

U.S. Energy Storage Monitor: Q4 2016 Executive Summary



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December 2016

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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.

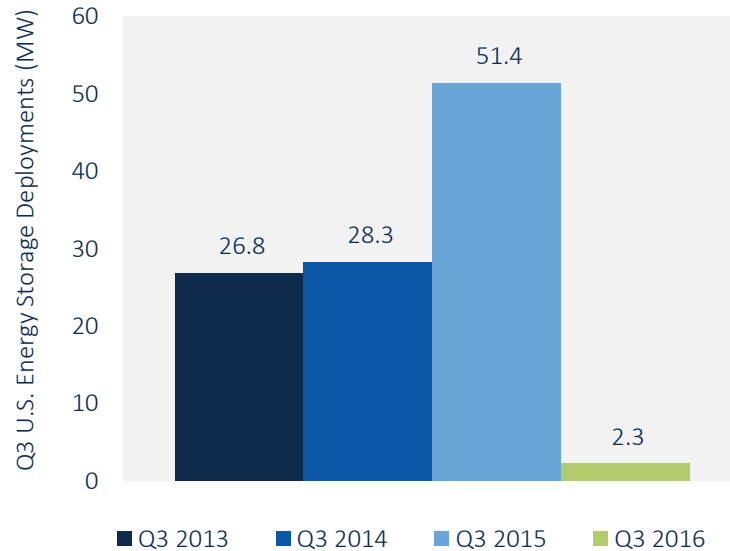
Notes:

- 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 from GTM Research (munsell@gtmresearch.com) or Matt Roberts with the Energy Storage Association (m.roberts@energystorage.org)

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

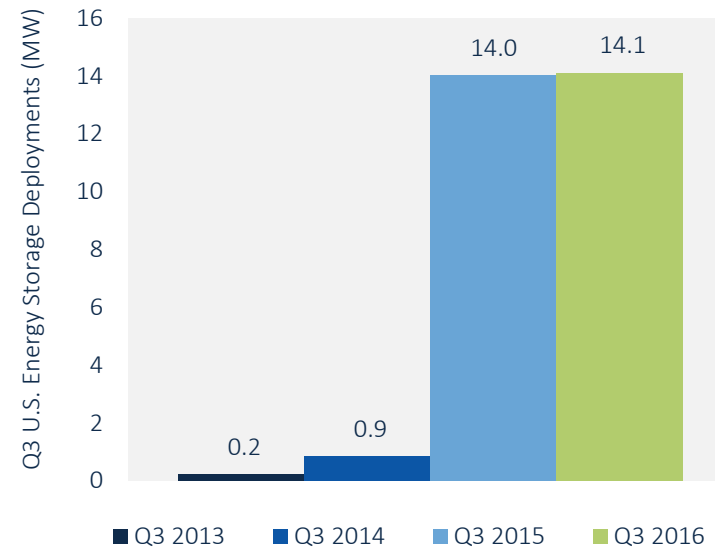
The U.S. Deployed 16.4 MW of Energy Storage in Q3 2016

