TEKUNCORKED

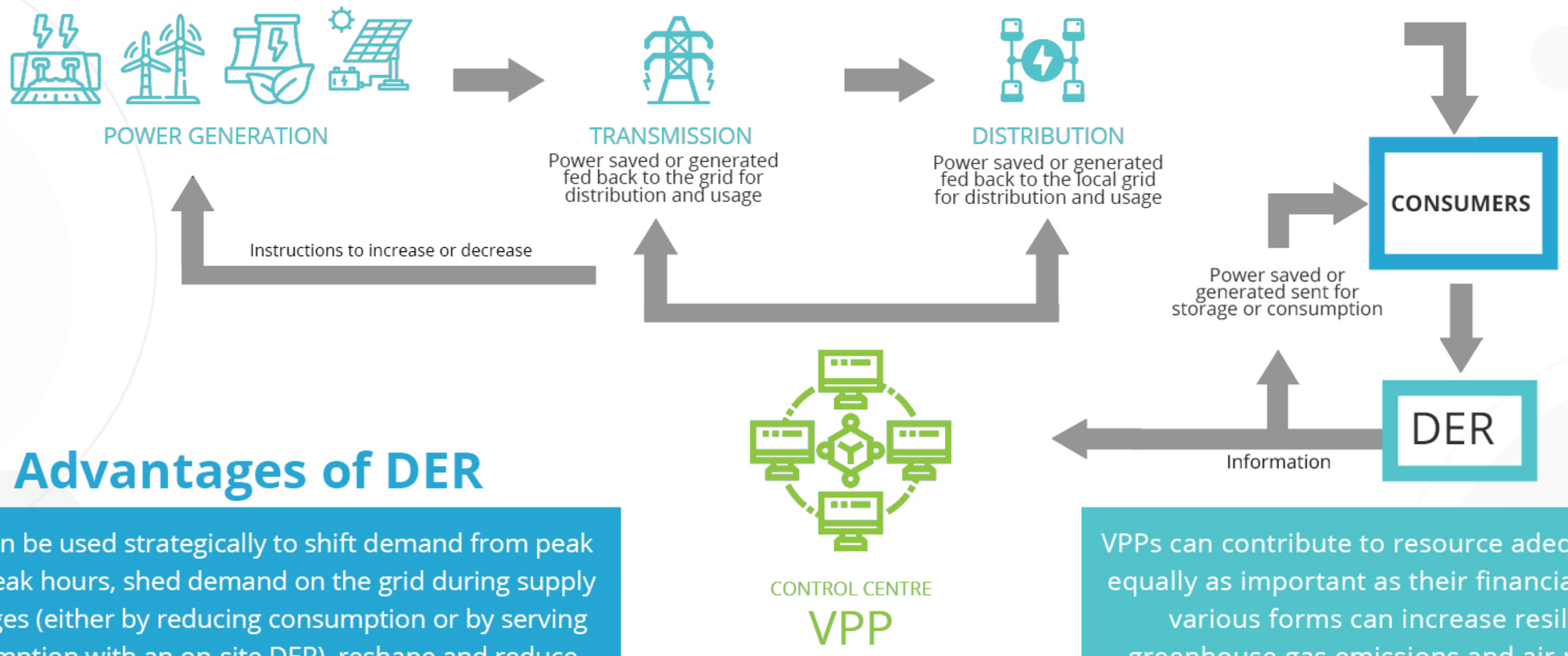
Reliable outage-free electricity for all

INDIA SMART UTILITY WEEK (ISUW) - 2024
March 12-15, Hotel Lalit, New Delhi

Solving for Energy Access through Virtual Power Plants

The next step forward...

