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India SMART UTILITY Week 2024

Supporting Ministries



Session 1: Resource Adequacy Planning for Net Zero Power Systems

Presented By

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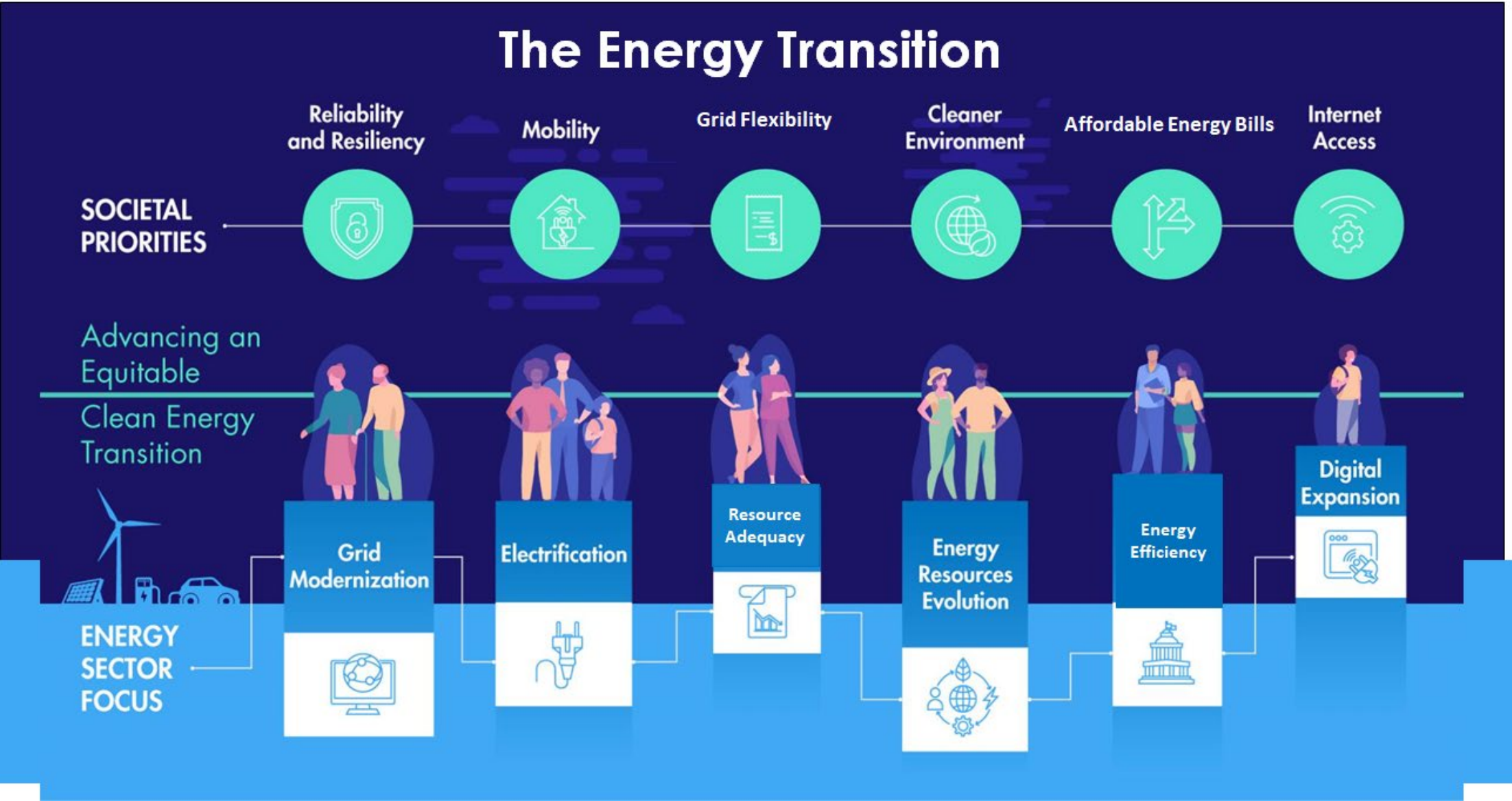
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Big Questions In Resource Adequacy



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Big Questions In Resource Adequacy