Front of the Meter



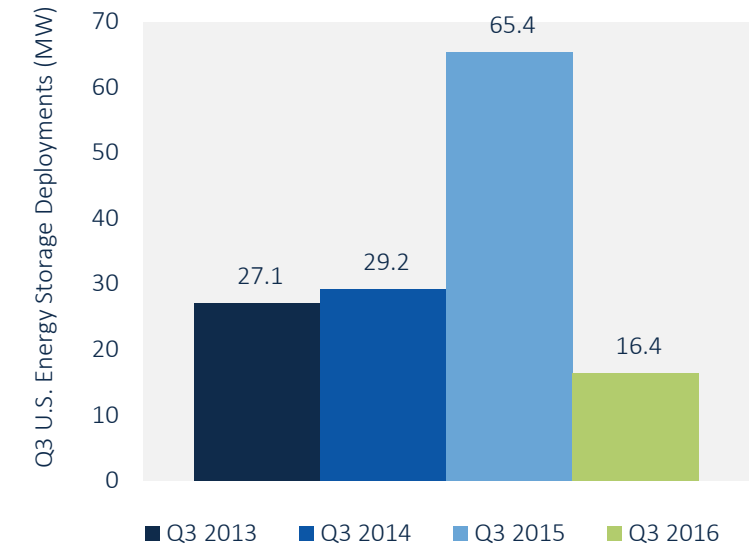
Source: GTM Research

Behind the Meter



Source: GTM Research

Total

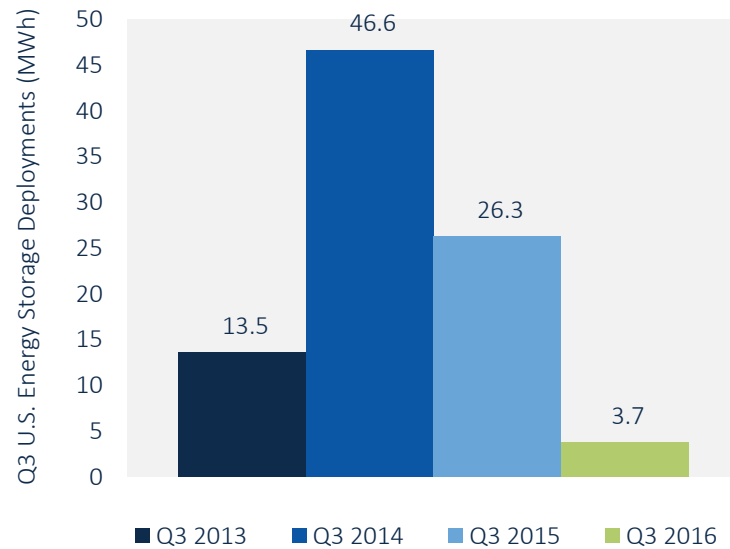


Source: GTM Research

- 16.4 MW of energy storage were deployed in Q3 2016, a 75% drop from the same quarter in 2015.
- Front-of-the-meter deployments dropped 96% from Q3 2015, as no projects above 1 MW were brought on-line for the first time since Q2 2014.
- Behind-the-meter deployments stayed essentially steady, increasing 1% from Q3 2015. Behind-the-meter deployments accounted for 86% of total MW deployed in Q3 2016, a record percentage driven by strong performance in the non-residential space, along with a slow quarter for utility-scale deployments.

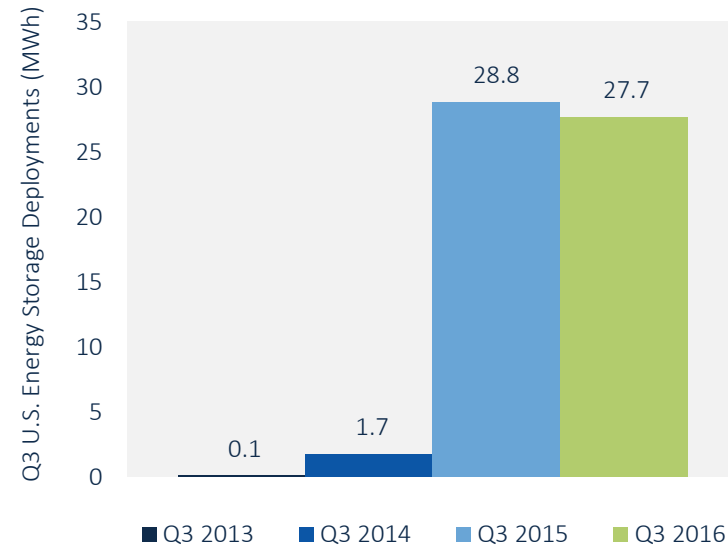
The U.S. Deployed 31.4 MWh of Energy Storage in Q3 2016