RESOURCE ADEQUACY THROUGH VPP

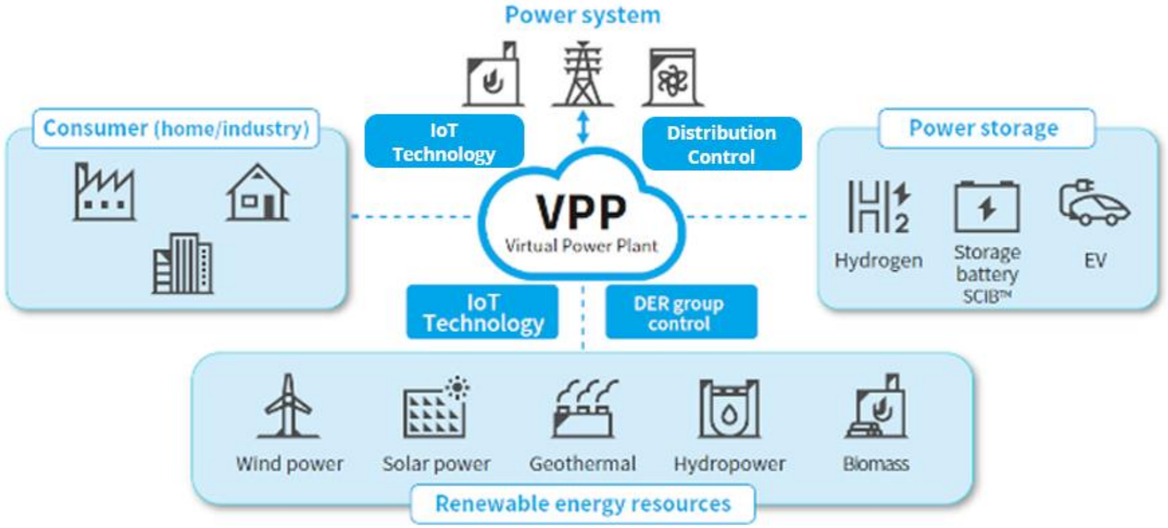


Advantages of DER

DERs can be used strategically to shift demand from peak to off-peak hours, shed demand on the grid during supply shortages (either by reducing consumption or by serving consumption with an on-site DER), reshape and reduce baseload consumption, or provide ancillary services to satisfy the needs of the distribution or transmission grid.

VPPs can contribute to resource adequacy at a low cost; equally as important as their financial benefits, VPPs in various forms can increase resilience, reduce greenhouse gas emissions and air pollution, reduce T&D congestion, empower communities, and be adapted to meet evolving grid needs.

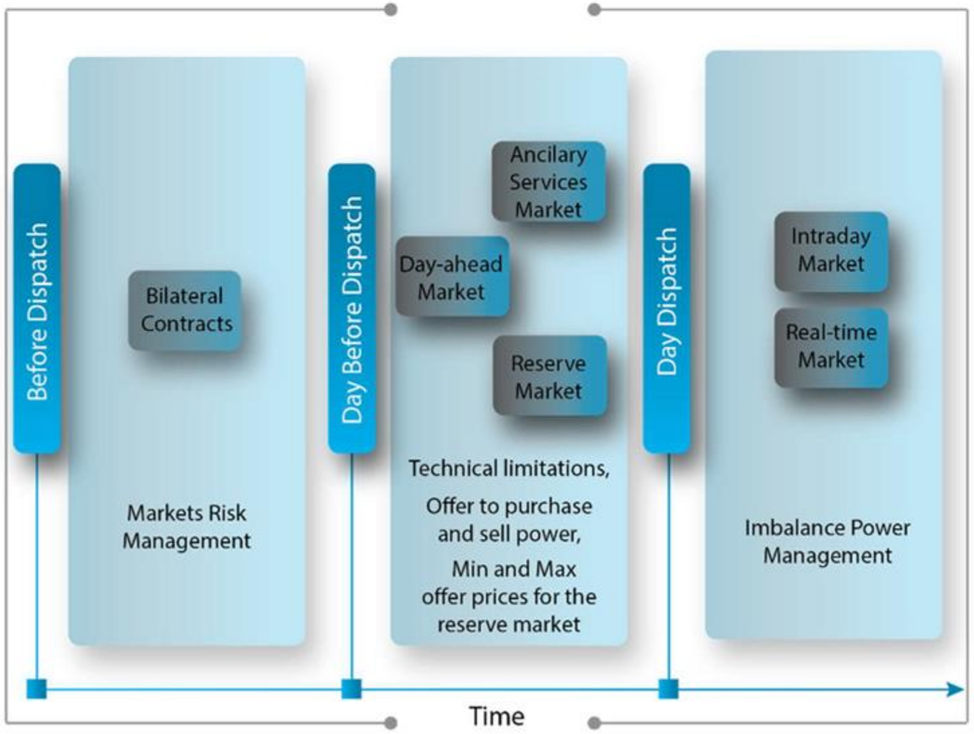
VPP OPERATIONS - SERVICES



The most common grid services VPPs are:

- **Energy**, measured per MWh delivered in the form of electricity demand reduction or electricity supply
- **Capacity,** measured per MW of a forward energy option
- **Ancillary services** that support power quality, which are measured in service-specific ways

VPP performance modeling uses large historical electricity datasets paired with probabilistic models of future electricity consumption. This ability to predict DER usage, including responses to signals from VPP operators, is critical to the reliable dispatch of VPPs.