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Grid Resilience



Grid Flexibility

Decarbonization

Decentralization

Digitalization

Adequacy (Flexibility)

Ability to serve
load in all hours
with margin

Variable
instead of
dispatchable

Aggregated
DER as a
resource

Flexible load
as a resource

Operational Reliability

Stability for credible
operating conditions
and disturbances

Inverters
instead of
inertia

Visibility and
control
with DER

“Prosumers”
for reliability
services

Resiliency

Ability to withstand
and recover from
HILF events

Asset, control and
communications
vulnerability

Blackstart with
Renewables
and DER

Cybersecurity

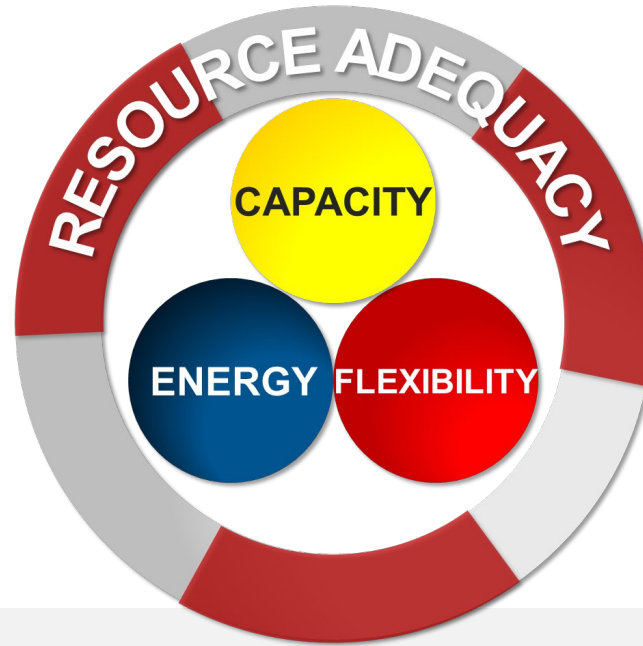


Big Questions In Resource Adequacy

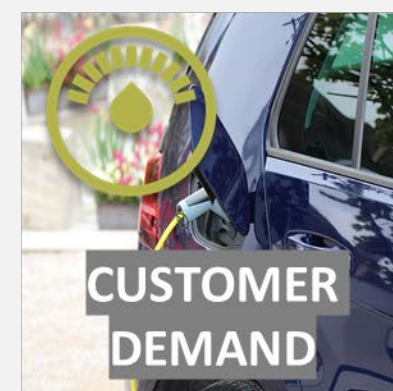
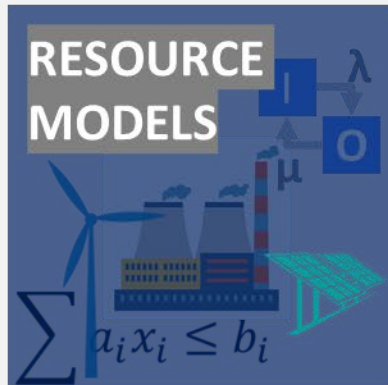


