

Sustainable Transportation Summit

H2 @ Scale: Utility Perspective

July 12, 2016





58%
GHG-free
wholesale
electric power

7 of 10
largest solar
plants in US

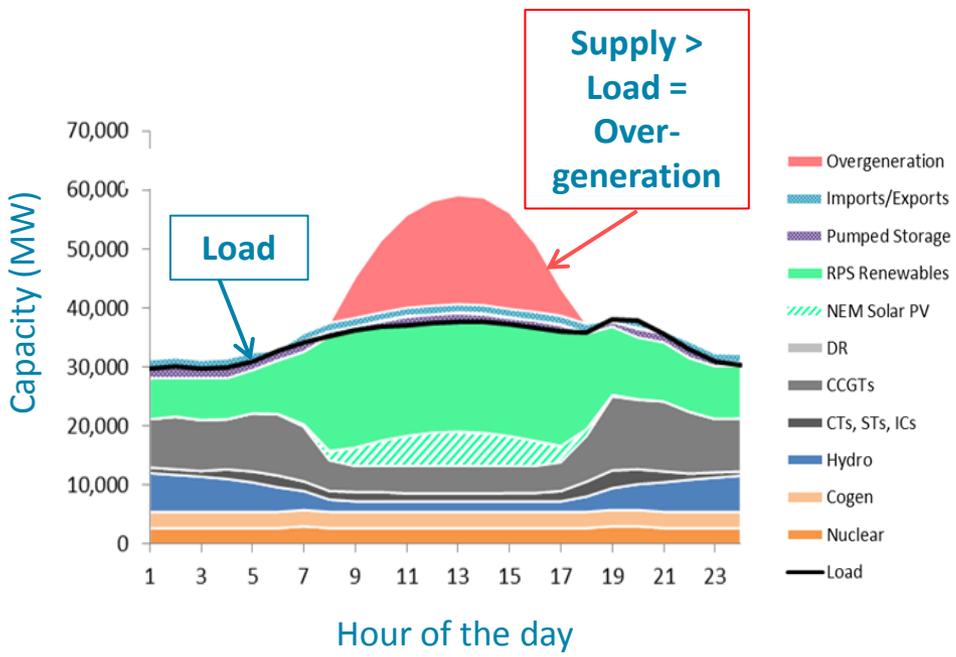
25%
of all rooftop
solar in the
United States

200,000
rooftop systems
connected

- **1** every **11**
minutes

Hydrogen storage to address overgeneration (P2G)