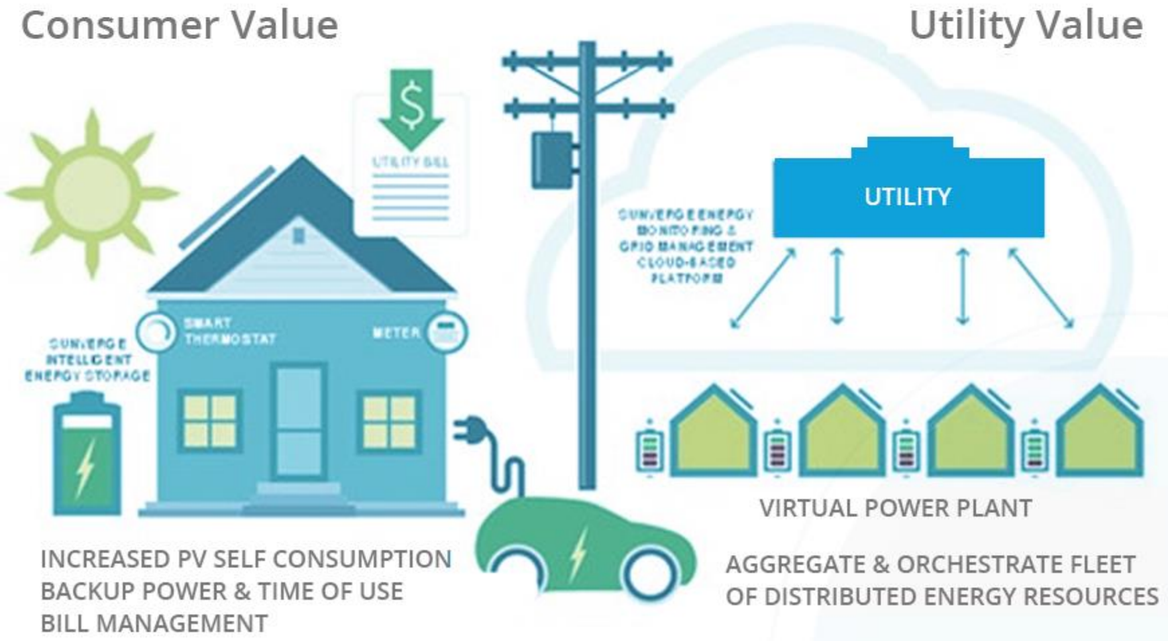


VPP BUSINESS MODELS

The primary operational costs are participant incentives; in other words, most of the money spent on VPPs flows to electricity consumers (households and businesses). The primary revenue streams are energy or capacity payments, which vary by market. These are based on realistic variations across geographies and time periods that determine the overall financial viability of the VPP business model.

VPP DEPLOYMENT MODELS HELP ILLUSTRATE FUNDAMENTAL COST AND REVENUE DRIVERS FROM THE PERSPECTIVE OF VPP OPERATORS:

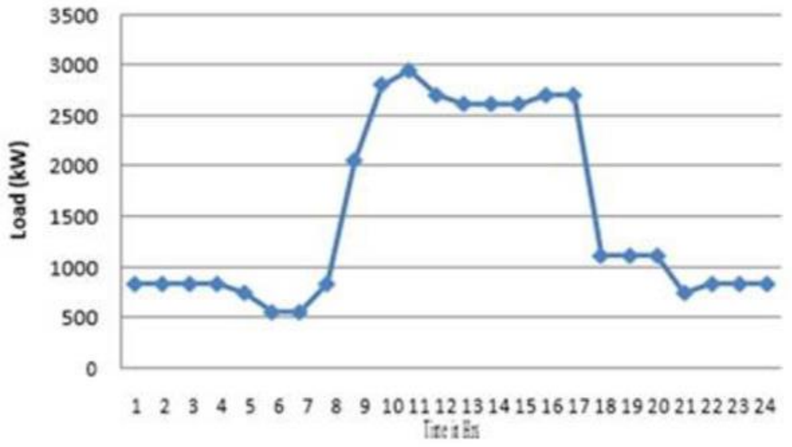
1. Smart thermostat demand response VPP
2. Utility-integrated BTM battery VPP
3. Emergency BTM battery demand response VPP
4. Additional VPP examples: Solar-plus-storage, Water heaters, Managed EV charging, V2X, C&I Loads



