

U.S. Energy Storage Monitor Q2 2015: Executive Summary

September 2015



About This Report

U.S. Energy Storage Monitor is a quarterly publication of GTM Research and the Energy Storage Association (ESA). Each quarter, we gather data on U.S. energy storage deployments, prices, policies, regulations and business models. We compile this information into this report, which is intended to provide the most comprehensive, timely analysis of energy storage in the U.S.

Notes:

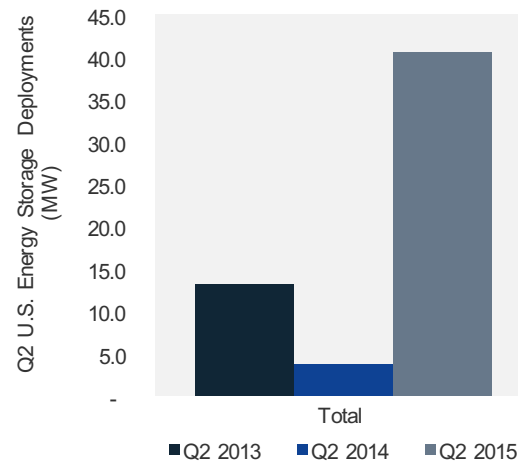
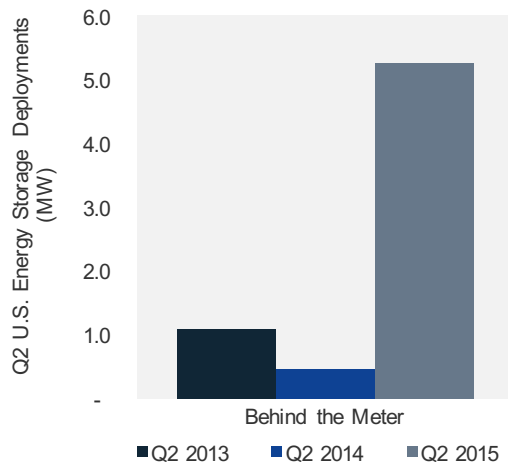
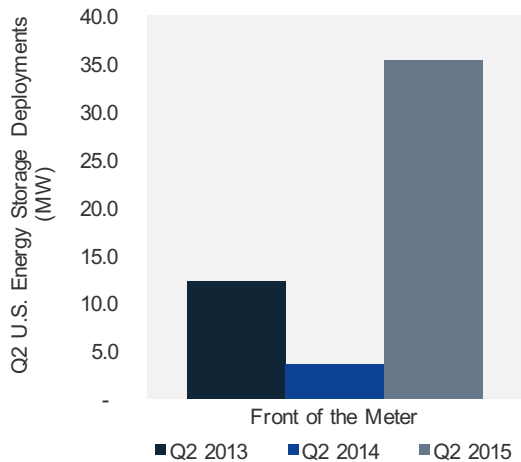
- All forecasts are from GTM Research; ESA does not predict future pricing, costs, or deployments
- References, data, charts and analysis from this report should be attributed to “GTM Research/ESA U.S. Energy Storage Monitor”
- Media inquiries should be directed to Mike Munsell (munsell@gtmresearch.com)

For more information or to purchase the full report, visit www.energystoragemonitor.com.