Front of the Meter



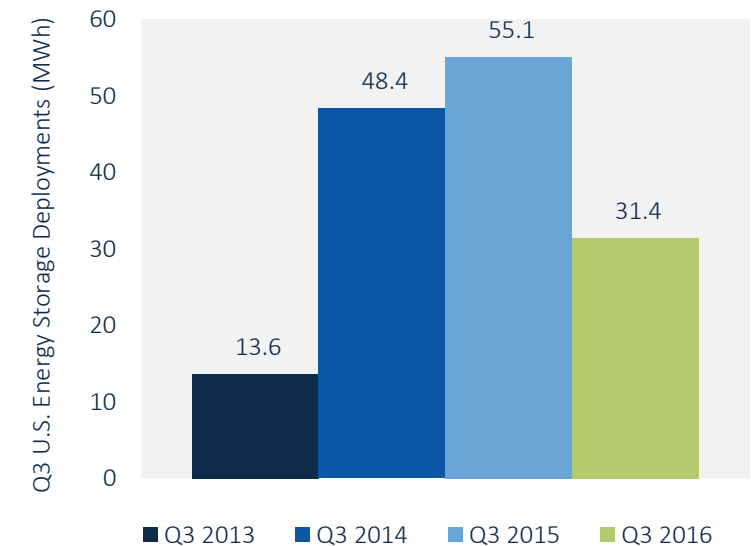
Source: GTM Research

Behind the Meter



Source: GTM Research

Total



Source: GTM Research

- The U.S. deployed 31.4 MWh of energy storage in Q3 2016, down 43% from 55.1 MWh in Q3 2015, driven by a slow quarter in the front-of-the-meter segment.
- Front-of-the-meter deployments fell from 26.3 MWh in Q3 2015 to 3.7 MWh in Q3 2016, a year-over-year decrease of 86%. As utility procurements come on-line in the coming months, we expect the front-of-the-meter segment to regain a significant market share, as several 4-hour duration projects are set to come on-line in Q4 2016.
- Behind-the-meter deployments were down 4% year-over-year, from 28.8 MWh in Q3 2015 to 27.7 MWh in Q3 2016. The behind-the-meter segment installed more than 10 MWh for the sixth consecutive quarter, showing the staying power of this market compared to the more volatile front-of-the-meter market over the past several years.

California and PJM (Excl. NJ) Account for 81 Percent of Deployments Since Q1 2013

Rank	Residential	Non-Residential	Utility
1	All Others*	California	PJM (excl. NJ)
2	California	All Others*	All Others*
3	Hawaii	PJM (excl. NJ)	California