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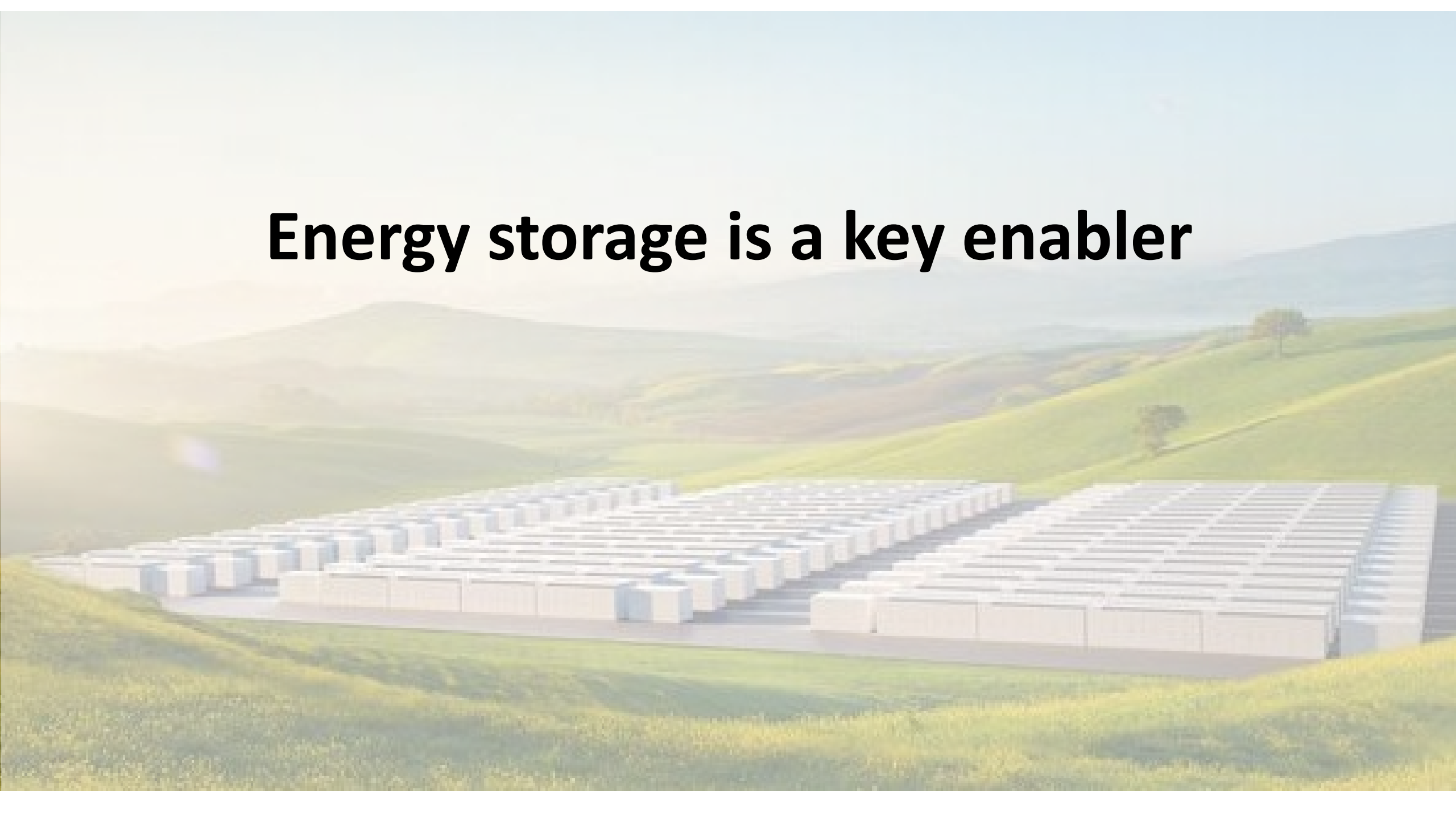
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5
RA GAPS



