Energy Storage Policy Review

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Exploring the Landscape of Behind the Meter Energy Storage

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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

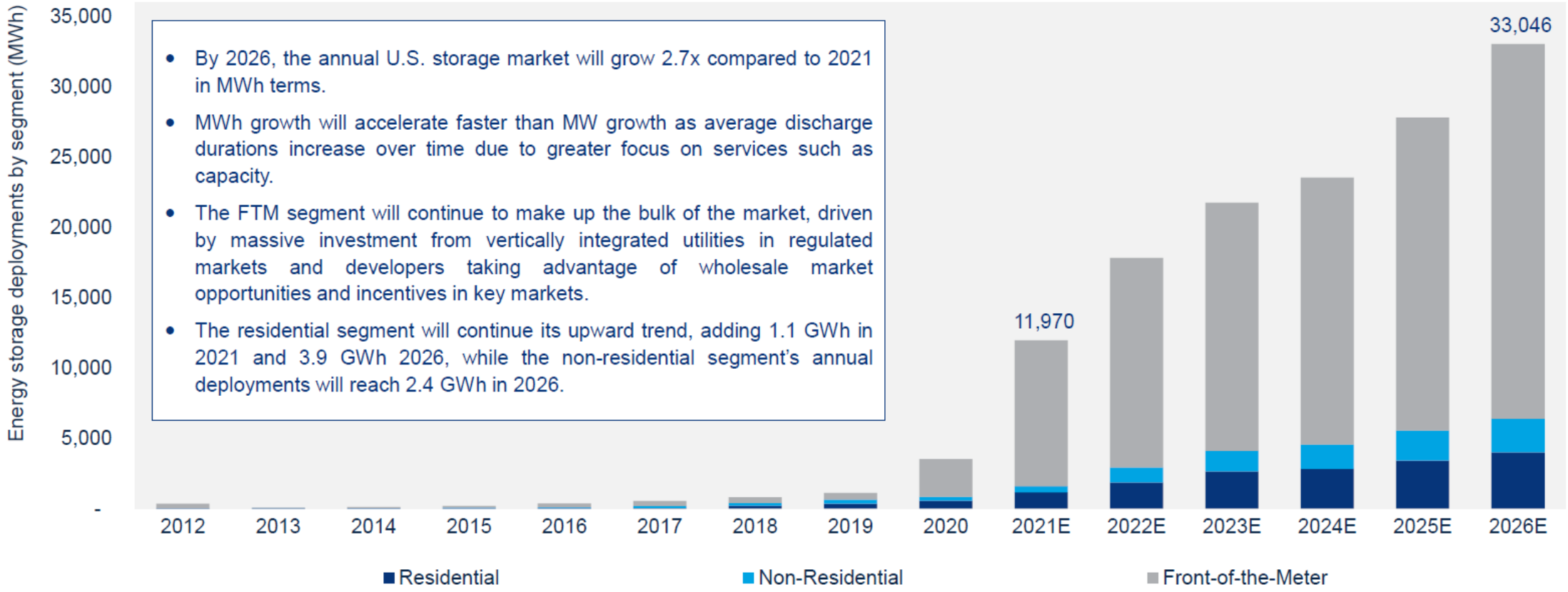
Top three markets by segment in Q1 2021 (energy capacity)

Rank	Residential	Deployments (MWh)	Non-residential	Deployments (MWh)	Front-of-the-meter	Deployments (MWh)
1	California	117.8	Massachusetts	34.2	California	580
2	"All Others"	25.3	California	17.8	N/A	0
3	Hawaii	23.8	New York	6.4	N/A	0

