

The State of U.S. Storage Market

Opportunities for Customers and Utilities



Ravi Manghani

Director, Energy Storage

manghani@gtmresearch.com

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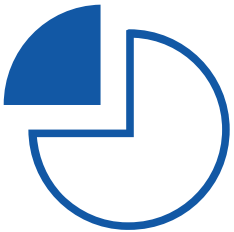
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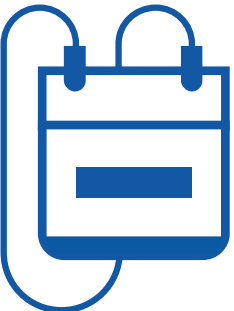
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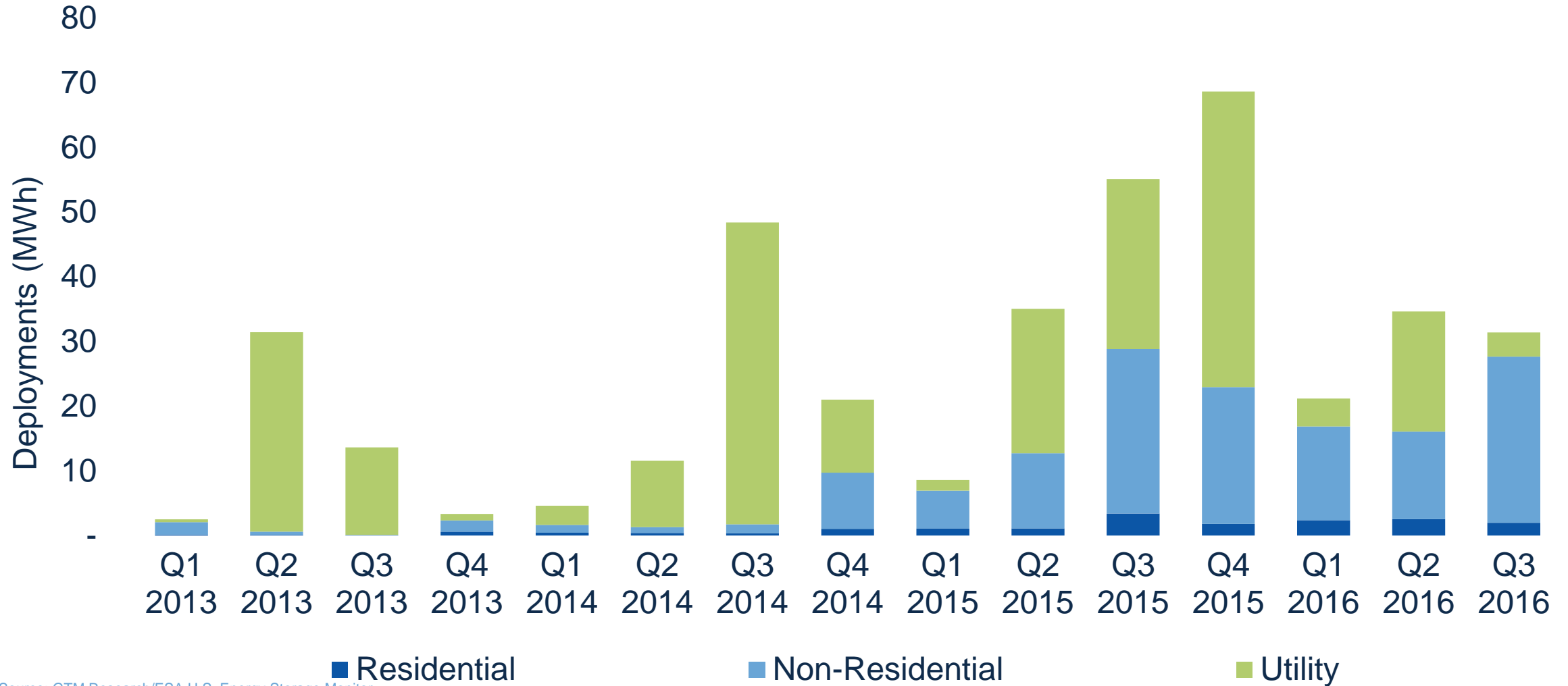
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Greentech Media and GTM Research experts come together to produce all of Greentech Media's industry conferences throughout the year. These summits provide a platform for our latest market intelligence and draw together the industry influencers from organizations across the value chain.

Deployment Trends

U.S. Energy Storage Market Has Grown In Fits And Starts

U.S. Energy Storage Deployments (MWh)

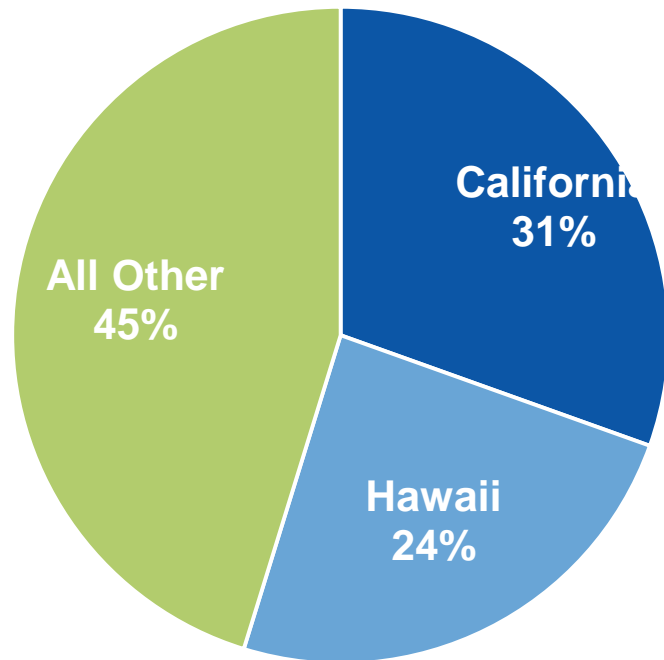


Source: GTM Research/ESA U.S. Energy Storage Monitor

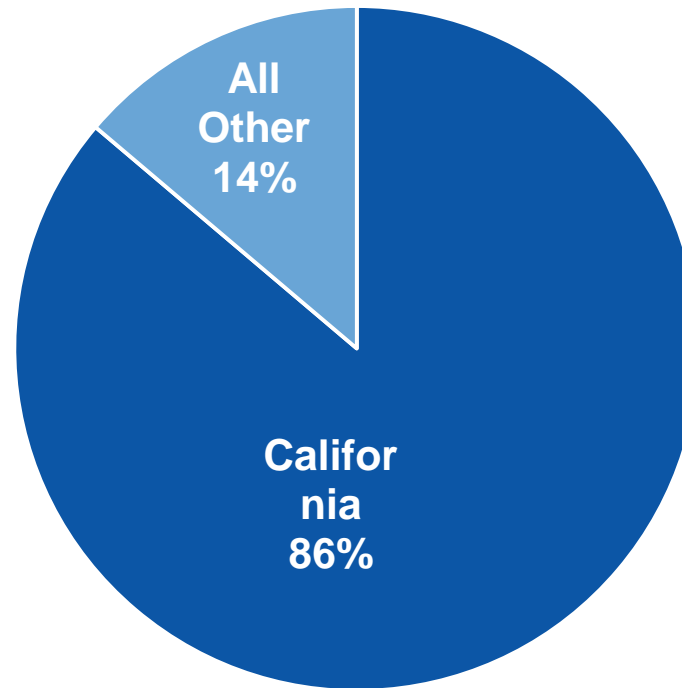
Where Is Energy Storage Deployed So Far?