Scope of This Report

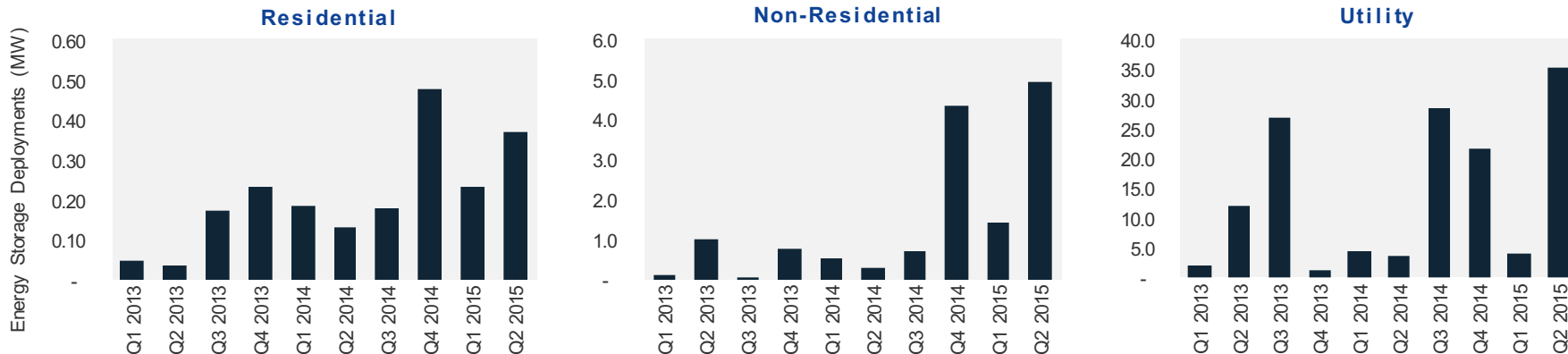
- **Capacity Metrics:** We report energy storage capacity and deployments in terms of power capacity (measured in watts). An alternative method would be to report the data in watt-hours, which provides information on the discharge duration at rated power capacity. All of our data sources (details on data sources provided in Appendix), including program administrators, utility companies, utility commissions, and system operators, currently track and report energy storage queue, deployments and interconnections in terms of power capacity: watts, kilowatts or megawatts. GTM Research defines capacity in terms of the interconnected power capacity, and not in terms of the flexible resource capability a given storage asset can provide (charging + discharging).
- Please note that some projects are publicly announced based on flexible resource capacity. For these projects, the announced capacity may differ from our capacity totals.
- **Segments:** We report energy storage capacity data in three segments: residential, non-residential and utility scale. Projects that are deployed on the end-customer side of the meter (i.e., behind the meter) are reported as falling in either the residential or non-residential segment. The non-residential segment includes commercial, industrial, education, military and nonprofit deployments, but excludes uninterruptible power supply (UPS). Regardless of their size, projects that are deployed on the utility side of the meter (i.e., in front of the meter) are reported in the utility-scale segment.
- **Technologies:** Electrochemical (batteries) and electromechanical technologies, excluding pumped hydro, are included in the historical deployment and forecast data.
- **Market Size:** Market size is reported in megawatts (or kilowatts) of deployments (i.e., interconnected and operational) by year and segment, as well as in U.S. dollars based on system price estimates and annual deployments (i.e., interconnection).

Largest Quarter for Energy Storage Since Q4 2012



- 40.7 MW of energy storage was deployed in Q2 2015, a nine-fold increase from Q2 2014, and six-fold increase from Q1 2015.
- Behind-the-meter market continued its strong showing of previous quarters, and grew over eleven times from same period last year.
- Front-of-meter market also had its best quarters since Q4 2012 when the 36 MW Notrees project was interconnected (which incidentally will be repowered with lithium-ion batteries, as announced this quarter).

Behind-the-Meter Segments on an Upward Trend



- The residential storage market grew 61% in Q2 2015 vs. Q1 2015. However, it still was the smallest of three segments, and accounted for only 1% of Q2 2015 deployments.
- Q2 2015 was the largest quarter yet for non-residential segment, beating the previous best in Q4 2014 by 13%.
- The utility-scale (front-of-meter) segment accounted for 87% of the market, which shows the disparity between the two sectors. Q2 2015 was a quarter where both behind-the-meter segments had meaningful growth.
- Market-specific deployment data is provided in the full report.

