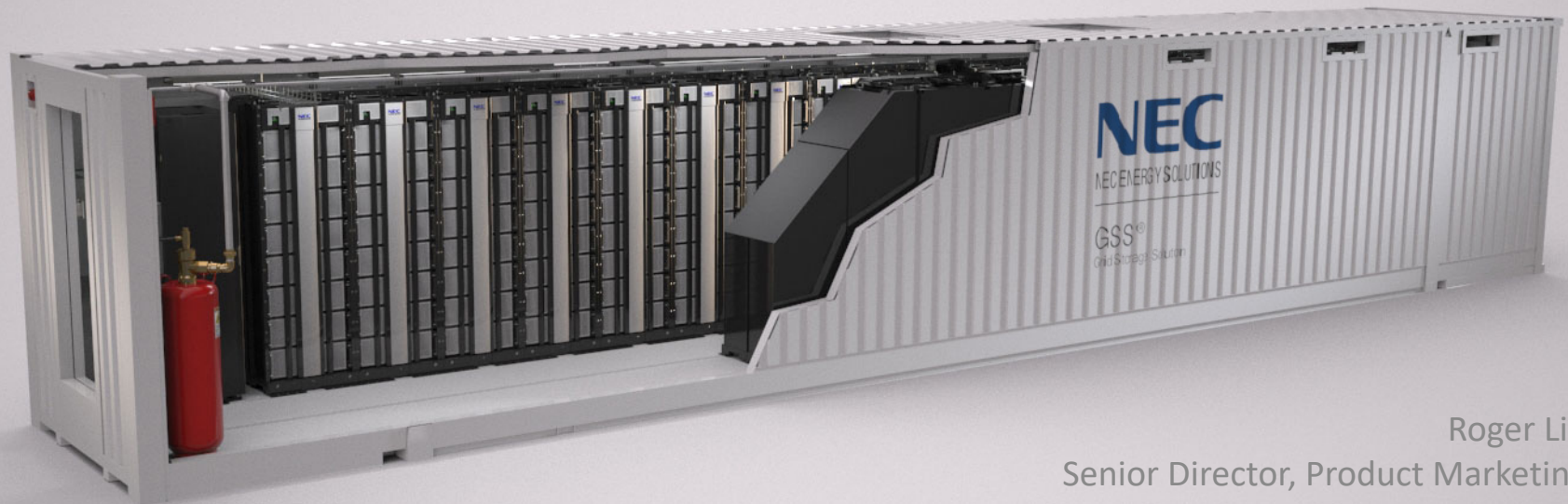


Energy Storage For A Municipal Utility



Roger Lin
Senior Director, Product Marketing
NEC Energy Solutions
rlin@neces.com

The GSS[®] grid storage solution

An Integrated System

- The GSS[®] grid storage solution is a fully integrated, turnkey, AC energy storage plant ready to interconnect to the grid
 - Configured-to-order from factory-assembled, standard modular components
 - Designed and manufactured by NEC Energy Solutions:
 - AEROS[®] controls, a complete energy storage command and controls software package
 - GBS[®] grid battery systems; energy storage with BMS and controls hardware in outdoor-rated enclosures (standard containerized, but custom enclosures possible)
 - Includes necessary equipment from third-parties, engineered to work with all NEC ES equipment
 - Power conversion hardware (inverters) from leading manufacturers around the world
 - Thermal management units (air conditioning or water chillers) for battery cooling