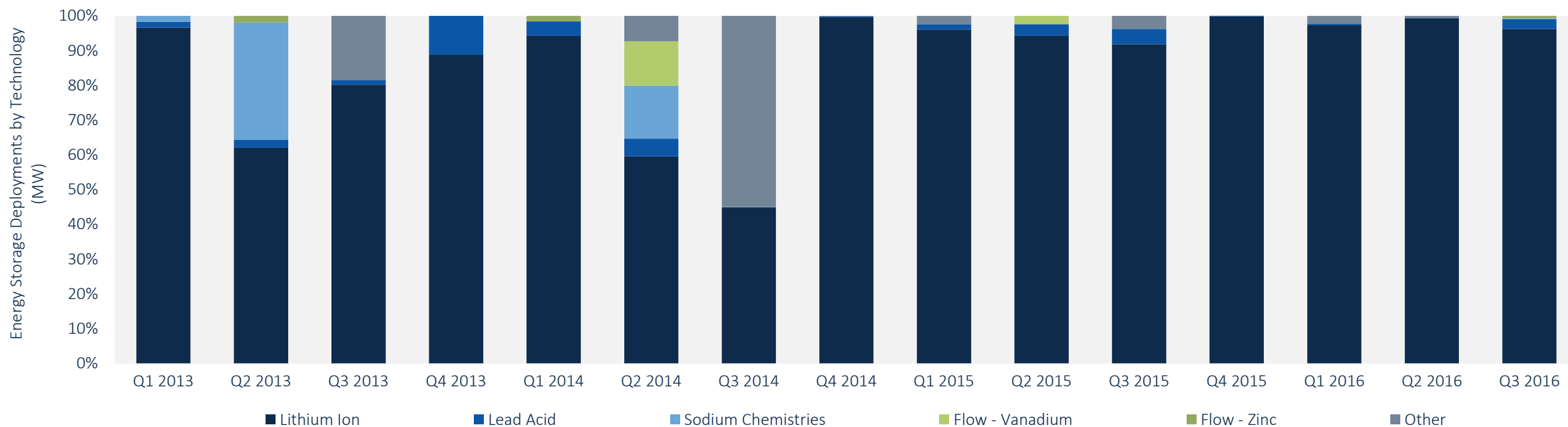
Source: GTM Research

- PJM (excl. NJ) and California collectively account for the majority of U.S. energy storage deployments in MW terms (81% combined share, down from 82% in Q2 2016).
- Rankings remained steady from Q2 2016, with the top three markets in the residential, non-residential and utility-scale segments all remaining unchanged from Q2 2016.
- PJM (excl. NJ) holds 74% of the utility-scale market, due in large part to the deployments in its frequency regulation market. We expect this market to shift heavily toward California over the next two quarters as several projects resulting from utility procurements come on-line. Utility-scale projects will be coming on-line in California over the next six to eight months as a result of expedited procurement procedures that were instituted to help remedy the supply shortfall related to the Aliso Canyon gas leak in Southern California. We expect the California market to continue to build on this growth and see more deployments counting toward AB 2514 and other programs.
- California continues to dominate the non-residential energy storage segment with 85% of the market, with more than 25 times the amount of deployments in PJM territory and more than 30 times the deployments of the next largest single-state market (New Jersey).
- California remains the largest single-state market for residential energy storage with 29% of the overall market, but other markets now make up 36% of the market, eclipsing California for the second straight quarter. Arizona is also growing in market share, with 8% of the total residential market.

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

Lithium-Ion Technology Continues the Trend of More Than 90% Share for the Eighth Consecutive Quarter

Quarterly Energy Storage Deployment Share by Technology (MW %)