Top Energy Storage Markets' Cumulative Deployments Since Q1 2013

Rank	Residential	Deployments (kW)
1	California	1,288
2	Hawaii	380
3	Arizona	166

Rank	Non-Residential	Deployments (MW)
1	California	10.8
2	PJM (excl. NJ)	1.1
3	All Others*	1.1

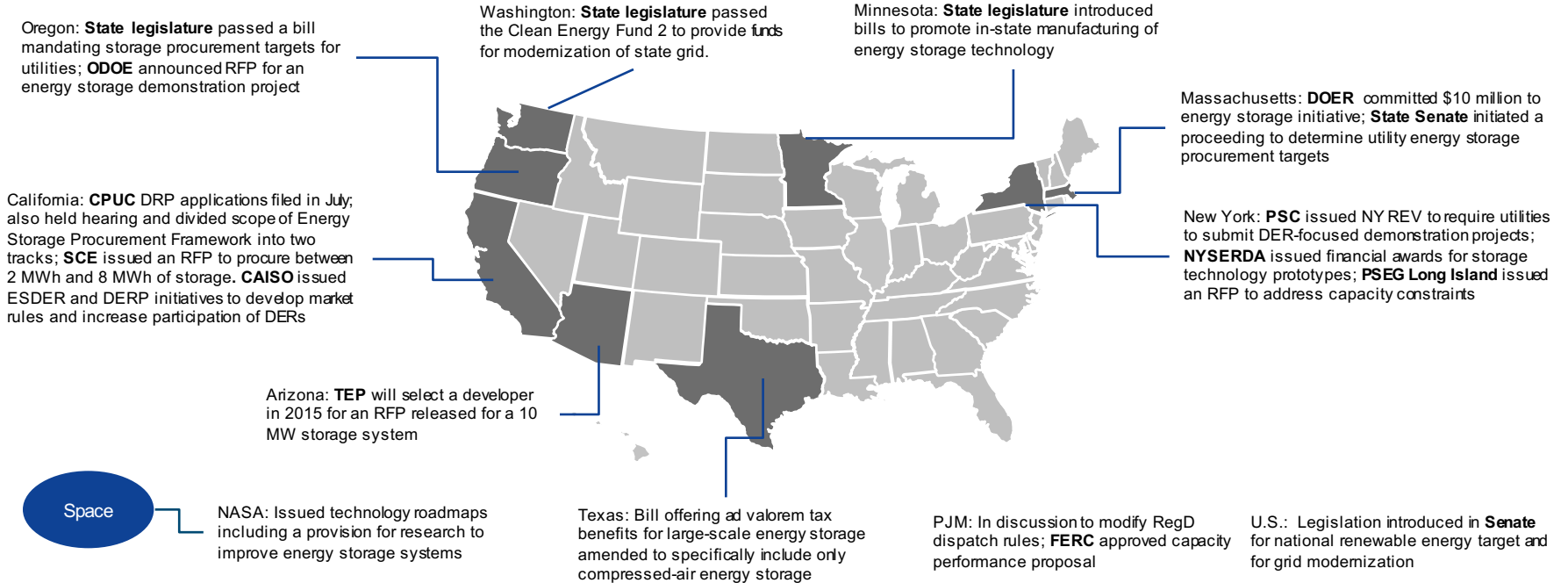
Rank	Utility	Deployments (MW)
1	PJM (excl. NJ)	100.2
2	California	23.7
3	All Others*	8.7

Rank	Total	Deployments (MW)
1	PJM (excl. NJ)	101.2
2	California	35.8
3	All Others*	9.8