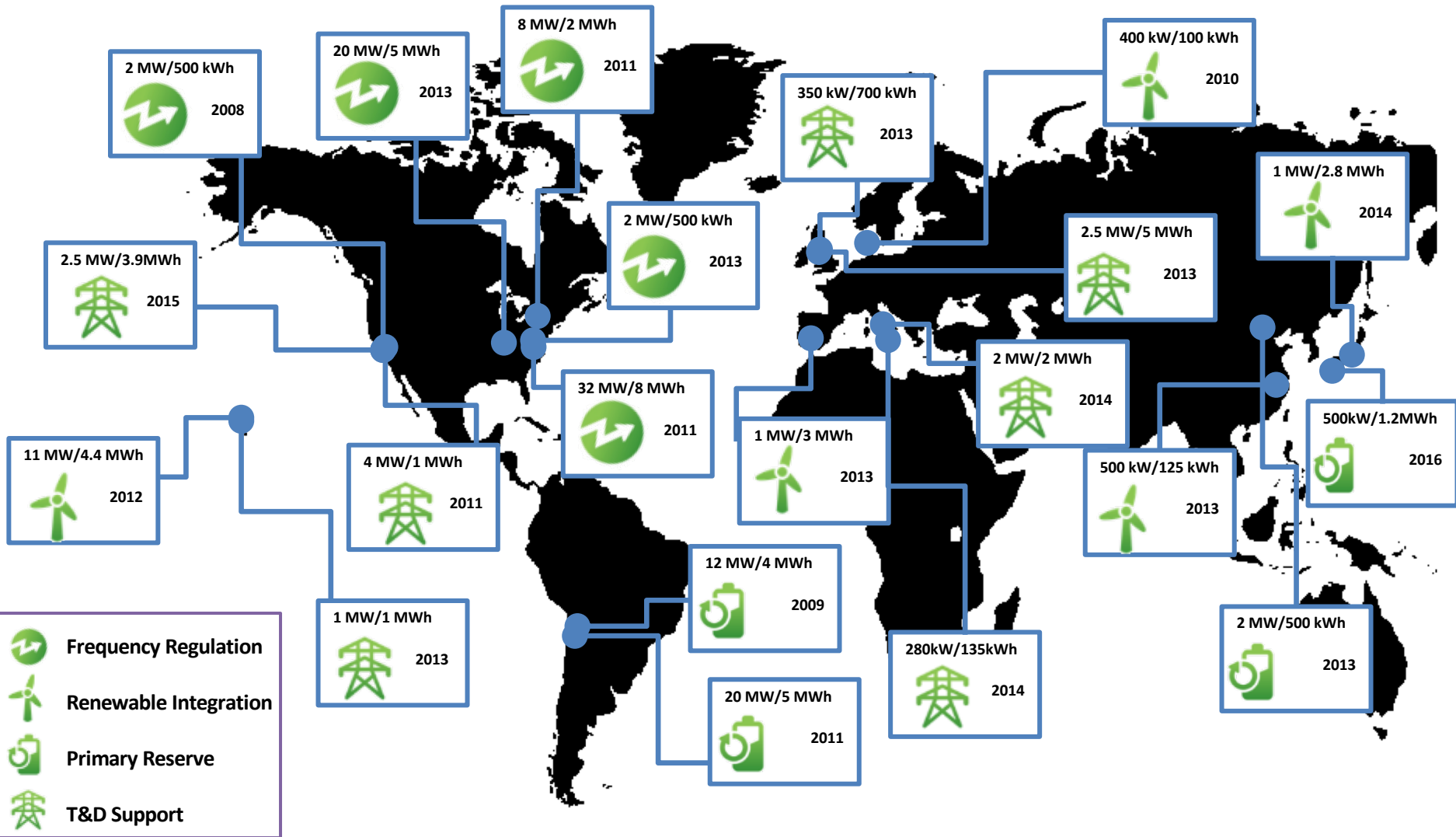
Custom enclosure GSS[®] grid storage solution