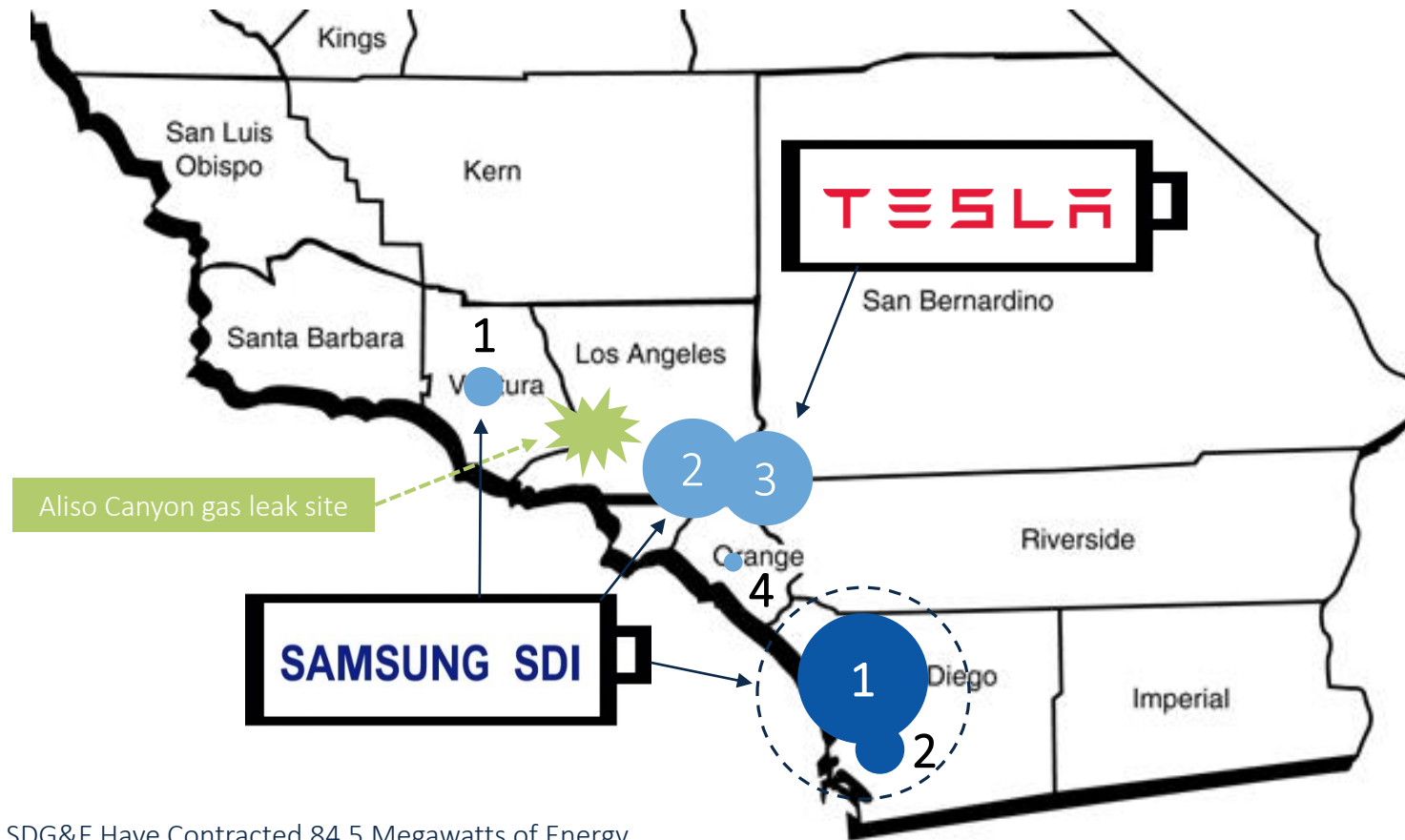


Source: GTM Research

- Lithium-ion batteries dominated the energy storage market for the eighth straight quarter, representing 96.2% of the market in Q3 2016, down from 99.3% in Q2 2016.
- Lead acid batteries came in second with 2.7% of the market in Q3 2016.

*"Other" includes flywheel and unidentified energy storage technologies

Aliso Canyon Expedited Energy Storage Procurement Totals 84.5 Megawatts



SCE and SDG&E Have Contracted 84.5 Megawatts of Energy Storage As Part of Aliso Canyon Procurement

CA County Map Source: California Elections Website <http://www.sos.ca.gov/elections/map/>

SCE Aliso Canyon Awarded Procurements

1. Western Grid Santa Paula, 5 MW/20 MWh
On-line target Q1 2017
2. AltaGas-Greensmith Pomona, 20 MW/80 MWh
On-line target Q4 2016
3. Tesla Ontario, 20 MW/80 MWh
On-line target Q4 2016
4. Powin Energy Irvine, 2 MW/8 MWh
On-line target Q1 2017

