L&T Chennai Campus Microgrid

Project Overview

Larsen & Toubro (L&T) is a large engineering, technology, construction, manufacturing, and financial services conglomerate valued at $17 billion and with customers in over 30 countries around the world. L&T Construction is the construction arm of L&T; it is India's largest construction organization offering engineering, procurement, and construction (EPC) solutions with single-source responsibility for executing large industrial and infrastructure projects from concept to commissioning.28 The company has proven capabilities for executing all types of mega-projects on a turnkey basis (design and construction services including procurement, supply, installation, testing and commissioning).

L&T Construction's solar business is one of India's largest solar EPC players, with approximately 1 GW of projects incorporating various technologies. The company offers services for Utility Scale Solar PV & CSP projects and DER projects such as rooftop solar PV, fuel cells, solar pumps, microgrids, and energy storage.29

L&T Construction's campus headquarters at Manapakkam in Chennai is a hub for developing solutions for a range of business applications, among which renewable energy initiatives are prominent. Acquired in 1961, the campus is spread over 27 acres. Almost every campus structure has won prestigious awards for excellence in construction and features green designs. The Engineering Design and Research Centre, Technology Centre II, and Technology Centre III all meet LEED green building standards.

The entire campus has grid-connected solar PV systems on rooftops; this was the company's first solar pilot project installed in 2008 (Figure 22). The approximately 1 MW system has been operational since 2009, and features different modules, inverters, and balance of system component technologies (Table 48). It features a unique east-west wave configuration that generates 6% more electricity than a standard south-facing solar array. Solar street lighting is also provided on campus. L&T has also developed an 8.7 MW wind farm in Tamilnadu, which provides electricity to the campus.

Along with other recent advancements in energy systems, L&T's Solar Business has also initiated a pilot microgrid project at the Technology Centre II building.

Technical Characteristics

- 130.5 kW solar PV
- 7.2 kW micro-wind power
- 10 kW/32kWh Li-ion battery energy storage system
- 2 x 808 kW diesel generators

Value Proposition

The primary drivers for L&T Construction to develop the microgrid included:

- Piloting the microgrid inside its own campus with a detailed study and monitoring.
- Increasing the renewable energy portion of the campus generation portfolio.
- Increasing campus power reliability and sustainability.

Lessons Learned

The integration of the microgrid into the existing power infrastructure of the Technology Centre II building enhanced the overall power stability, efficiency, and resilience of the facility. It also enabled faster control and monitoring of loads and generation sources. The microgrid has enabled L&T to power the building with renewable sources at times when they are abundant, thereby reducing the reliance on conventional DG sources and deferring consumption from utility power. Load "controllability," which is one of the key microgrid offerings, facilitates load distribution, shedding, and shifting with regards to utility supply availability, renewable supply availability, and peak demand, thereby reducing the onus on the power system. Since this microgrid was a brownfield project, the technical complexities were significant. The constraints were identified and tackled in the engineering and design phase, ensuring smooth execution and operation of the system.