INDIA'S FIRST GRID SCALE BATTERY ENERGY STORAGE SYSTEM
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PROJECT SPOTLIGHT

First grid-scale energy storage solution in India begins addressing significant flexibility needs in the market

TATA
TATA POWER
TATA POWER-DDL
AES
we are the energy
Mitsubishi Corporation
FLUENCE
A Siemens and AES Company

SYSTEM OVERVIEW

- Owned by AES and Mitsubishi Corporation
- Sited at a substation operated by Tata Power-DDL
- 10 MW, 10 MWh
- Fluence's Advancion Energy Storage Technology Platform

APPLICATIONS

- Frequency Regulation
- Transmission and Distribution Enhancement

PROJECT HIGHLIGHTS

- India's first grid-scale battery-based energy storage system will demonstrate the value of several key applications
- Will boost efficiency and resiliency and ensure greater reliability for more than 2 million residents in Tata Power- DDL's service area
- Largest battery-based energy storage system deployed in South Asia
- The system will demonstrate how energy storage can address challenges in the areas of peak load management, system flexibility, frequency regulation and reliability on the network – all of which are key concerns for the India market.
- Deploying energy storage will help network operators mitigate solar and wind resources' variability and reduce congestion on the region's transmission system, delivering more affordable, clean energy and enabling new sources of revenue from frequency regulation and other grid services.

THE ENERGY CHALLENGE IN INDIA

As India's metropolitan cities add population and expand, the power needs of both residents and businesses expand as well, creating challenges for serving peak electricity load. Adding capacity to the distribution network is difficult in dense urban environments where availability of land is challenging. Battery-based energy storage provides a highly modular solution for distribution companies to address these needs, with the ability to deploy storage in a matter of months and add just the right amount of capacity.

CHANGES TO THE WAY INDIA IS SOURCING ITS ELECTRICITY PROVIDE ADDITIONAL CHALLENGES.

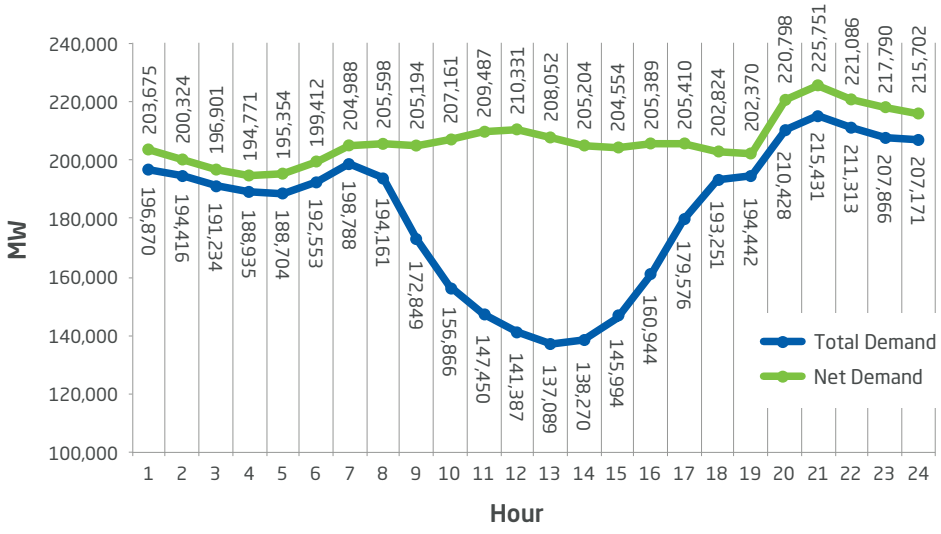
India recently expanded its renewable energy target to 225 gigawatts of solar, wind and small hydro generation by 2022, and 46 GW of peaking capacity is required by 2027. Figure 1 depicts the projected net demand on a typical day for all of India. Net demand is total demand minus intermittent non-dispatchable renewable resources, primarily solar and wind.

Figure 1 demonstrates that as solar resources are added to the grid, there is a risk of solar generating so much power during daylight hours that dispatchable thermal plans are turned off. However, as the sun sets and solar generation drops off, the system will not have enough energy to support people returning home and using electronic devices because the thermal plans that were turned off during the day are not able to ramp fast enough. This coupled with India's normal evening peak results in ramping requirements of approximately 57 GW in 6 hours.

Battery-based energy storage assets are critical for addressing both oncoming changes in India's power system, adding much-needed capacity in cities to ensure power can be delivered when and where residents need it. Energy storage is the most cost effective and flexible asset available that can meet rigorous ramping storage provides a highly modular solution for distribution companies to address these needs, with the ability to requirements, neutralize the volatility caused by renewables, and be deployed in step with the needs of India's quickly growing cities.

Energy storage delivers twice as much flexibility as any other electric power asset because it can both deliver and absorb power from the network, acting as a buffer to the intermittency of renewables and eliminating the need for wasteful curtailment. Storage can be sited anywhere in the network including densely populated load centers and rural areas on the edges of the network. It has no direct emissions or water use. This project is a first step for widespread deployment of energy storage in India.

FIGURE 1



Source: Government of India, Ministry of Power, Central Electricity Authority, National Electricity Plan Volume I, January 2018, Exhibit 5.2