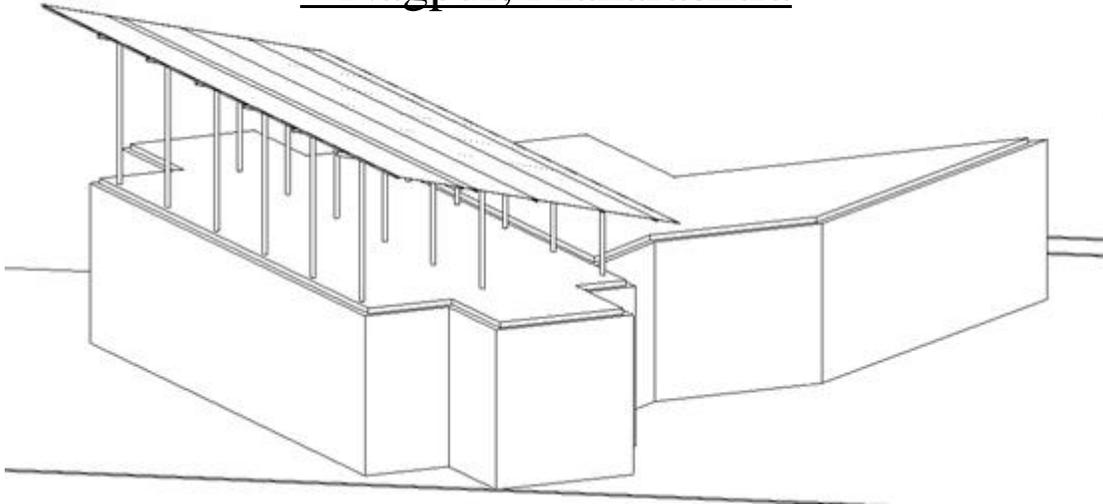


25 KW Solar Rooftop Installation at Asara Apartment

– Nagpur, Maharashtra



Project Integrator & Developer –

Sunkranti Energy Private Limited.

1. Introduction

The need for sustainable and cost-effective energy solutions has led to the increased adoption of solar power systems in residential area. This case study focuses on the installation of 25 KW solar rooftop system at an Asara Apartment, showing its planning, execution, challenges and outcomes. The main objective behind solar roof top installation is to reduce dependency on grid electricity and lower energy costs for residents of apartment. The 1st step is to analyse and planning about feasibility. A feasibility study to determine the apartment's solar potential, roof space analysis, and load requirements. Structural analysis confirmed that the rooftop could support the weight of the panels and equipment.

2. Problem Statement:

An Asara Apartment 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



Enhance Sustainability



Increase Energy Independence

4. Solution Overview:

Sunkranti Energy & Asara Apartment decided to install a **25-kW solar photovoltaic (PV) system** on the rooftops of apartment. The system was designed to meet **98% of the Apartment's total energy consumption**. Key features of the solution include:

- **System Size:** 25 kW (enough to generate approximately 50200 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 Apartment to export excess solar energy generated at their rooftop solar plant to the grid of DISCOM, which is then adjusted against Apartment energy bill.



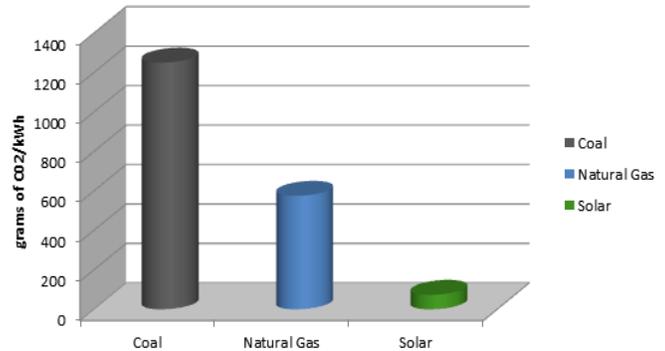
5. Financial Breakdown:

- **Installation Costs:** The total upfront cost of the installation, including solar panels, inverters, batteries, and labour, was **15 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 4, 01,500 Rs. INR in annual savings from reduced electricity costs.
- **Return on Investment (ROI):** The expected payback period is **4 year**. 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, Asara Apartment anticipates a **4 Lakh INR** net savings per year.

6. Environmental Impact:

- **CO2 Emissions Reduction:** The solar system will offset approximately **45 tons of CO2** annually, equivalent to removing **10 cars from the road**.
- **Sustainability Achievements:** The system aligns with Asara Apartments commitment to reducing its carbon footprint and contributes to meeting environmental compliance standards.

Carbon Dioxide Emissions by Energy Source



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.

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 Asara Apartments 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.
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11. Conclusion:

The solar rooftop installation at Asara Apartment was a success, meeting the Apartment'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 hour's tariff.
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