U.S. Energy Storage Deployments (MWh), Cumulative Through Q3 2016

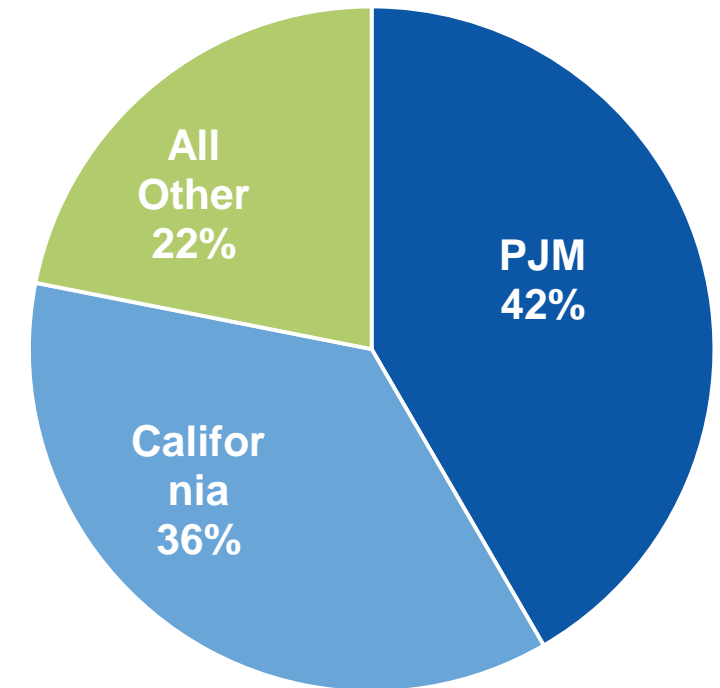
Residential



Non-Residential



Utility



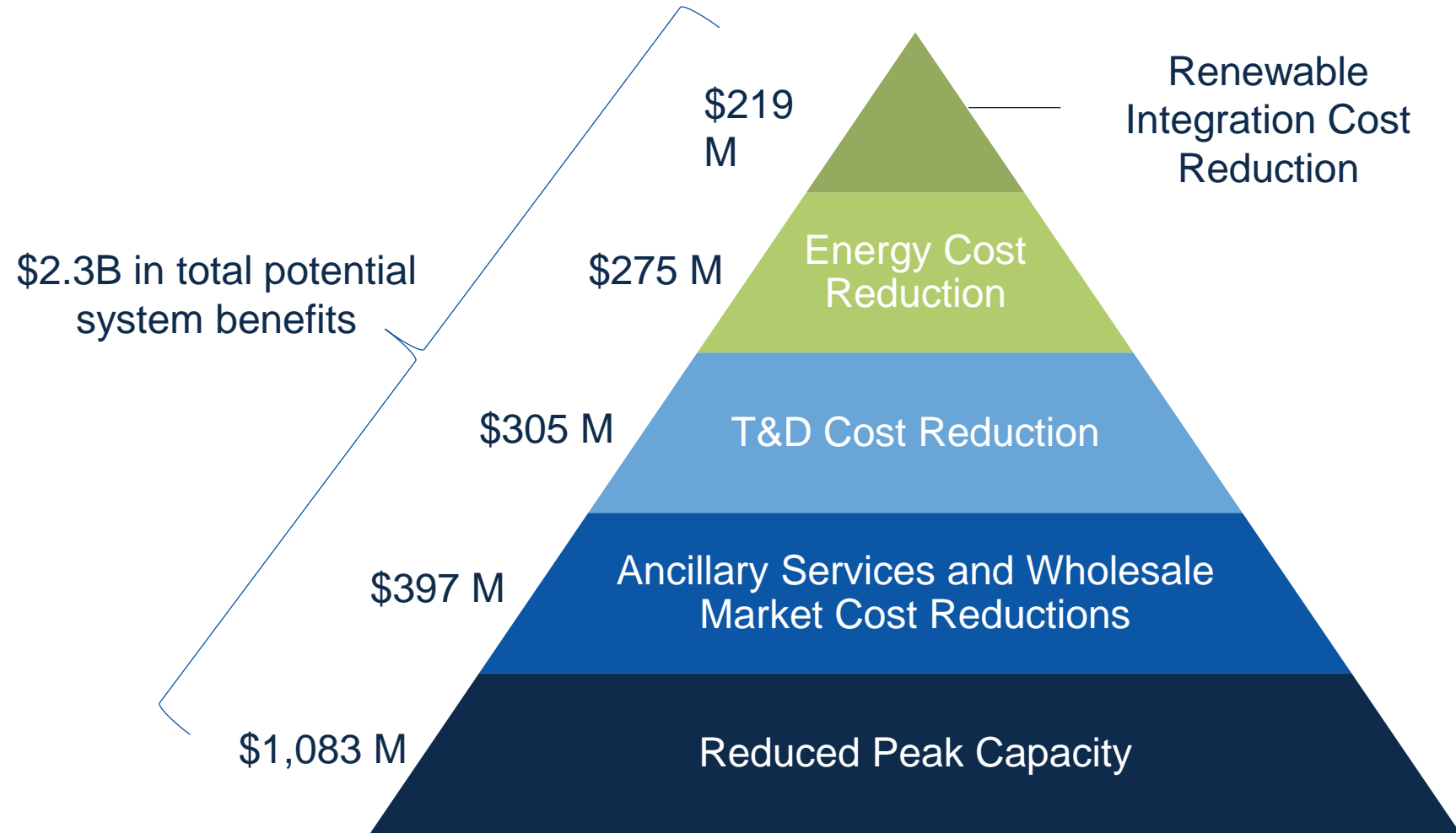
Source: GTM Research/ESA U.S. Energy Storage Monitor