Energy storage is a key enabler



Battery Energy Storage in California



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5 GW

in CAISO, May 2023

~5%

load from battery charging
& RA capacity in CAISO

>50%

CAISO regulation up and
down requirements

Source: California ISO Special Report on Battery Storage, July 2023



Battery Energy Storage in California

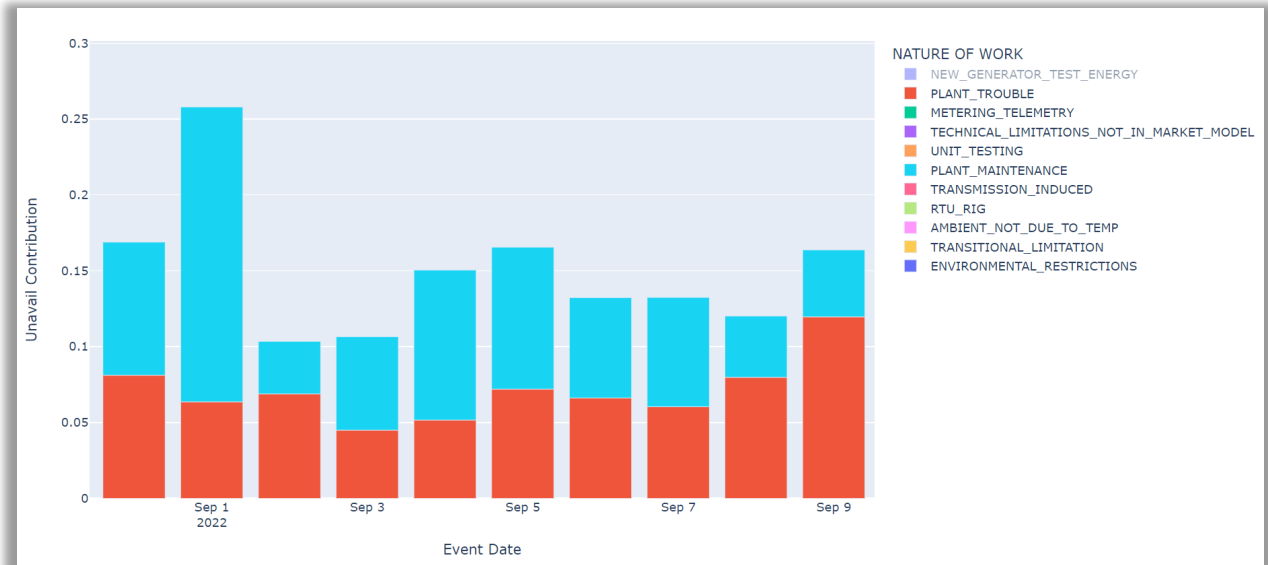
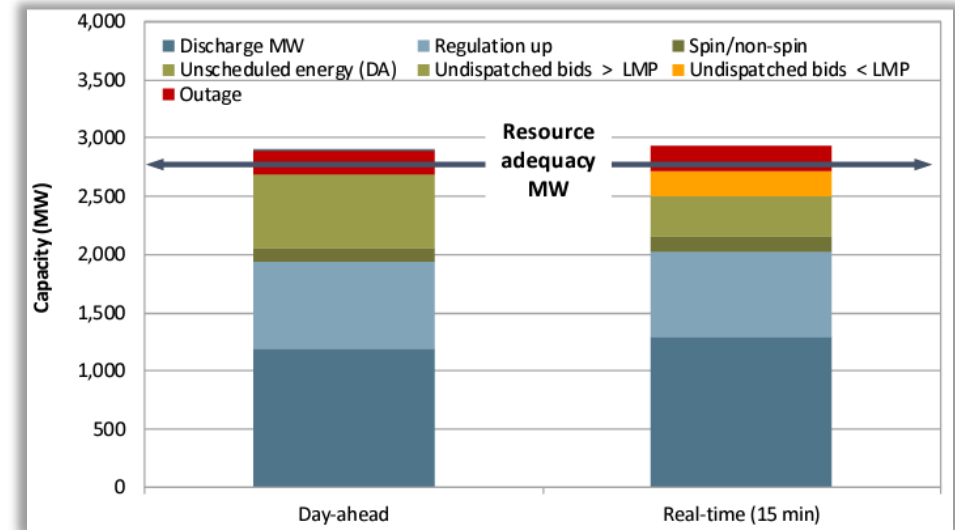
- Special minimum SOC constraint
- Issued manual dispatches
- 20% of RA capacity was not dispatched
- 10% - 26% unavailable to participate

Source: California ISO Special Report on Battery Storage, July 2023

During the 2022 September heat wave, batteries provided valuable net peak capacity and energy. Batteries provided 2.4 percent of generation for the CAISO balancing area in hours-ending 17 to 21 from August 31 to September 9.

There's opportunity for higher value

Average RA battery schedules during Emergency Energy Alert events



Resource Adequacy (RA) for Decarbonization



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Future Scenario Development



- Framework for developing coherent future scenarios
- Integrate climate impact in scenario development
- Tools to support system planners in developing consistent cases

RA Models and Data



- New demand forecast tools & customer models
- Supply & delivery models for emerging resources and issues
- Data development

Tools, Metrics and Criteria



- Operational Tools for assessing capacity/energy/flexibility
- Metric/criteria comparison
- Case studies to demonstrate

Framework, practices, tools to ensure available supply to meet demand with margin given clean energy resource mix and increased reliance on electricity



THANK YOU

*For discussions/suggestions/queries email: **jayantkumar@Lntecc.com***
<https://ltptd-des.com>