



Case Study: First Net-Zero Building in India

OutBack Grid/Hybrid Power System Installation



Overview

Malankara Plantations Limited, founded in 1910, is an active plantation company operating in a historical business complex. The office power consumption consists of 18 tons of air conditioning, followed by water pumps, three packing machines, IT/networking and lighting. It was connected to a private power grid owned by the local maharaja, but the complex experienced frequent blackouts due to power shortages on the electrical grid.

With rising energy costs and increased availability of government subsidies, management turned to TeamSustain to install solar panels on the existing roof while preserving the historical integrity of the structure. The 27kW system consists of nine OutBack GVX inverters, seven FLEXmax Charge Controllers and two MATE3 communication devices.

The new system ensures uninterrupted power, offers an energy cost savings payback of less than five years and has made the structure the **first Net-Zero building in India**.

System Specifications

Location: Malankara Tea Plantation, Kottayam, India

System Power: 27kW Grid/Hybrid System

System Components: (9) GVX 3048 Inverter/Chargers, (7) FLEXmax 80 Charge Controllers and (2) MATE3 System Display Controllers

Power Source: PV Array and Backup Battery Bank



We chose OutBack products for the Malankara Tea Plantation because of their reputation for reliability in a tropical climate with extreme temperatures. OutBack's rugged systems deliver uninterrupted power and cut diesel emissions for air conditioning and other major energy loads. Despite regular power cuts in the surrounding grid, the Malankara Tea Plantation stays online with clean, solar backup power and maintains historic heritage status with this creative solution."

George Mathew

Vice President, TeamSustain

TeamSustain is an OutBack Power Distributor



Challenge

The building complex of Malankara Plantations is an 86-year-old structure and is historically registered, classifying it as “heritage” in India and making its preservation mandated by the state. The plantation is located in a tropical region where temperatures range from 28°C to 32°C. Ninety-five percent of the energy load occurs during the day, and the tariff cost of electricity is projected to increase 6.5 percent in the next few years. Additionally, the cost of diesel fuel increased 50 percent over the past five years.

Previously, the building was positioned to move off-grid as it had some backup capability, but since the building had heritage status, it required an engineered solution that would not make any alterations or disturbances to the original building.

Objectives

- Install a renewable energy generation system and reduce power intake from the grid
- Preserve the historic office complex structure by engineering a solution that provides reliable energy
- Ensure uninterrupted power supply for the offices with backup power
- Mitigate emissions caused by diesel generator operation

Solution

While off-grid posed an enticing solution, the Indian government emphasized solar PV installations with capital subsidies of 90-Rupees per watt up to a maximum of 30 percent of the project cost. The Malankara Plantation executives decided to install solar arrays on a space-frame structure on four columns cantilevered over the roof, to not disturb the building’s architecture and preserves its heritage status. TeamSustain executed the system design, engineering, installation and commissioning of the power plant using OutBack Power’s advanced and efficient power electronics.

The solar arrays are powered by three-phase 27kW array of nine **OutBack GVX 3048** Inverter/Chargers for their modular design, field serviceability, reliability and durability. The arrays consist of 25kW modules in space frames, comprised of thin-film PV elements. The Malankara Plantation also installed **OutBack FLEXmax 80** Charge Controllers with maximum power point tracking (MPPT) capability, providing 30 percent higher yield compared to conventional charge controllers, and the **OutBack MATE3** System Display and Controller to remotely program and monitor the OutBack system. The charge controllers were additionally equipped for temperature compensation to facilitate proper charging of the battery bank, thus resulting in longer battery life.



Benefits

- First Net-Zero energy building in India
- Energy cost savings payback in fewer than five years
- Complete disconnection from the unreliable grid, functioning solely on self-generated solar power
- Reduction of up to 47 tons of carbon emissions per year, saving an estimated 97% in diesel fuel consumption
- Capability to sell excess electricity generated back to the grid, making the complex an energy-plus building