Market Drivers

Key Wins in 2016

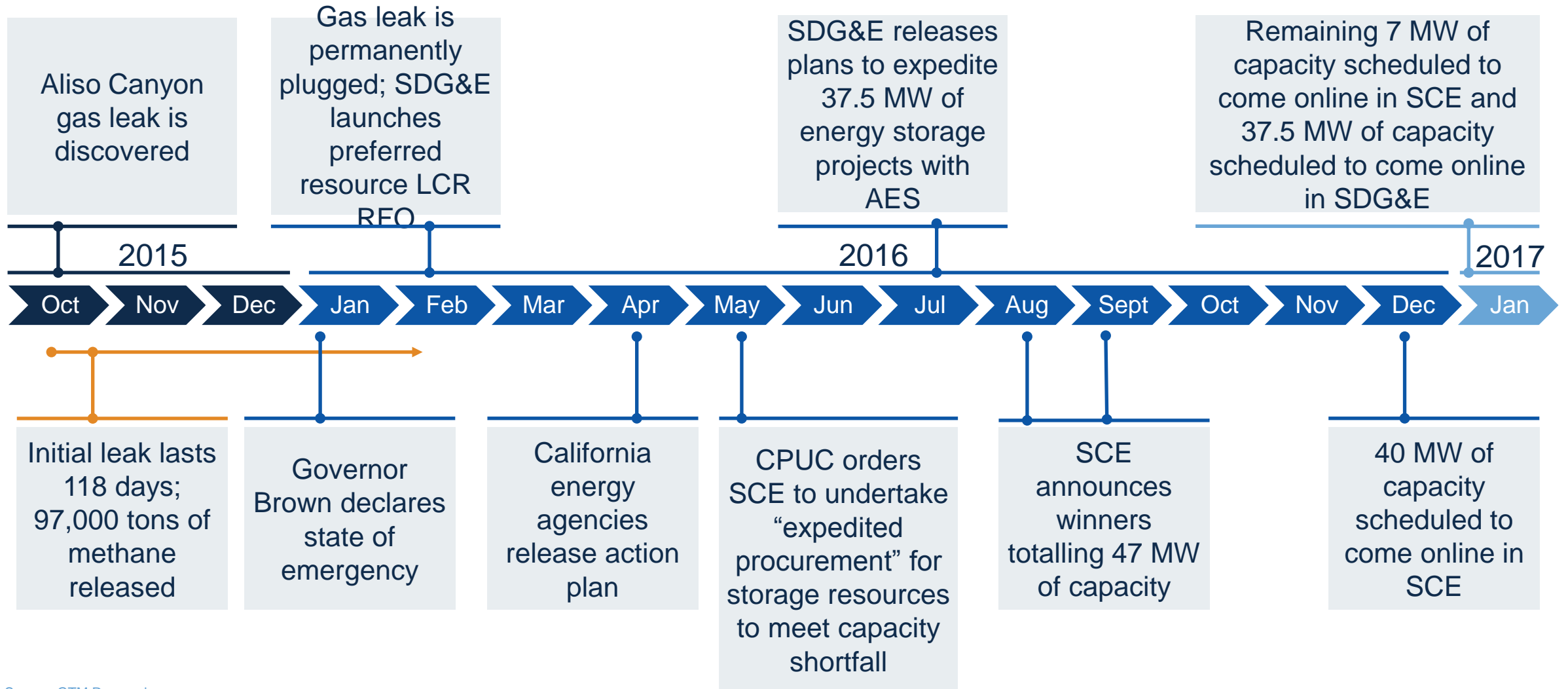
The Value Of Energy Storage Is Increasingly Clear

Potential System Benefits Highlighted by Massachusetts State of Charge Report



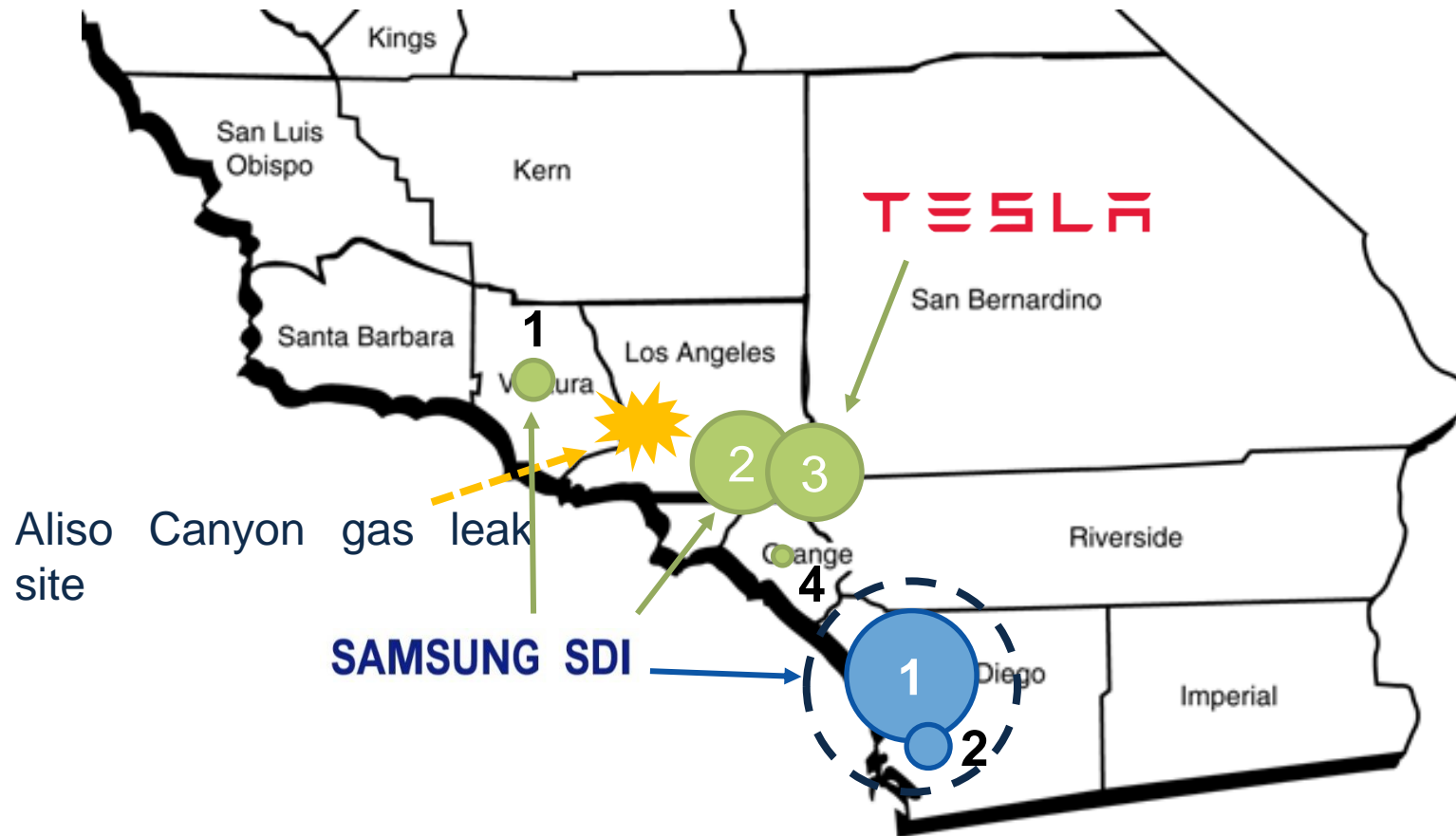
Source: State of Charge Report – Massachusetts Energy Storage Initiative