ELECTRICAL DISPATCH THROUGH VPP

SCENARIO 1

It is the reference case, where the load is completely dispatched from the main grid.

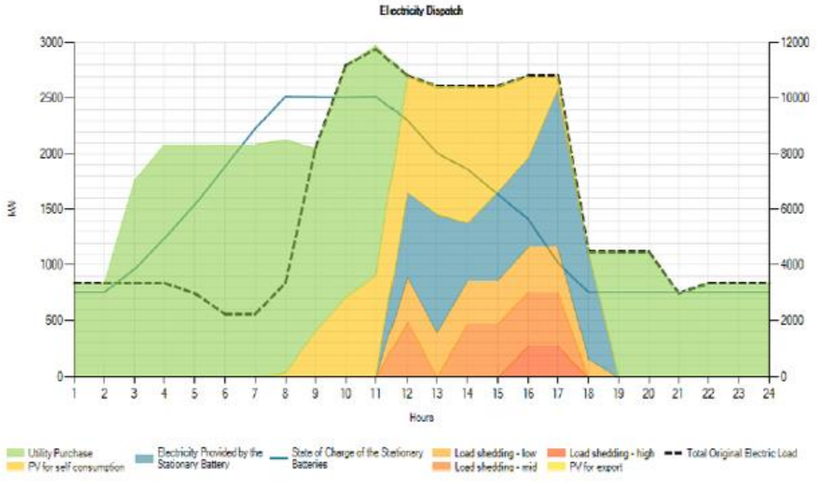


OBSERVATIONS

The feeder peak demand is significantly higher than the average load, which mostly occurs during peak hours.

SCENARIO 2

VPP autonomous operation with DER and storage integration.

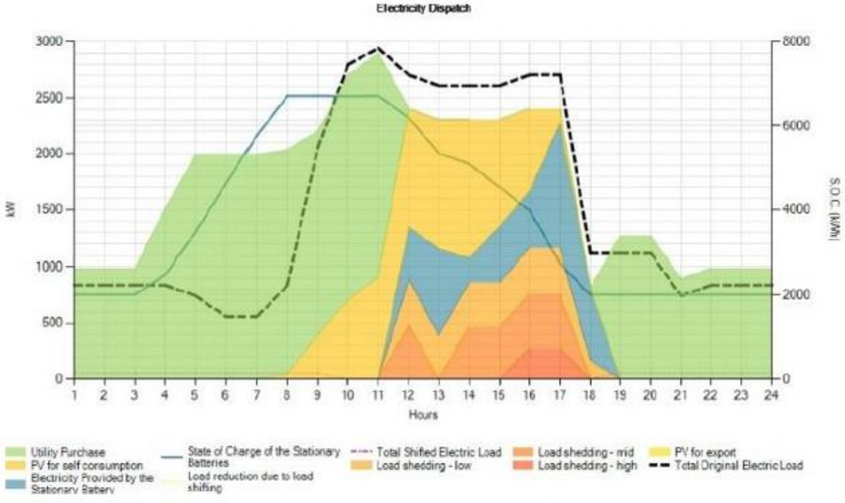


OBSERVATIONS

During an outage, an emergency or high priority load is dispatched from the aggregated generation of the grid interconnected DERs.

SCENARIO 3

To reduce the EENS significantly, the combined scheduling of all the resources is done.



OBSERVATIONS

There is a minimum load is shed during the VPP operation with batteries, which represents the highly cost-effective and reliable system for optimal energy scheduling.

SOLVING FOR ENERGY ACCESS THROUGH VIRTUAL POWER PLANTS

Thank You.