Energy Storage Policy Review
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Exploring the Landscape of Behind the Meter Energy Storage

Julie Hayes, Principal
Julie Hayes Consulting

Monica Thilges, Director
APTIM Energy Solutions

Mark Martinez, Manager
Emerging Markets and Technology
Southern California Edison

Energy for What’s Ahead®
What we will cover today

• Status and forecasts of energy storage deployments
• Case for Behind the Meter
• Mandates & policy drivers
• Utility program models
• Key takeaways
Leading Energy Storage States

Two FTM projects in California and a buzzing residential market keep the state in the top spot

Top three markets by segment in Q1 2021 (energy capacity)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Residential</th>
<th>Deployments (MWh)</th>
<th>Non-residential</th>
<th>Deployments (MWh)</th>
<th>Front-of-the-meter</th>
<th>Deployments (MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>California</td>
<td>117.8</td>
<td>Massachusetts</td>
<td>34.2</td>
<td>California</td>
<td>580</td>
</tr>
<tr>
<td>2</td>
<td>“All Others”</td>
<td>25.3</td>
<td>California</td>
<td>17.8</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Hawaii</td>
<td>23.8</td>
<td>New York</td>
<td>6.4</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Wood Mackenzie Power & Renewables
U.S. Deployment Forecast

U.S. energy storage annual deployment forecast, 2012-2026E (MWh)

- By 2026, the annual U.S. storage market will grow 2.7x compared to 2021 in MWh terms.
- MWh growth will accelerate faster than MW growth as average discharge durations increase over time due to greater focus on services such as capacity.
- The FTM segment will continue to make up the bulk of the market, driven by massive investment from vertically integrated utilities in regulated markets and developers taking advantage of wholesale market opportunities and incentives in key markets.
- The residential segment will continue its upward trend, adding 1.1 GWh in 2021 and 3.9 GWh 2026, while the non-residential segment's annual deployments will reach 2.4 GWh in 2026.

Source: Wood Mackenzie Power & Renewables
Behind-the-meter (BTM) storage in SCE’s service territory is projected to grow at 29% Compound Annual Growth Rate (CAGR) between 2019 and 2030 based on existing incentives and a declining technology cost curve, subsidized by SGIP.
California Energy Storage Snapshot

% of Energy Storage Rated Capacity (kW) by System Classification and Sector

<table>
<thead>
<tr>
<th>Classification</th>
<th>Residential</th>
<th>Non-Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar + Storage</td>
<td>96.6%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Solar + Other</td>
<td>0.2%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Stand Alone Storage</td>
<td>3.1%</td>
<td>63.4%</td>
</tr>
</tbody>
</table>

Source: CEC analysis of SGIP Weekly Statewide Report (10/21/2019)
The Case for BTM Storage

Different states have been early movers incorporating batteries and other flexible behind-the-meter (BTM) resources into new programs. Multiple forces collectively make a compelling case for battery storage. The utilities in California are under pressure to quickly scale up deployment of their battery programs.

### Multiple Forces Influence Development of BTM Energy Storage

<table>
<thead>
<tr>
<th>Utility Compliance</th>
<th>Customer Interest</th>
<th>Regulatory Directives</th>
<th>Technology Advances</th>
<th>Grid Modernization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet state mandates to acquire storage resources</td>
<td>Customer interest in batteries for resiliency</td>
<td>Battery storage directives</td>
<td>Availability of enabling technologies</td>
<td>Grid modernization co-mingled</td>
</tr>
</tbody>
</table>
The Case for BTM Storage Programs

Customers
BTM battery programs democratize ownership and confers benefits by making energy storage accessible to all. Owners of these assets are compensated for battery dispatch in these programs and additionally improve their own resilience to grid disturbances with ready access to an onsite source of power.

Utilities
Utilities benefit from BTM assets because they do not incur the cost or responsibility of energy storage ownership. The programs are structured so that utilities only pay for actual load reductions during DR events. Long duration contracts create a pipeline and increase program efficiencies.

Regulators
BTM battery programs offer a tool for achieving various state goals, including RPS, GHG, clean peak and more.