Source: Wood Mackenzie Power & Renewables

U.S. Deployment Forecast

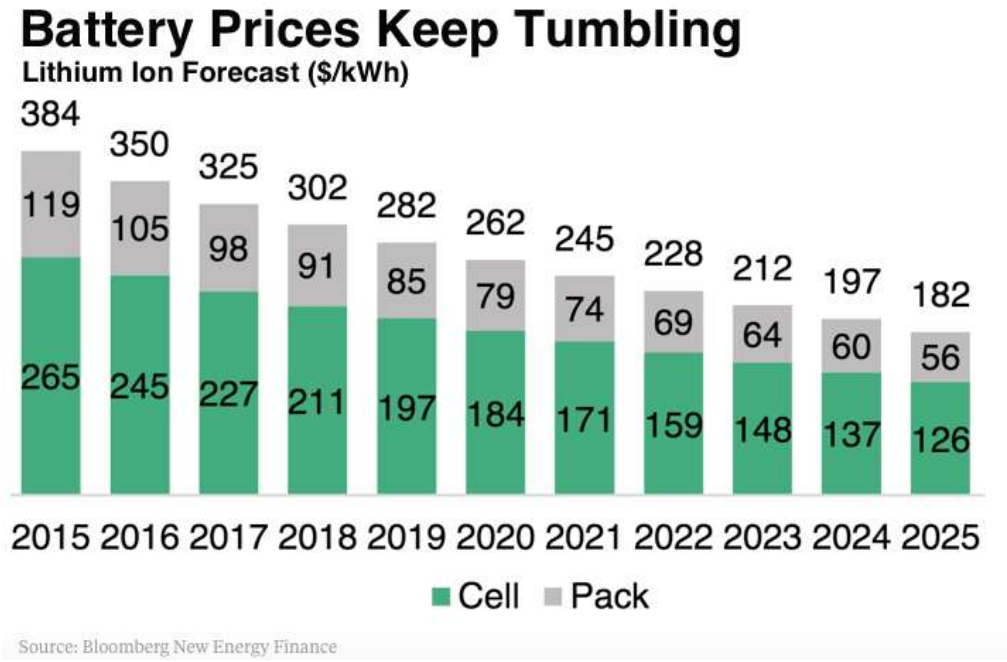
U.S. energy storage annual deployment forecast, 2012-2026E (MWh)



Source: Wood Mackenzie Power & Renewables

The California Perspective

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.

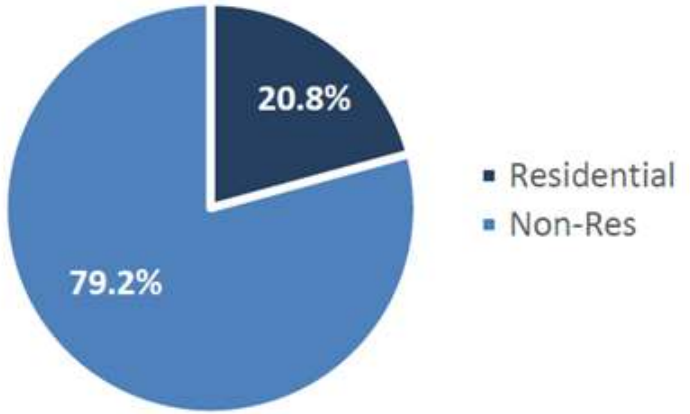


	2020	2021	2022	2023
Behind The Meter Energy Storage Installs (Cumulative)	11,600	18,000	26,000	35,000
MW	260	323	398	486

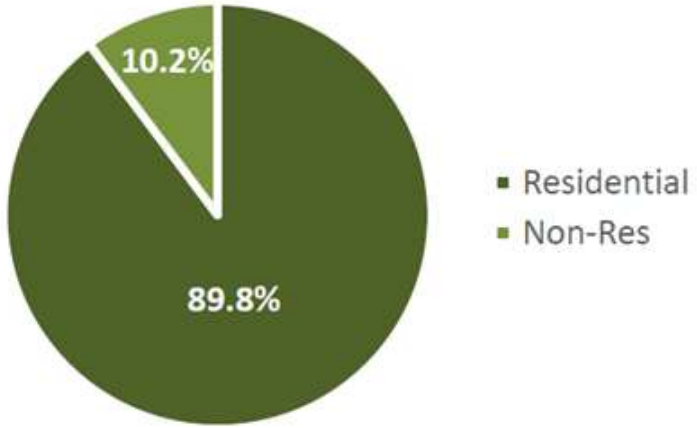
California Energy Storage Snapshot

% of Energy Storage Rated Capacity (kW) by System Classification and Sector		
Classification	**Residential**	**Non-Residential**
Solar + Storage	96.6%	32.6%
Solar + Other	0.2%	4.0%
Stand Alone Storage	3.1%	63.4%

