100kW Solar Rooftop Installation at National Bank for Agriculture and Rural Development – Bhuvneshwar

Project Integrator & Developer –

Sunkranti Energy Private Limited.

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1. Introduction:

NABARD is India's apex development bank, established in 1982 under an Act of Parliament to promote sustainable and equitable agriculture and rural development. In its journey of more than four decades, the premier development financial institution has transformed lives in Indian villages through Agri-finance, infrastructure development, banking technology, promotion of microfinance and rural entrepreneurship through SHGs & JLGs and more. It continues to aid in nation building through participative financial and non-financial interventions, innovations, technology and institutional development in rural areas. The Bank was facing rising energy costs, environmental compliance pressures, and a need to reduce its carbon footprint. After assessing various options, NABARD decided to install a solar rooftop system to power its operations and meet sustainability goals.

2. Problem Statement:

The NABARD faced several challenges:

- **High Energy Costs**: Energy bills accounted for a significant portion of operational costs.
- **Sustainability Goals**: Sunkranti Energy is aiming to reduce its environmental impact and meet corporate sustainability targets.
- **Energy Price Fluctuations**: DISCOM was increasingly vulnerable to energy price volatility due to reliance on the local grid.

3. Project Objectives:

- **Reduce Electricity Costs**: Lower operational expenses by offsetting a significant portion of electricity consumption.
- **Increase Energy Independence**: Minimize reliance on external energy sources and mitigate risks from power outages or price fluctuations.
- **Enhance Sustainability**: Achieve a reduction in greenhouse gas emissions and contribute to the company's green image.

4. Solution Overview:

Sunkranti Energy & NABARD decided to install a **100-kW solar photovoltaic (PV) system** on the rooftops of their main manufacturing facility. The system was designed to meet **50% of the company's total energy consumption**. Key features of the solution include:

- **System Size**: 100 kW (enough to generate approximately 146000 kWh annually).
- **Solar Panels**: High-efficiency Bi-facial glass to glass panels with a 30-year warranty.
- **Inverters**: Commercial-grade string inverters to optimize energy conversion with a 10-year warranty.
- **MMS** – Module Mounting structure with 180-micron HDG that will sustain of 120km/hr wind speed.
- **Roof Utilization**: The system used about 85% of the available 10,000 square feet of roof space.
- **Energy Net Metering:** Net metering mechanism that allows Nabard to export excess solar energy generated at their rooftop solar plant to the grid of DISCOM, which is then adjusted against NABARD energy bill.

5. Financial Breakdown:

- **Installation Costs**: The total upfront cost of the installation, including solar panels, inverters, batteries, and labor, was **45 lakh** INR
- **Incentives and Tax Credits**: The project qualified for federal and state incentives, including the **30% Investment Tax Credit** and a local utility rebate, which reduced the upfront investment.
- **Annual Energy Savings**: The solar system is expected to generate 1168000 Rs. INR in annual savings from reduced electricity costs.
- **Return on Investment (ROI)**: The expected payback period is **4 years**. After that, the system will continue to provide energy savings with minimal maintenance costs.
- **Net Savings**: After accounting for incentives, annual savings, and system costs, NABARD anticipates a **2.2 Cr INR** net savings over the next 20 years.

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6. Environmental Impact:

- **CO2 Emissions Reduction**: The solar system will offset approximately **63 tons of CO2** annually, equivalent to removing **18 cars from the road**.
- **Sustainability Achievements**: The system aligns with NABARD's commitment to reducing its carbon footprint and contributes to meeting environmental compliance standards.

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7. Installation Timeline:

- **Site Assessment & Design**: 1 month. Detailed analysis of energy consumption patterns, design 3D roof structure, shadow analysis and sunlight exposure.
- **Permitting & Approvals**: 2 months. Securing necessary local permits and coordinating with the utility for grid connection and net metering approval.
- **Installation**: 3 months. Full installation of solar panels, inverters, and permissions.
- **Commissioning**: 1 month. Final testing, system calibration, and handover to operations.

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8. Challenges and Solutions:

- **Roof Reinforcement**: The roof required some reinforcement to support the solar panels. A structural engineer assessed and made recommendations for minor modifications, which were incorporated into the design.
- **DG Set Integration**: Integrating DG Set with the existing electrical infrastructure required careful planning to avoid downtime and ensure seamless operation. This was achieved by working with specialized energy management systems to optimize energy use.
- **Operational Disruption**: Installation took place during off-peak production hours to minimize disruption to daily operations.

9. Monitoring and Maintenance:

- **Real-Time Monitoring**: A cloud-based monitoring platform was installed, providing the operations team with real-time data on energy generation, storage, and consumption.
- **Maintenance Plan**: The solar panels come with a 30-year warranty, but regular maintenance (cleaning and inspections) is planned annually to ensure optimal performance.
- **Performance Guarantee**: The system provider offers a performance guarantee for the first 5 years, ensuring that the system meets minimum energy production thresholds.

10. Lessons Learned:

- **Thorough Pre-Installation Assessment**: A detailed roof inspection and energy audit helped to avoid surprises during the installation process.
- **Integration Challenges**: Integrating the system with the NABARD's existing electrical infrastructure required close collaboration with the utility provider and careful planning.
- **Financial Planning**: While the initial investment was substantial, the long-term savings and incentives made the solar rooftop installation a financially viable option.

11. Conclusion:

The solar rooftop installation at NABARD's was a success, meeting the Nabard's objectives of reducing energy costs, increasing sustainability, and enhancing energy independence. The system's performance exceeded expectations, providing substantial energy savings and helping the company achieve its green goals. The project also positioned Sunkranti Energy as a leader in sustainability within the solar integration and developer sector.

Key Takeaways:

- Solar energy can be a powerful tool for businesses looking to reduce costs and improve sustainability.
- Government incentives and rebates can significantly lower the financial barriers to solar adoption.
- The long-term benefits of solar energy, both financial and environmental, far outweigh the initial investment.
- Planning and collaboration with energy experts and utility providers are critical for successful installation and integration
- Storages of energy could be useful for the peak hours terrif.