Alison Canyon: 15 Months Of History



Source: GTM Research

Aliso Canyon Procurement Result Breakdown



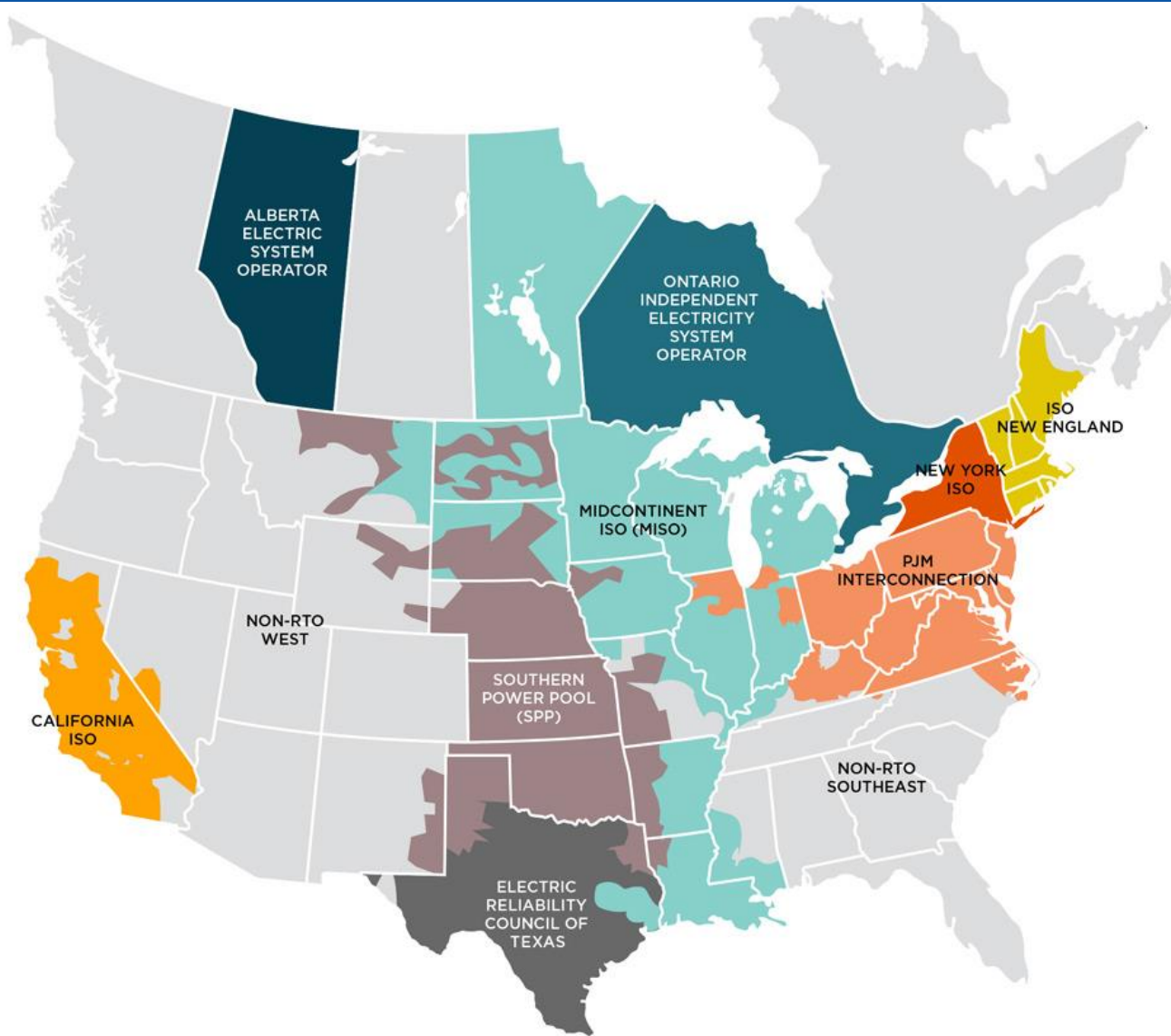
Procurement data sources: SCE and SDG&E announcements and procurement websites, CA County Map
 Source: California Elections Website <http://www.sos.ca.gov/elections/map>

SCE	SDG&E
47 MW / 4 hr duration	37.5 MW / 4 hr duration
Multiple RFP Winners	Single Awardee
Online 2016/2017	Online 2017
New procurements	Expedited from ongoing procurement

- SCE Procurements**
1. Western Grid, 5 MW/20 MWh
 2. Altagas-Greensmith, 20 MW/80 MWh
 3. Tesla, 20 MW/80 MWh
 4. Powin Energy, 2 MW/8 MWh

- SDG&E Procurements**
1. AES, 30 MW – 120 MWh
 2. AES, 7.5 MW – 30 MWh

The Biggest Boost Yet: FERC Proposal, November 17



Proposed participation model must...

..ensure that storage resources are eligible to provide all capacity, energy and ancillary services that they are technically capable of providing

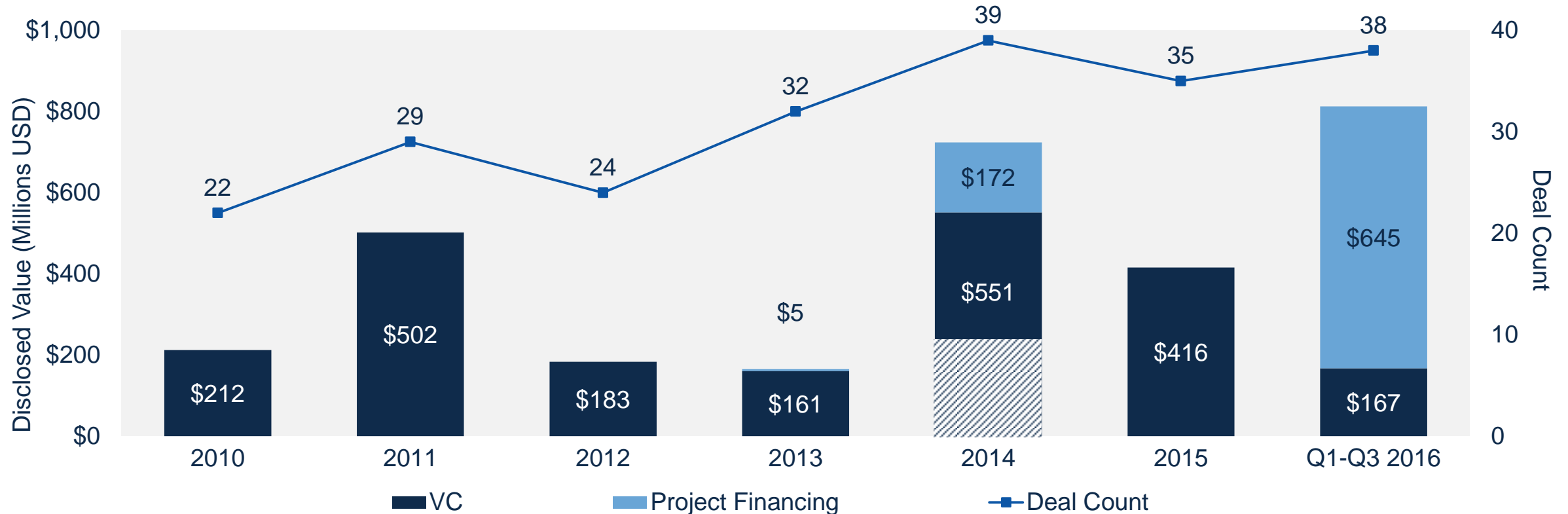
..incorporate bidding parameters that account for the physical and operational characteristics of electric storage resources