Energy Storage Capacity by Sector



Number of Installed Systems by Sector



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

Utility Compliance

Meet state mandates to acquire storage resources

Customer Interest

Customer interest in batteries for resiliency

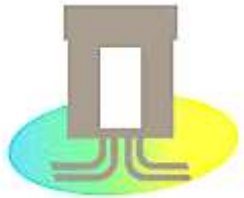
Regulatory Directives

Battery storage directives

Technology Advances

Availability of enabling technologies

Grid Modernization



Grid modernization co-mingled

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

Value	Use Case	Description
Bill Savings	Demand Charge Reduction	Energy storage can lower a customer's peak demand or shift to off-peak demand periods.
	Time-Of-Use Bill Management	Energy storage can shift loads, charging during times of low demand and discharging .... during times of high demand.
Increased Distributed Generation Self- Consumption	Solar plus Storage	Energy storage can store excess distributed generation to offset future consumption from the utility.
Resiliency	Backup Power	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.

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

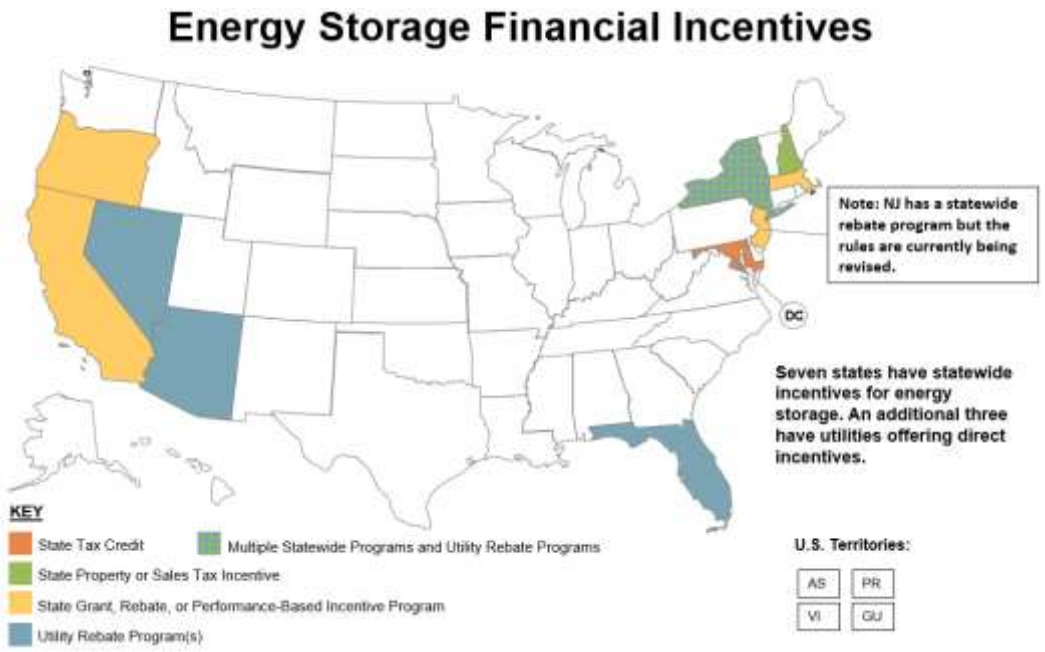
Why Utilities should interact with BTM

- 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



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

Utility owns asset and customer relationship

Utility Provides Incentives & Aggregation

Pros	Cons
Customer Pays for a Portion of the Asset	Less Potential to Rate Base
Some Control of Distributed Energy Storage Asset	Less Control of Energy Storage Asset
Customer Relationship Retention	Less Customer Relationship Retention

Utility retains customer relationship

Utility Purchases Services from 3rd Party

Pros	Cons
Some Indirect Control of Distributed Energy Storage Asset	Less Control of Energy Storage Asset
No Aggregation Costs for Various Proprietary Protocols	No Rate Base Potential
Outsourcing of aggregation responsibilities	Risk: 3rd party goes out of business
	No Customer Relationship

