115kW Solar Rooftop Installation in

Madhya Pradesh State Tourist Development Corporation Limited

-at Tawa resort, Baisan Resort, Maikal Resort & Marbal Rock

Project Integrator & Developer – Sunkranti Energy Private Limited

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1. Introduction:

MPT Tawa Resort is adjoining the Tawa reservoir. The rooms in this resort are designed to capture full view of the dam. The sprawling lay out of the property offers enough space for the kids to play around. The quality food, unmatched guest service and hospitable ambience make it the best hotel its precincts. The closest airport to this property is Raja Bhoj Airport (135 km). What people love the most about this property is its great location and hospitality.

MPT Bison Resort situated essentially at the forest entry point of the Satpura National Park puts you in touch with nature at its pristine best. Nestled in the back waters of Tawa Reservoir, this beautiful waterfront property is popular for its fine cottages, peerless hospitality and breath-taking ambience.

MPT Maikal Resort of 'MPT Hotels & Resorts' offers par excellence hospitality in these tranquil surroundings. Away from all cacophony of cities, the resort offers the calming view of the vast expanse of the water of the Bargi dam. The resort offers best service and quality food. Bargi dam is 1 km from this place.

The Marble Rock Resort is the best place to enjoy the dazzling Marble Rocks towering above a meandering Narmada is MPT Hotels & Resorts' MPT Marble Rocks. You could stay in our comfortable and uniquely positioned rooms or take a tent to feel one with nature.

These resort comes under the Madhya Pradesh State Tourist Development Corporation Limited these resort were facing rising energy costs, environmental compliance pressures, and a need to reduce its carbon footprint. After assessing various options, Tawa resort, Baisan resort, Maikal resort & Marbal resort decided to install a solar rooftop system to power its operations and meet sustainability goals.

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2. Problem Statement:

The Resort's 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.
- **Emission of CO_2**: Due to fuel used in generation of energy, CO_2 emission increases, this will affect the nature of Environment and MP tourism Development

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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.

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4. Solution Overview:

Sunkranti Energy & Madhya Pradesh State Tourist Development Corporation Limited decided to install a **115-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**: 115 kW (enough to generate approximately 1,000,000 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 resort's to export excess solar energy generated at their rooftop solar plant to the grid of DISCOM, which is then adjusted against resort's energy bill.
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5. Financial Breakdown:

- **Installation Costs**: The total upfront cost of the installation, including solar panels, inverters, batteries, and labour, was **54.85 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, MADHYA PRADESH STATE TOURIST DEVELOPMENT CORPORATION LIMITED anticipates a **2.2 Cr INR** net savings over the next 20 years.

MPSTDC

Madhya Pradesh State Tourism Development Corporation,

Paryatan Bhavan, Bhad Bhada Road, Bhopal 462003.

Solar Power Plant Generation report - March 2023

SITE	Tawa Resort 30KW			Baison Resort 30KW			Marbal Rock 15KW			MAIKAL RESORTS 40KW			Total 115kw
Month	Total Generation	Tariff LV2.2	Saving	Total Generation	Tariff LV2.2	Saving	Total Generation	Tariff LV2.2	Saving	Total Generation	Tariff LV2.2	Saving	Montly Save
Aug-22	1752	7.55	12,088.00	1965	6.9	13,558.00	0	6.9	-	3764	6.9	25971	51,617.00
Sep-22	3136	7.55	21,638.00	3055	6.9	21,079.00	1465	6.9	10,108.00	4765	6.9	32878	85,703.00
Oct-22	4190	7.55	28,911.00	4098	6.9	28,276.00	1794	6.9	12,378.00	4852	6.9	33478	1,03,043.00
Nov-22	3696	7.55	25,502.00	3795	6.9	26,185.00	1400	6.9	9,660.00	4560	6.9	31464	92,811.00
Dec-22	3595	7.55	27,142.25	3450	6.9	23,805.00	1433	6.9	9,887.70	4875	6.9	33638	94,472.45
Jan-23	3298	7.55	24,899.90	3375	6.9	23,287.50	1392	6.9	9,604.80	4273	6.9	29484	87,275.90
Feb-23	4083	7.55	30,826.65	4181	6.9	28,848.90	1489	6.9	10,274.10	4590	6.9	31671	1,01,620.65
Mar-23	4097	7.55	30,932.35	4256	6.9	29,366.40	1560	6.9	10,764.00	4757	6.9	32823	1,03,886.05
			2,01,940.15			**1,94,405.80**			**72,676.60**			**2,51,406.50**	**7,20,429.05**

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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.

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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.

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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 MADHYA PRADESH STATE TOURIST DEVELOPMENT CORPORATION LIMITED'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 MADHYA PRADESH STATE TOURIST DEVELOPMENT CORPORATION LIMITED's was a success, meeting the Madhya Pradesh State Tourist Development Corporation Limited'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.