...establish a minimum size requirement for participation that does not exceed 100 kW

Source: FERC Open Commission Meeting Staff Presentation Item E-1,

Corporate Investments in Energy Storage at \$660 Million in Q3 2016

Disclosed Corporate Investments in Energy Storage, 2010-Q3 2016 (Million \$, Number of Deals)

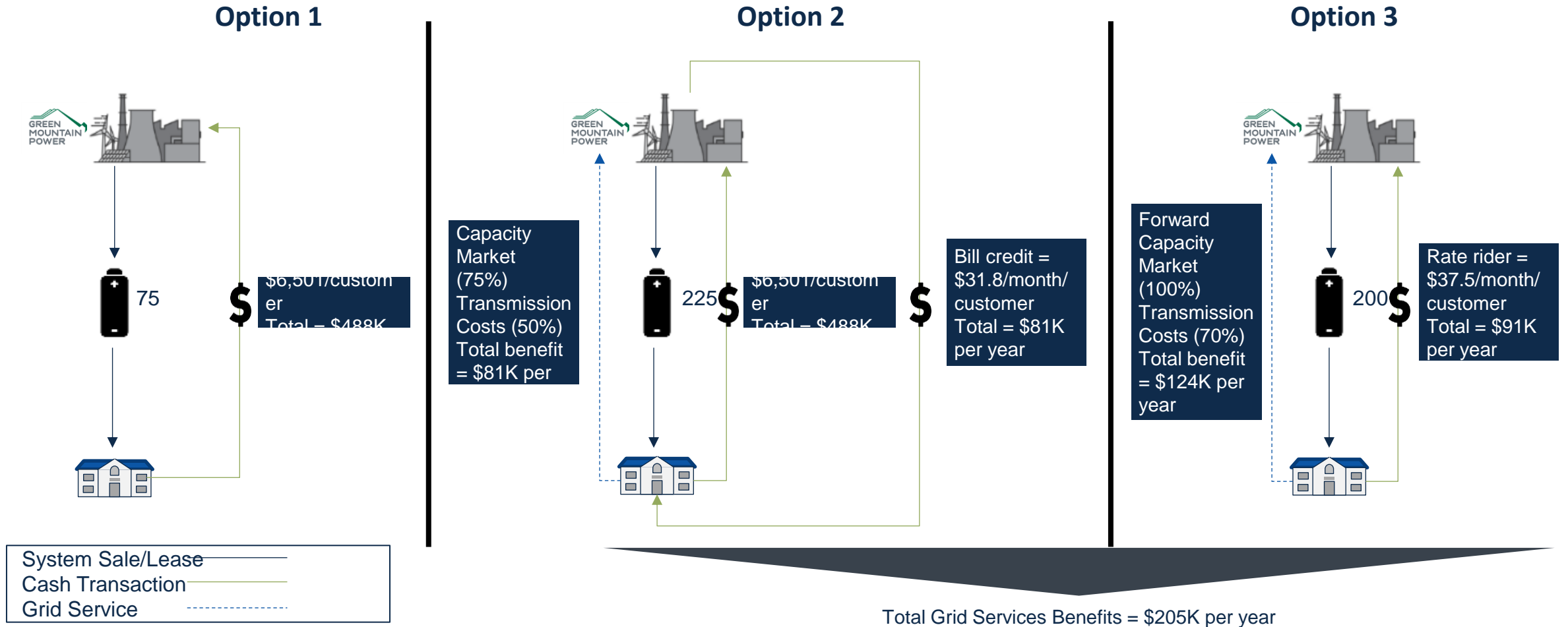


Source: GTM Research/ESA U.S. Energy Storage Monitor

Note: The total disclosed investment in 2014 was boosted by a rumored \$250 million investment in Boston-Power (shaded in the figure above); Data excludes battery materials and upstream companies. 2014 data differs from *U.S. Energy Storage Monitor 2014 Year in Review* due to the exclusion of EV startup Atieva and inclusion of stealth startup Fluidic Energy.

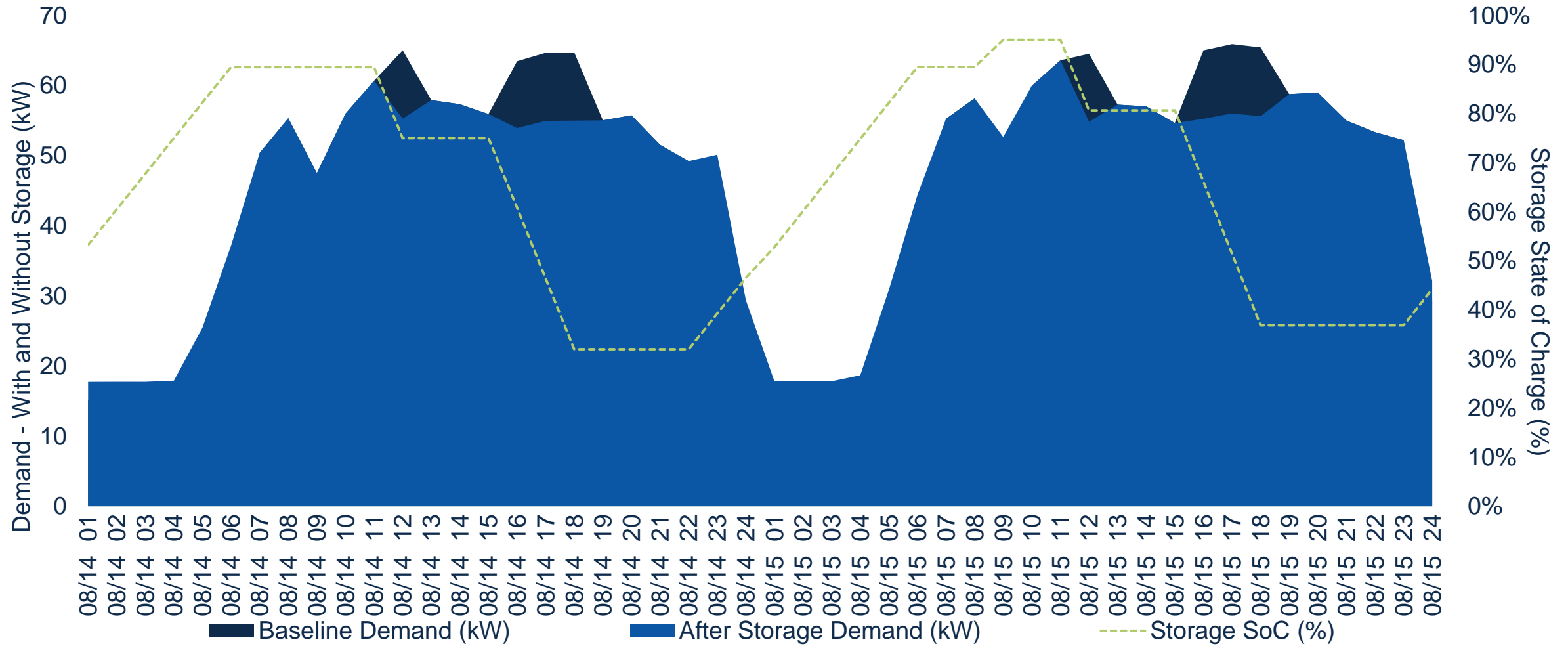
Case Studies Are Worth Thousand Deployments...