Standard containerized GSS[®] grid storage solution



Global GSS® Grid Storage Solution Installations



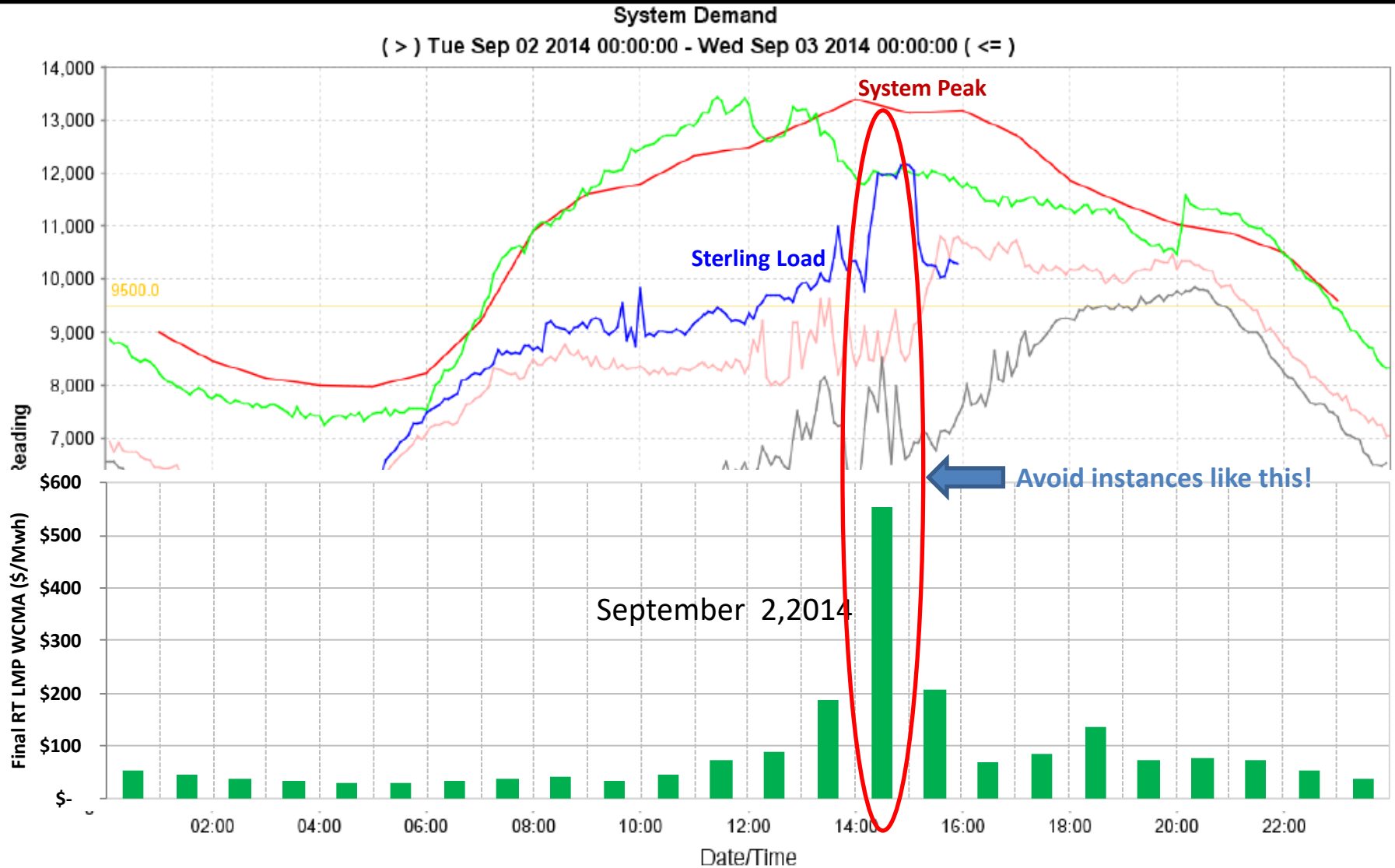
Sterling Energy Storage Project

Sterling Energy Storage Project

- Town of Sterling, Massachusetts
 - Sterling Municipal Light Dept
 - 3MW of PV in Sterling
 - Among highest per capita PV generation in the country
 - Desired additional resiliency and better integration of existing PV
- Now installing energy storage
 - 2MW, 3.9MWh GSS[®] grid storage solution
 - Groundbreaking was on Oct 12
- Multiple benefits
 - Provide power for Sterling Police and Dispatch Center during outages
 - Provides electricity cost savings to ratepayers
 - Firms the value of PV
 - Enables future microgrid capability



Value to Sterling Municipal



Sterling Energy Storage Installation Nov 14 2016

Energy storage container arriving on-site November 14



Sterling Energy Storage Installation Nov 14 2016

Energy storage container placement onto concrete footers



Sterling Energy Storage Installation Nov 14 2016

Energy storage and inverter in place...



Sterling Energy Storage Installation Nov 14 2016



Sterling Energy Storage Installation Nov 14 2016

Air conditioning ductwork installed...



2MW, 3.9MWh lithium ion energy storage system

Groundbreaking on Oct 12, equipment installation on Nov 14....

Final commissioning expected to be complete this month

Sample NEC Project Portfolio

Other Real (and Diverse) Energy Storage Projects

Energy Storage in PJM Frequency Regulation



- **Located at Laurel Mountain wind farm in West Virginia**
- **32 MW lithium ion energy storage**
- **Operational since 2011**



Energy Storage in Primary Reserve



- Located in Chile, South America 1,400km north of Santiago
- 20MW lithium ion energy storage facility
- Operational since 2011