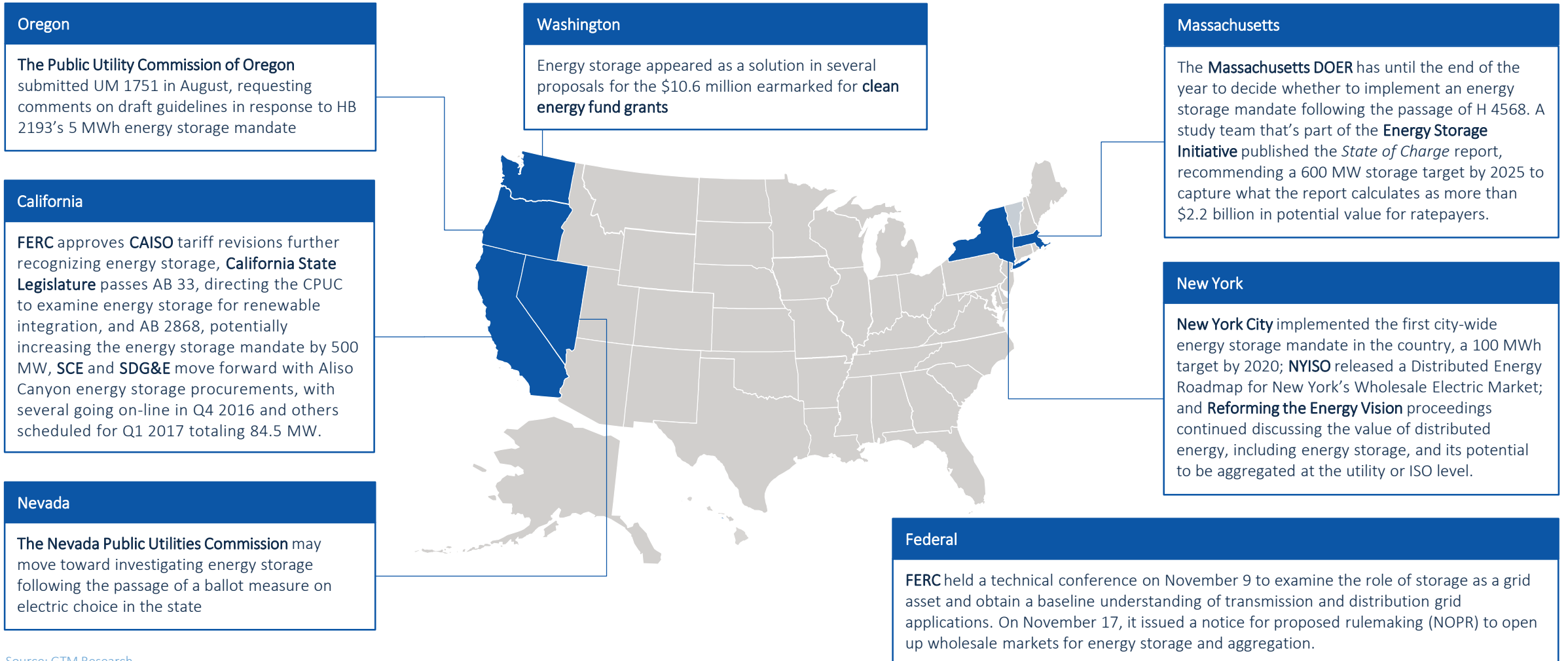
SDG&E Aliso Canyon Awarded Procurements

1. AES Escondido 30 MW/120 MWh
On-line target Q1 2017
2. AES El Cajon 7.5 MW/30 MWh
On-line target Q1 2017

SCE Procurement	SDG&E Procurement
47 MW/4-hr. duration	37.5 MW/4-hr. duration
Multiple RFP winners	Single awardee
On-line 2016/2017	On-line 2017
New procurements ordered from CPUC	Procurements expedited from ongoing LCR program

