel Cleaning**
    - **Annual Electrical System Inspection**

7. Performance Monitoring Mechanism

- **Cloud-based performance tracking** with real-time alerts.
- **Automated fault detection system** to identify efficiency drops.

8. Expected Energy Generation

- **Annual Generation:** 920,000 kWh
- **Efficiency Factors:**
    - **Solar Panel Efficiency:** 17.5%
    - **Inverter Efficiency:** 97%
    - **Grid Availability:** 98%

PART C – Financial and Implementation Plan

9. Project Cost Estimate

Component	Specifications	Quantity	Estimated Cost (USD)
Solar Panels	550Wp Polycrystalline	1,091 units	$310,000

Inverters	120KW Grid-Tied	5 units	$60,000
Mounting Structure	Corrosion-Resistant Alloy	As Required	$40,000
Cabling & Wiring	Copper, UV-Protected	As Required	$22,000
Net-Metering System	Smart Bi-Directional Meter	1 unit	$8,000
Installation & Labor	Civil & Electrical Works	-	$65,000
Total Estimated Cost	-	-	**$505,000**

10. Project Timeline

- **Phase 1 (Planning & Permitting):** 1.5 Months
- **Phase 2 (Procurement & Logistics):** 2.5 Months
- **Phase 3 (Installation & Testing):** 2 Months
- **Phase 4 (Commissioning & Final Approval):** 1 Month

Conclusion

The **600KWp Solar PV Grid-Connected Plant** is a well-structured, **financially viable**, and **technically sound** renewable energy solution. The project aligns with **global sustainability efforts** and **corporate decarbonization goals**, ensuring **long-term cost savings** and **environmental benefits**.