Residential Case Study: Green Mountain Power to Use Behind-the-Meter Storage to Reduce Peak Capacity and Transmission Costs



Source: Green Mountain Power, GTM Research

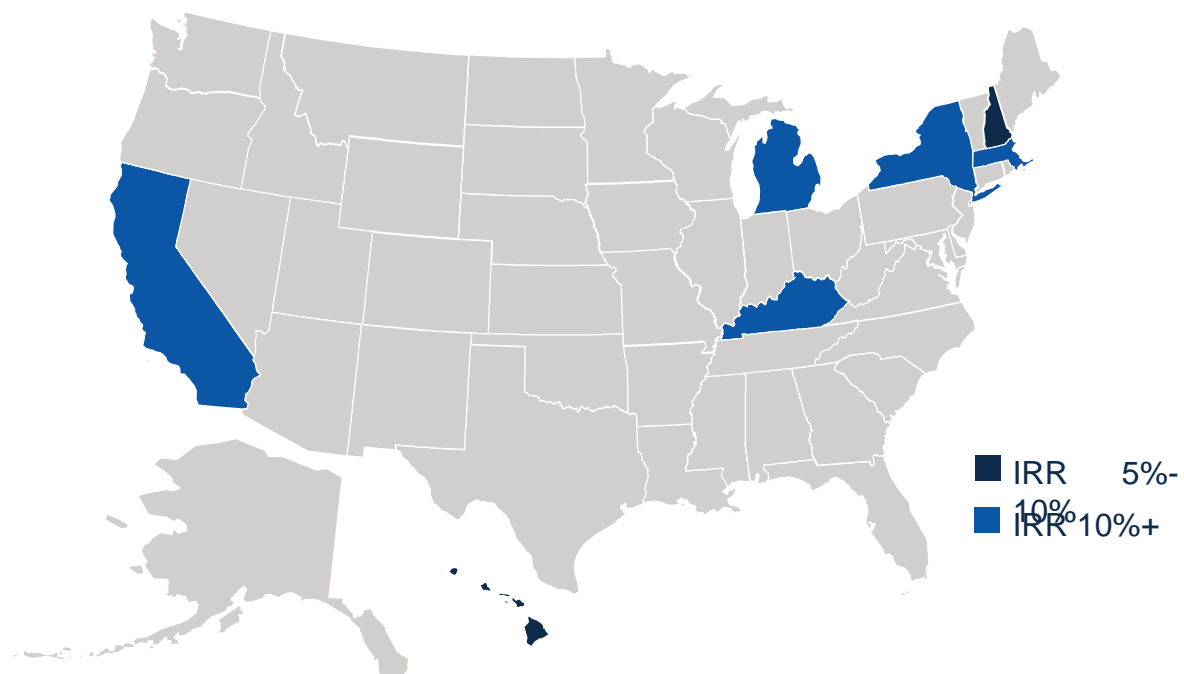
Non-Residential Case Study: Demand Reduction for a Commercial Customer → Bill Savings Opportunity



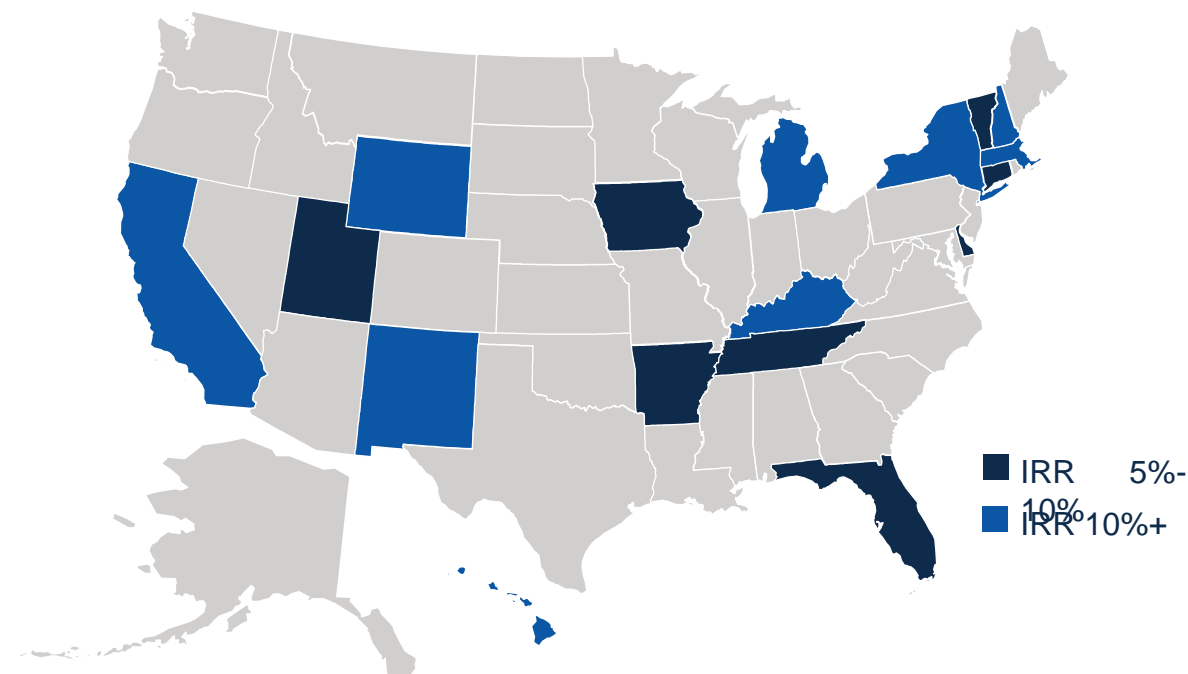
Source: GTM Research The Economics of Commercial Energy Storage in the U.S.: The Outlook for Demand Charge Management

Non-Residential Case Study: Medium C&I Energy Storage Returns Above 5 Percent in Seven Utilities in 2016, in 17 Utilities in 2021 (Base Case)