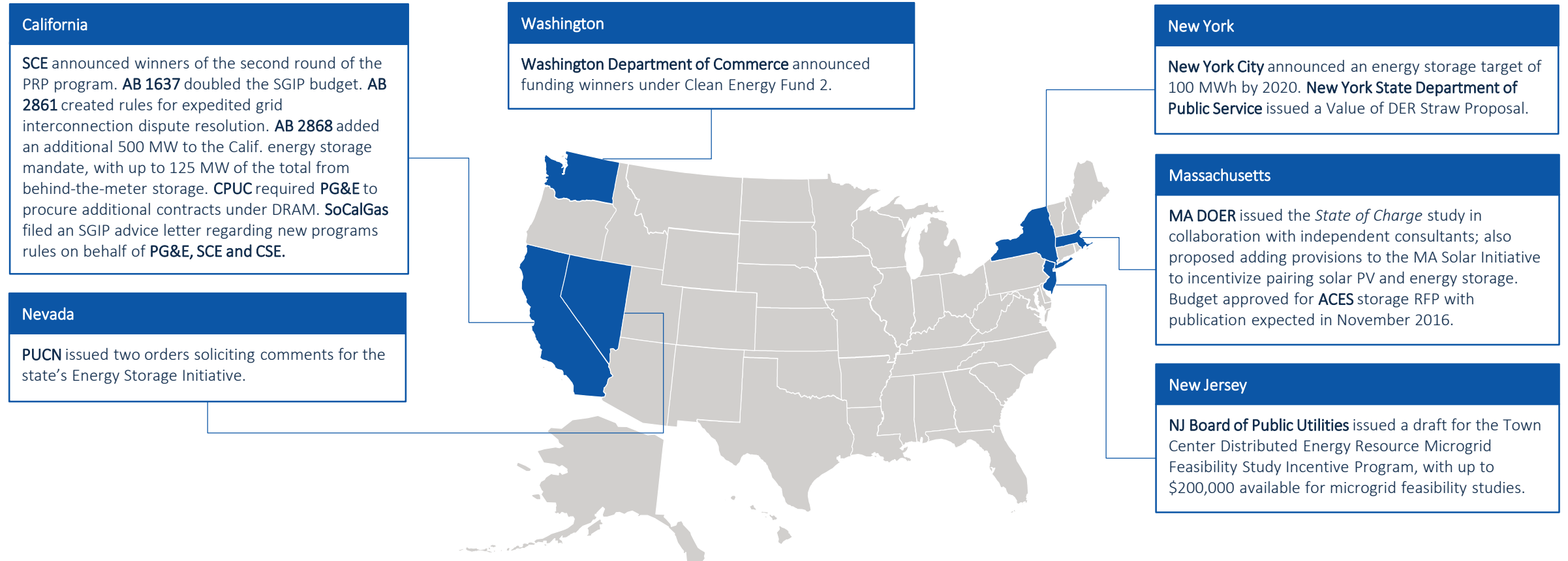
GTM Research Based on SCE and SDG&E announcements and procurement websites

Front-of-the-Meter Policy and Market Developments, Q4 2016



Source: GTM Research

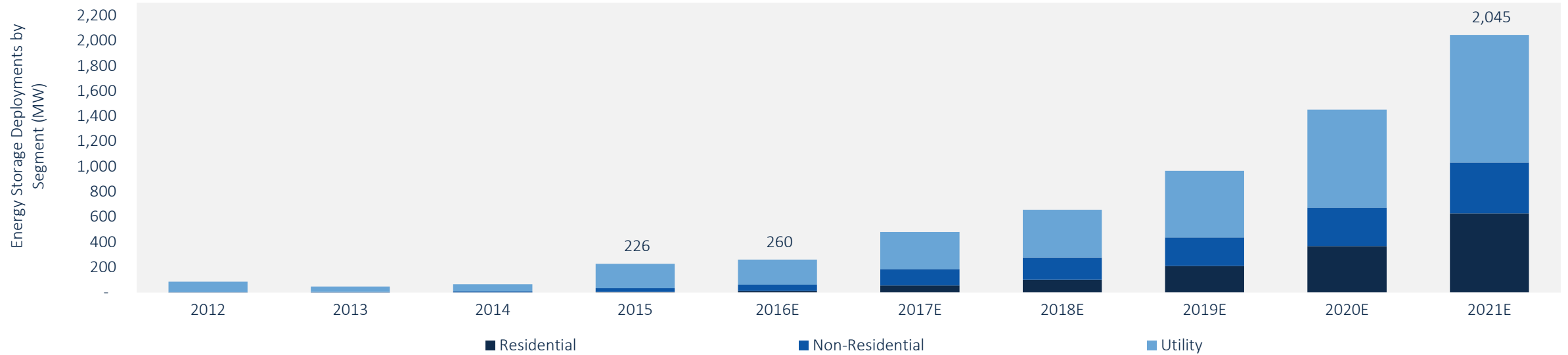
Behind-the-Meter Policy and Market Developments, Q4 2016



Source: GTM Research

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

U.S. Annual Energy Storage Deployment Forecast, 2012-2021E (MW)