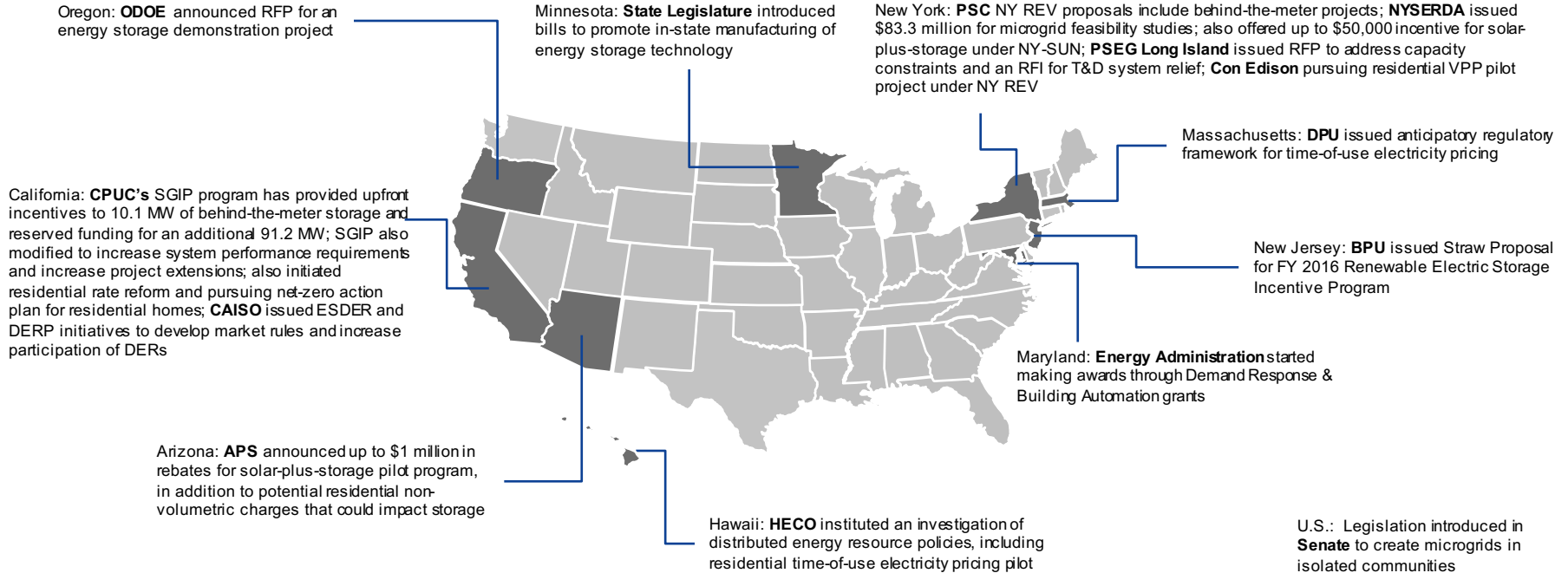
- PJM and California exchange the number 1 and 2 spots in utility-scale and non-residential cumulative deployments since Q1 2013. Collectively, these markets have deployed 137 MW of the 156 MW deployed in the last 10 quarters (88% combined market share).
- California is the largest residential and non-residential market, and accounts for 62% and 77%, respectively, of the total deployed storage in these segments.
- Utility-scale deployments are just as concentrated among these two markets. Other markets such as Hawaii, Texas and New York have had more than 20 MW of utility-scale energy storage deployments prior to Q1 2013, and hence do not show up in the top 3.

* GTM Research is currently monitoring seven individual markets. Complete coverage of all markets is available in the full report.

Front-of-the-Meter Policy and Market Developments, Q2 2015



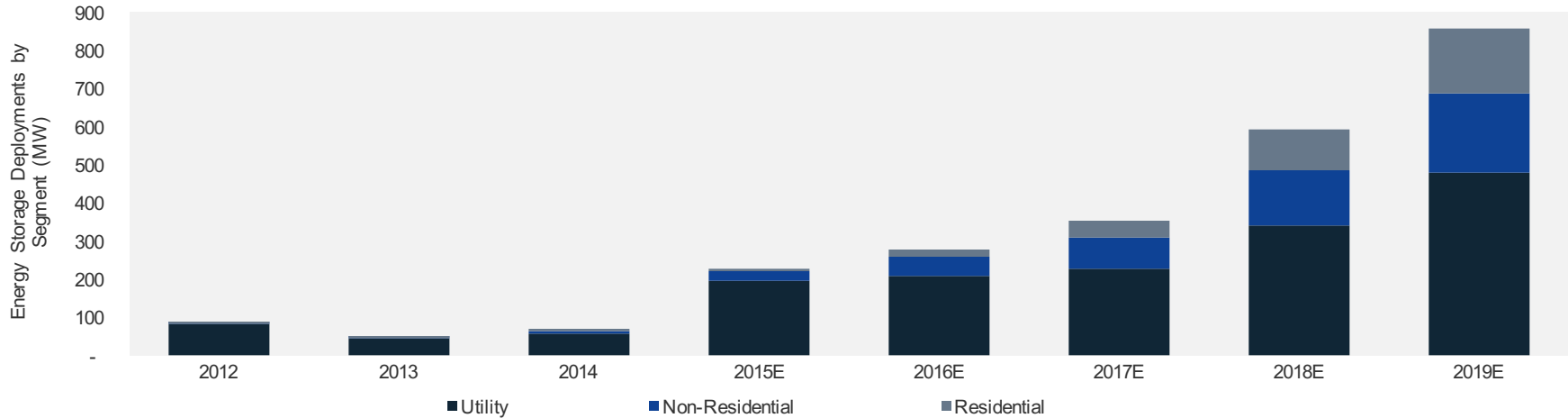
Behind-the-Meter Policy and Market Developments, Q2 2015