Battery Industry
The program offers standardization and continuity needed to rapidly grow a market. The emphasis on aggregated dispatch of BTM storage makes it possible for a wide range of battery projects to participate.

Wholesale Market
Improved local grid reliability can alleviate wholesale market operational issues.
Why Customers Invest in BTM

<table>
<thead>
<tr>
<th>Value</th>
<th>Use Case</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill Savings</td>
<td>Demand Charge Reduction</td>
<td>Energy storage can lower a customer's peak demand or shift to off-peak demand periods.</td>
</tr>
<tr>
<td></td>
<td>Time-Of-Use Bill Management</td>
<td>Energy storage can shift loads, charging during times of low demand and discharging during times of high demand.</td>
</tr>
<tr>
<td>Increased Distributed Generation Self-Consumption</td>
<td>Solar plus Storage</td>
<td>Energy storage can store excess distributed generation to offset future consumption from the utility.</td>
</tr>
<tr>
<td>Resiliency</td>
<td>Backup Power</td>
<td>Energy storage can provide backup power in the event of an outage (if utilities allow). This can apply to residential, commercial, or industrial customers, as well as microgrids.</td>
</tr>
</tbody>
</table>

Source: APPA (2019), Behind the Meter Energy Storage – What Utilities Need to Know
Why Utilities should interact with BTM

- Deferral or avoidance of infrastructure investments
- Reduced payments to wholesale power suppliers
- Reduced need for curtailment of intermittent renewables
- Demand response opportunities with Virtual Power Plants
- Increased system efficiency and localized load factor
- Increased service offering opportunity
- Reduce peak demand/avoid investments in generation

Source: APPA (2019), Behind the Meter Energy Storage – What Utilities Need to Know
State Policies Drive Storage Adoption

✓ Procurement mandates and targets
✓ Including storage in clean energy goals
✓ Including storage in the planning process
✓ Resiliency and reliability objectives
✓ Interconnection process improvements
✓ Financing and tax incentives
✓ Technology demonstration programs and studies
✓ Workforce and economic development
Federal Policy Actions

• Proposed Federal Legislation
  - Energy Storage Tax Incentive and Deployment Act
  - American Jobs Plan
  - Other Legislative Efforts

• FERC Orders impacting energy storage
  - Order 841
  - Order 2222
  - Order 2222-A
Different Models of Utility Management of BTM Storage

Utility Ownership & Operation
- **Pros**
  - Potential to Rate Base Distributed Assets
  - Customer Pays for a Portion of the Asset
  - Full Control of Distributed Energy Storage Asset
  - Maintains Customer Relationship
- **Cons**
  - Outside Utility Comfort Zone
  - Regulatory Challenges
  - Must Reserve Customer Backup Capacity

Utility Provides Incentives & Aggregation
- **Pros**
  - Customer Pays for a Portion of the Asset
  - Some Control of Distributed Energy Storage Asset
  - Customer Relationship Retention
- **Cons**
  - Less Potential to Rate Base
  - Less Control of Energy Storage Asset
  - Less Customer Relationship Retention

Utility Purchases Services from 3rd Party
- **Pros**
  - Some Indirect Control of Distributed Energy Storage Asset
  - No Aggregation Costs for Various Proprietary Protocols
  - Outsourcing of aggregation responsibilities
- **Cons**
  - Less Control of Energy Storage Asset
  - No Rate Base Potential
  - Risk: 3rd party goes out of business
  - No Customer Relationship
Key Takeaways

1. **Growth**
   Annual U.S. battery storage market projected to grow 2.7 times by 2026.

2. **Leadership**
   California is the top energy storage state in the US followed by Massachusetts.

3. **Trends**
   Federal and state policy continues to push for battery storage expansion.

4. **Opportunities**
   Number/scale of utility driven BTM programs will expand, given growing demand and mandates.
Thank you

Mark Martinez
Manager
SCE Emerging Markets and Technology
Mark.S.Martinez@sce.com

Julie Hayes
Principal
JHC, LLC
julie@juliehayesconsulting.com

Monica Thilges
Director
APTIM Energy Solutions
monica.thilgescochran@aptim.com