No customer relationship or direct control of assets

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

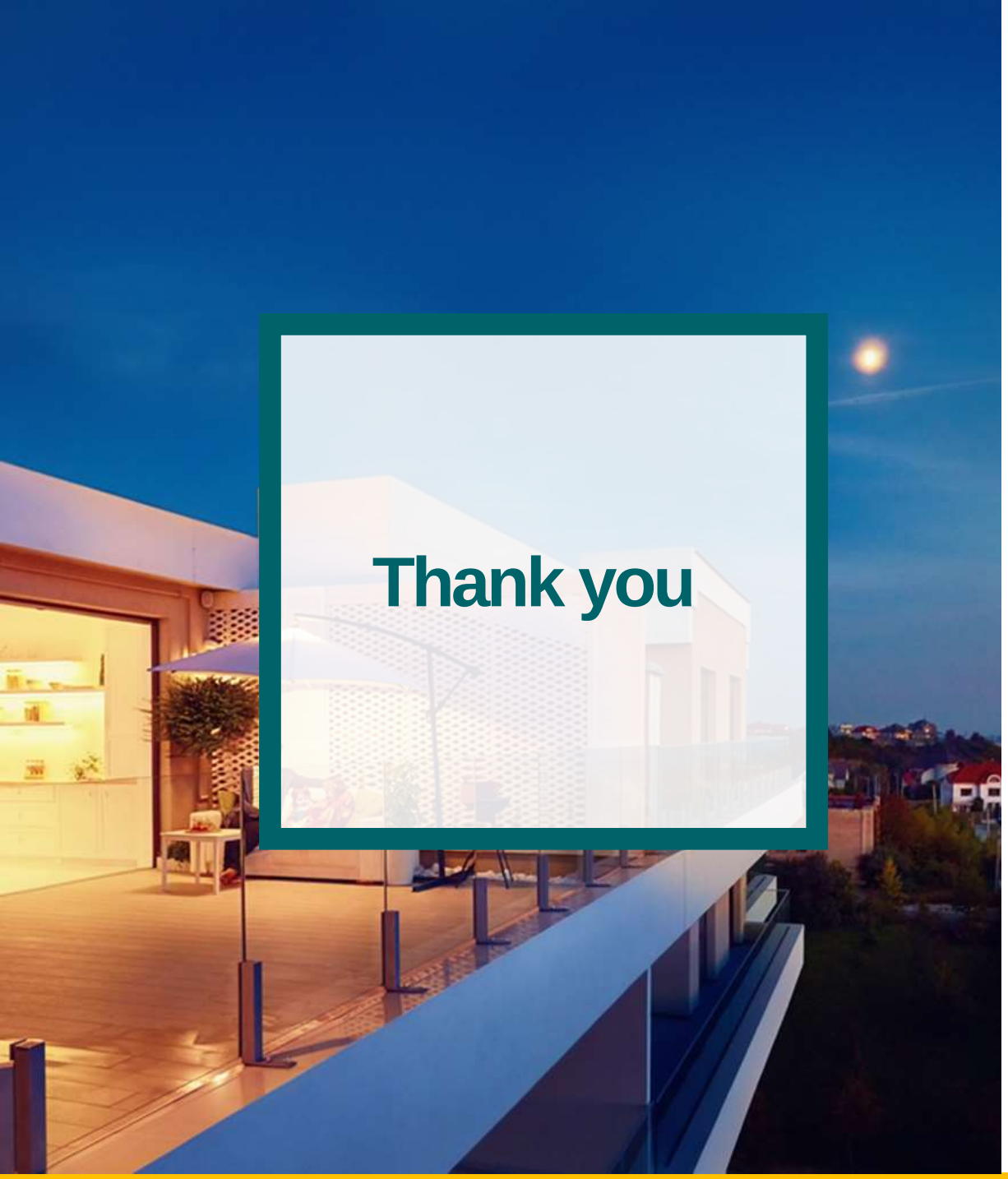
Trends

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

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