New State Markets Opening Doors for Energy Storage

State	Policy/Initiative	Market Drivers	Storage Applications	Challenges	Trends to Watch
MD	<ul style="list-style-type: none"> Demand Response and Building Automation Grants; Microgrids Task Force 	<ul style="list-style-type: none"> Grid reliability/resiliency Congestion is a major focus PJM ancillary services market Renewable integration 	<ul style="list-style-type: none"> Demand-charge management Renewable firming Frequency regulation 	<ul style="list-style-type: none"> Energy policy: presently focuses on behavioral rather than technological modifications 	<ul style="list-style-type: none"> High level of microgrid deployment and increasing interest in microgrids
OR	<ul style="list-style-type: none"> Storage mandate: H.B. 2193 Storage Demonstration RFP 	<ul style="list-style-type: none"> Major focus: Grid reliability/resiliency Renewable integration Non-residential demand charges 	<ul style="list-style-type: none"> Demand-charge management Backup power Renewable firming T&D deferral 	<ul style="list-style-type: none"> Economics: energy storage not financially viable in residential space 	<ul style="list-style-type: none"> Partnerships between utility and non-residential customers expected to provide energy storage solutions
WA	<ul style="list-style-type: none"> Clean Energy Fund 2 	<ul style="list-style-type: none"> Major focus: Growing local clean energy economy Reliability/resiliency Renewable integration 	<ul style="list-style-type: none"> Renewable firming Backup power 	<ul style="list-style-type: none"> Economics: Low demand charges Economics: Low non-residential electricity rates 	<ul style="list-style-type: none"> State interest in promoting clean energy cluster through local storage vendors

2015 on Path to Be the Biggest Year Yet for Energy Storage



- We expect significant growth in the U.S. energy storage market over the next five years across all sectors, resulting in an 858 MW annual market in 2019 – 13 times the size of the 2014 market, and four times the size of 2015 market.
- 2015 will see rapid growth, with 220 MW deployed and each segment more than doubling on an annual basis, with a further upside in non-residential segment, but a significant downside to utility-scale segment.

U.S. Energy Storage Monitor

Produced in a collaboration between GTM Research and the Energy Storage Association (ESA), the *U.S. Energy Storage Monitor* is the industry's only comprehensive, quarterly research report on energy storage markets, deployments, policies, financing and regulations in the U.S. The report is available for purchase quarterly or as an annual subscription.



Executive Summary vs. Full Report Content

Content	Executive Summary	Full Report
Energy Storage Deployments	National Aggregate	By State and Market Segment
Deployments by Technology	Not Available	Available
Market Trends	National Highlights	Detailed Analysis
Pricing Data	Not Available	Quarterly Index
Deployment Forecast	National Aggregate	By State and Segment

Report Pricing

Member Status	Executive Summary	Full Report (PDF Enterprise License)	
		Individual Quarterly Report	Annual Subscription-4 reports
ESA Members	Free	\$1,500	\$5,000
Non-ESA Members		\$2,500	\$8,000

This report is relevant to:

-  Technology Firms
-  Component Manufacturers
-  System Integrators
-  Third-Party Financiers
-  Project Developers
-  Utilities and IPPs
-  Universities
-  Policymakers and Regulators

For more information, contact Tate Ishimuro at ishimuro@gtmresearch.com or visit www.energystoragemonitor.com