Energy Storage in Ramp Rate Management

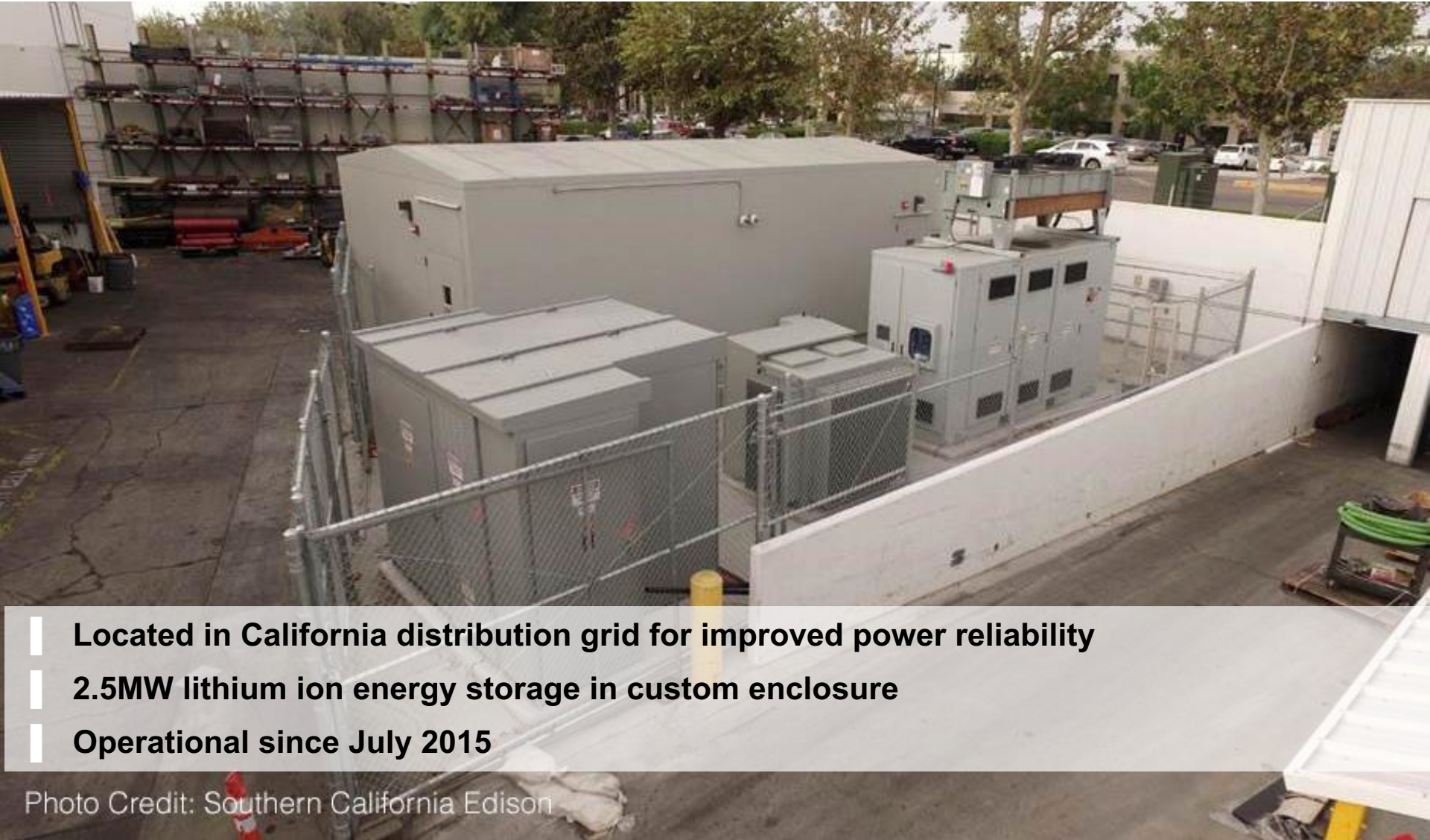


Located on Maui, Hawaii

11MW lithium ion energy storage working with a 21MW wind farm

Operational since December 2012

Energy Storage in Load Limiting/Peak Shaving



Located in California distribution grid for improved power reliability

2.5MW lithium ion energy storage in custom enclosure

Operational since July 2015

Photo Credit: Southern California Edison

Energy Storage in Microgrid Support



Located in China installed in pre-existing building with local wind, solar, and thermal generation

500kW lithium ion energy storage

Operational since March 2014

Other Energy Storage Case Studies

Other applications...

Frequency Regulation in PJM?

Primary Reserve in Chile?

Ramp Rate Management (Wind) in Hawaii?

Load Limiting (Peak Shaving) in California?

Microgrid Support in China?

Other applications not mentioned?

Thank you!

Roger Lin

Senior Director of Product Marketing

NEC Energy Solutions, Inc.

155 Flanders Road | Westborough, MA 01581

Direct +1 (508) 497-7261

rlin@neces.com

NEC

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