Generation mix calculated for April Day in 2030 with 50% RPS

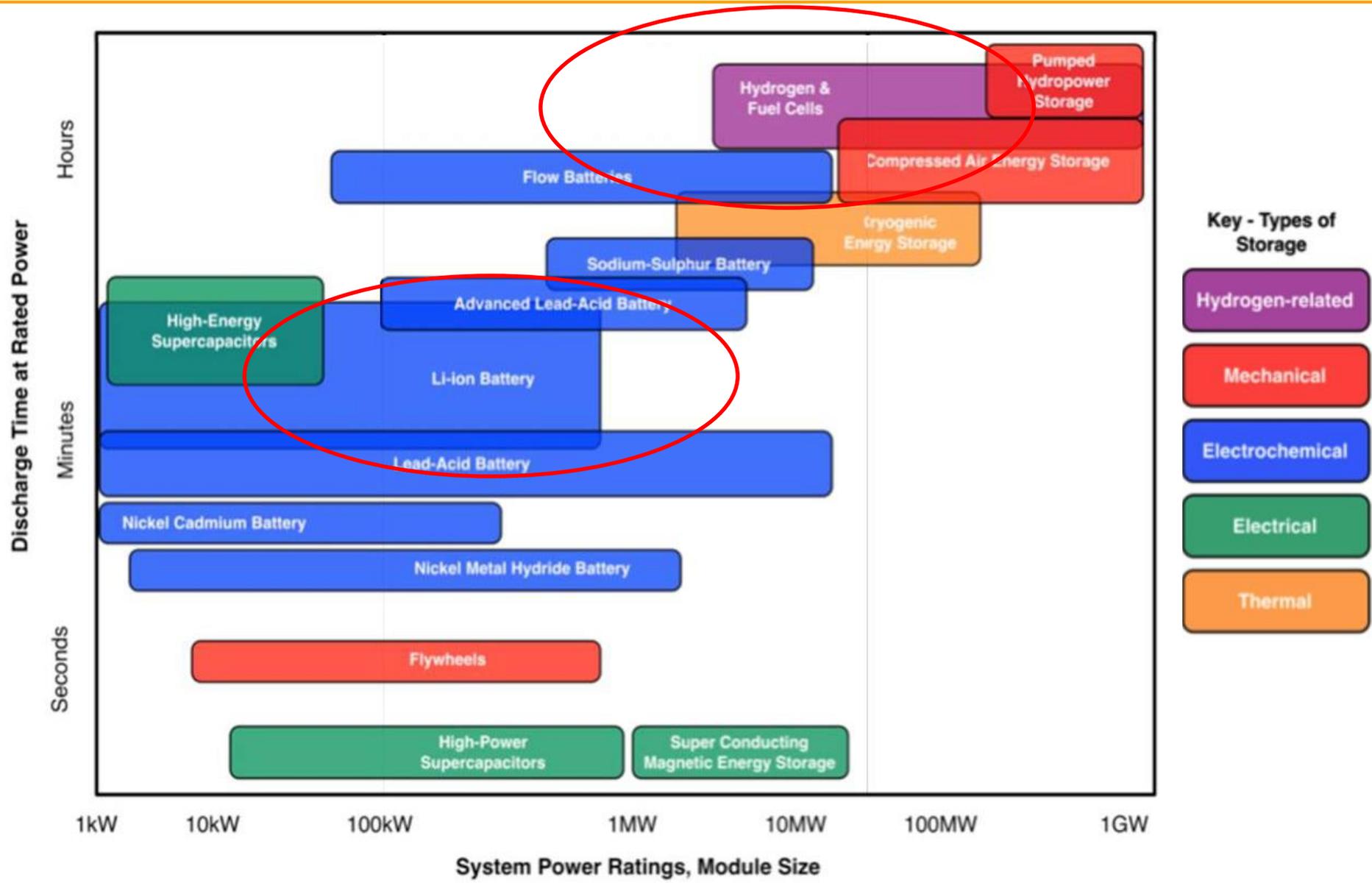


Overgeneration in 2030 at 50% RPS at 12,000 GWh/yr

Overgeneration Statistics	33% RPS	40% RPS	50% RPS Large Solar
Total Overgeneration			
<i>GWh/yr.</i>	190	2,000	12,000
<i>% of available RPS energy</i>	0.2%	1.8%	8.9%
Overgeneration frequency			
<i>Hours/yr.</i>	140	750	2,000
<i>Percent of hours</i>	1.6%	8.6%	23%
Extreme Overgeneration Events			
<i>99th Percentile (MW)</i>	610	5,600	15,000
<i>Maximum Observed (MW)</i>	6,300	14,000	25,000

Overgeneration signifies that more energy is flowing onto the grid than the system has load to serve

Storage portfolio must address both size and discharge needs



Source: Deloitte Consulting, "Energy Storage: Tracking the technologies that will transform the power sector" (2015)

Utility role in decarbonizing the transportation sector



- >60,000 PEVs in NorCal
- Deploy 7,500 Level 2 & 100 DC Fast Chargers over 3 years



- 20 CNG stations for the public and PG&E's fleet



- Support for Hydrogen Fuel Cell Vehicles

- Biogas as pathway to decarbonize natural gas
- Reduces waste and potential environmental hazards
- Supports continued evolution of low carbon transportation
- Pathway to renewable hydrogen