2016 C&I Energy Storage Economics



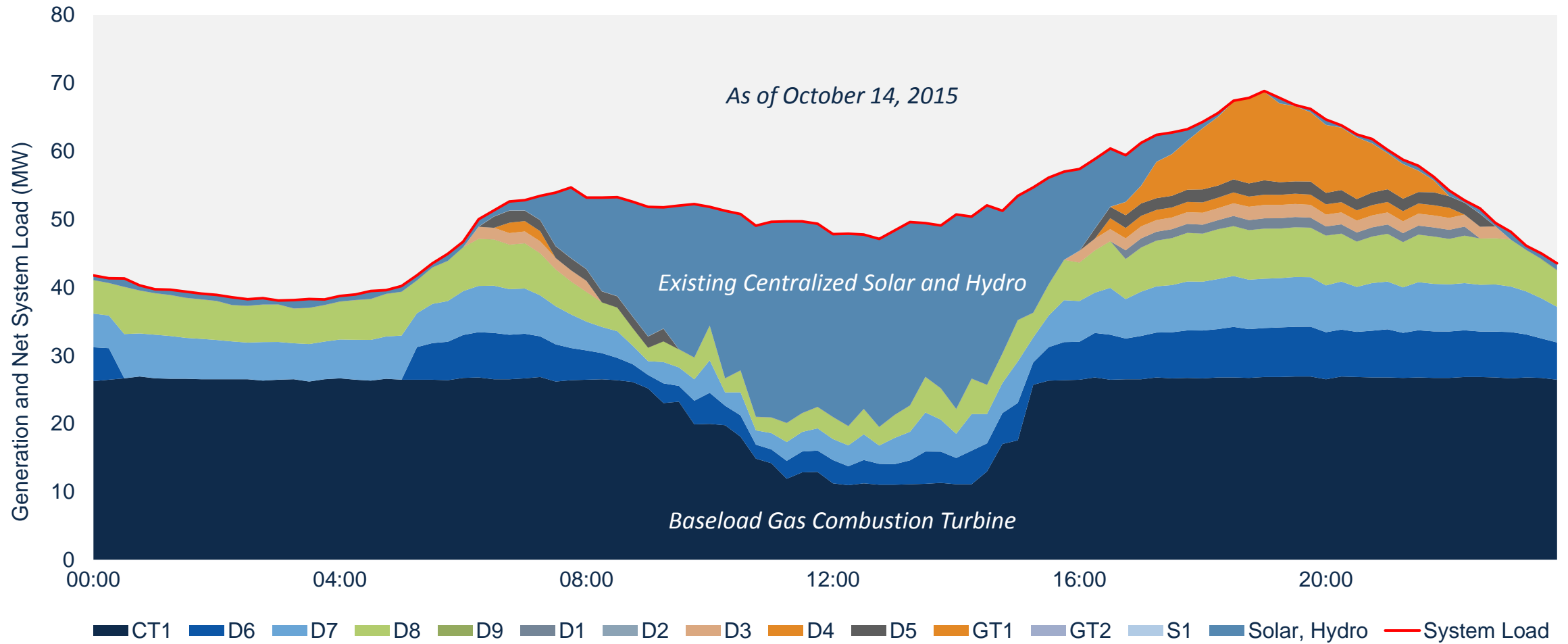
2021 C&I Energy Storage Economics (Base Case)



Source: GTM Research The Economics of Commercial Energy Storage in the U.S.: The Outlook for Demand Charge Management

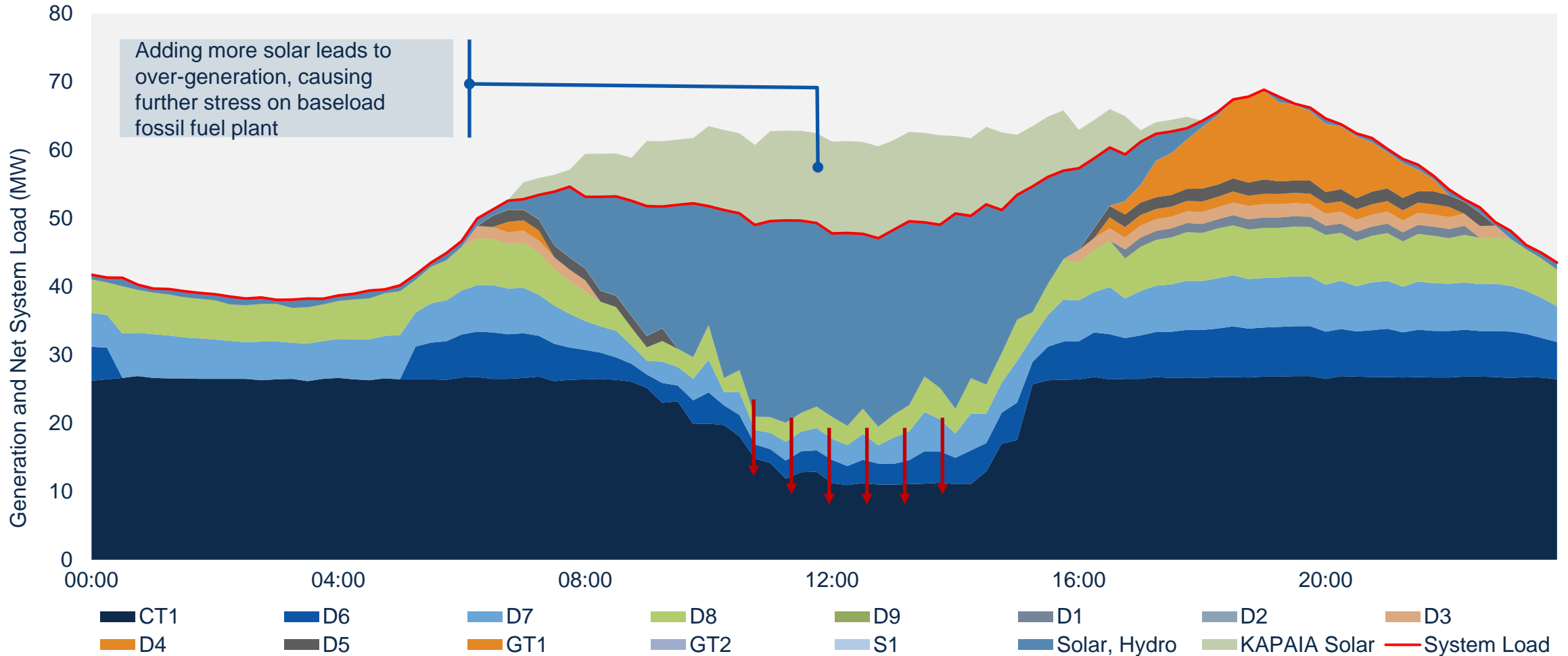
Source: GTM Research The Economics of Commercial Energy Storage in the U.S.: The Outlook for Demand Charge Management

Utility Case Study: KIUC Centralized Generation and Net Load Today



Source: KIUC, GTM Research. CT = Combustion turbine, D = Diesel engine, GT = Gas turbine, S = Steam turbine.