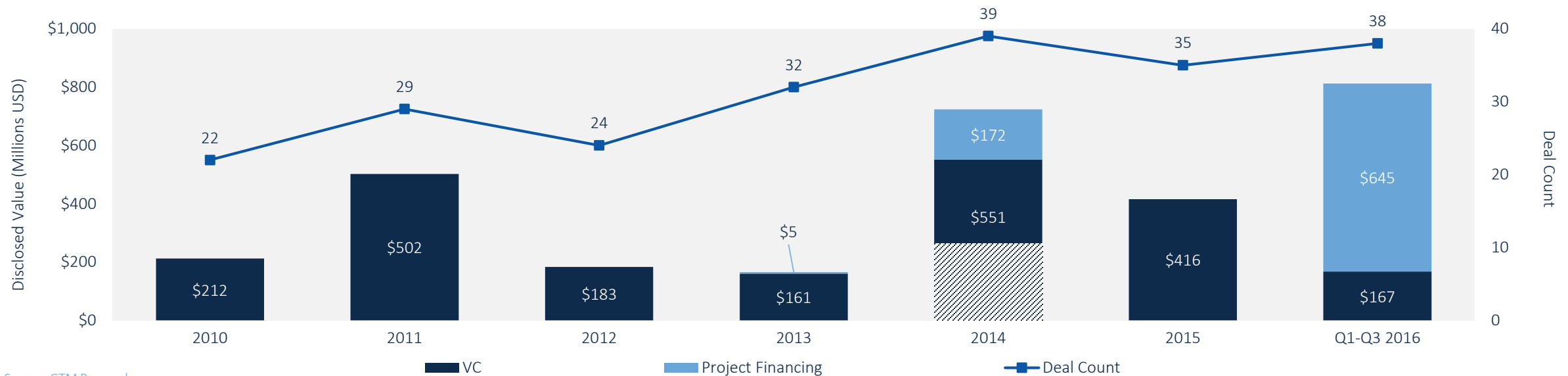


Source: GTM Research

- GTM Research expects the U.S. energy storage market to grow from 226 MW in 2015 to 260 MW in 2016, and over 2.0 GW by 2021, eight times the size of 2016 market.
- The behind-the-meter sectors will grow from 15% share in 2015 to account for almost a quarter of all deployments this year, and will account for half of the 2021 annual storage market.
- With the pending White House administration change, our outlook may be revised if the incoming administration puts forward regressive policy measures in 2017. Our outlook is based on a business-as-usual regulatory landscape and incremental developments, and with most storage regulatory activities in state and regional markets, the only scenario in which our forecast will be negatively affected is if renewable policies or initiatives such as the Grid Modernization Initiative or commitments announced at the White House Summit on Scaling Renewable Energy and Storage With Smart Markets are overturned.

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

- Total corporate investments in Q3 2016, including venture funding and project finance, totaled \$659.8 million, five times the corporate investments in Q3 2015 (\$131.6 million). Notably, Q3 2016 saw the largest amount of project financing for energy storage in any single quarter.
- The largest announced deal in Q3 2016 was \$300 million in project financing that Tabuchi Electric received from the Electric & Gas Industries Association. Advanced Microgrid Solutions also closed a large project financing deal worth \$200 million with Macquarie Capital.
- M&A activity included Total closing the company's acquisition of Saft in July 2016. Tesla and SolarCity shareholders approved Tesla's acquisition of SolarCity in November 2016.

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.

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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
Technology Coverage	Deployments by Technology	Status by Technology
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)	
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Non-ESA Members		\$2,500	\$8,000

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-  **Third-Party Financiers**
-  **Project Developers**
-  **Utilities and IPPs**
-  **Universities**
-  **Policymakers and Regulators**

For more information, contact **Evan Calkins** at calkins@greentechmedia.com or visit www.energystoragemonitor.com

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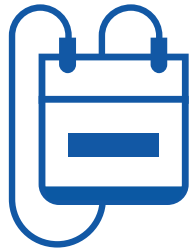
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