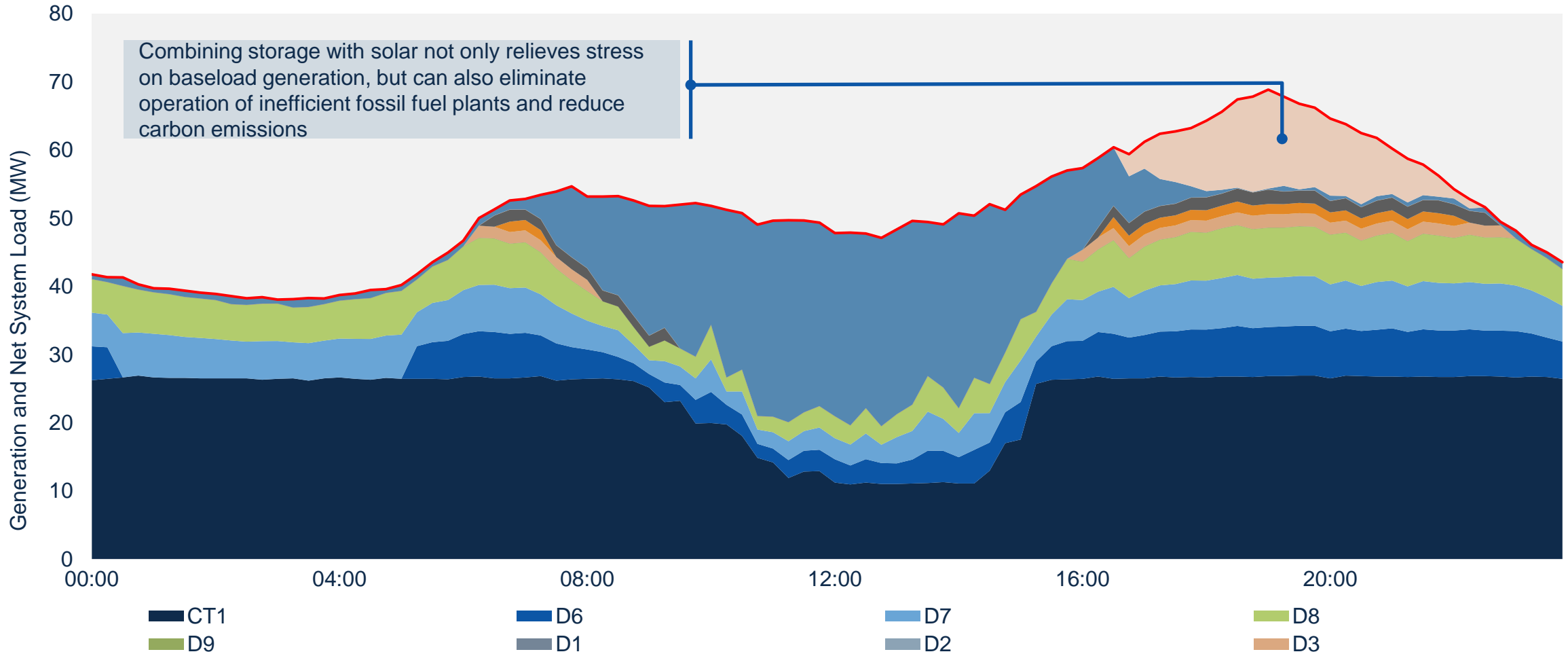
Utility Case Study: KIUC Centralized Generation and Net Load 13 MW Kapaia Solar Plant Addition



Source: KIUC, NREL PVWatts, GTM Research. CT = Combustion turbine, D = Diesel engine, GT = Gas turbine, S = Steam turbine.

Utility Case Study: KIUC Centralized Generation and Net Load

13 MW Kapaia Solar Plant Plus 13 MW/52 MWh Storage Plant Addition

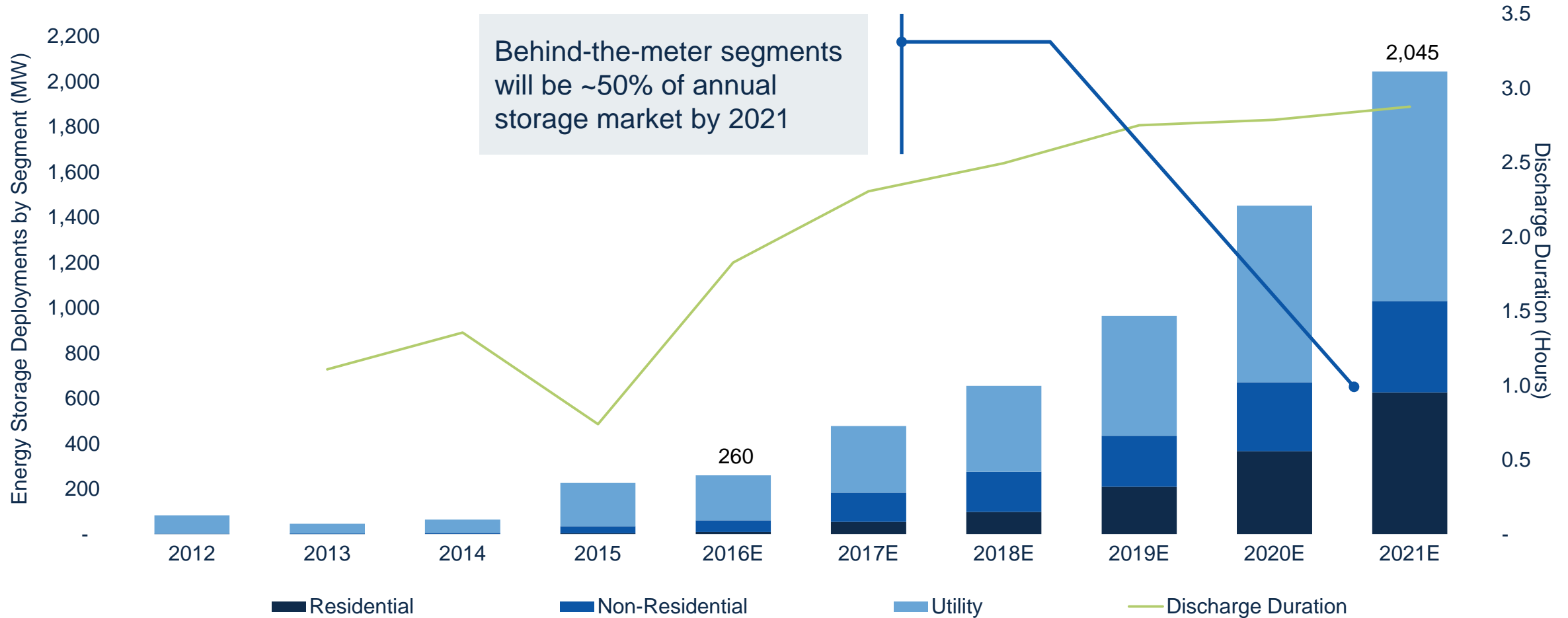


Source: KIUC, NREL PVWatts, GTM Research. CT = Combustion turbine, D = Diesel engine, GT = Gas turbine, S = Steam turbine.

U.S. Storage Market Outlook

U.S. Energy Storage Annual Deployments Will Exceed 2 GW by 2021

Market to Move to More Medium-to-Long Duration



Source: GTM Research/ESA U.S. Energy Storage Monitor

Thank you!

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