



NEW YORK
STATE OF
OPPORTUNITY.

NY-Sun

On-site Power PV + Storage

Presented by:

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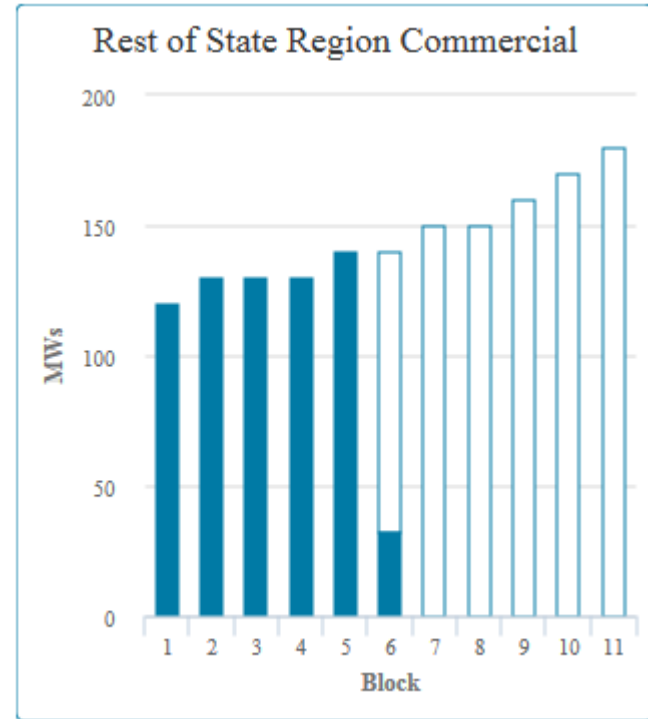
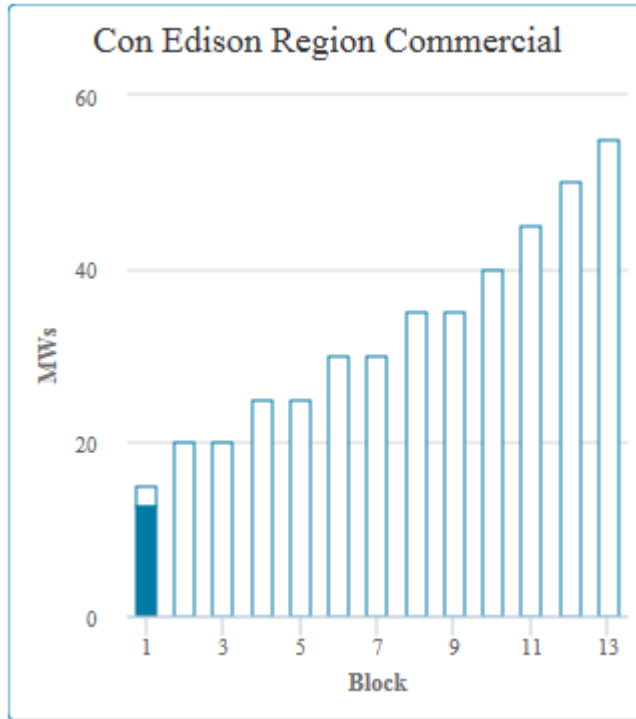
Outline

- ❑ Current state of PV and storage markets
- ❑ Opportunities and potential size of prize for an integrated system
- ❑ Voice of customer and timing
- ❑ Concepts for audience feedback

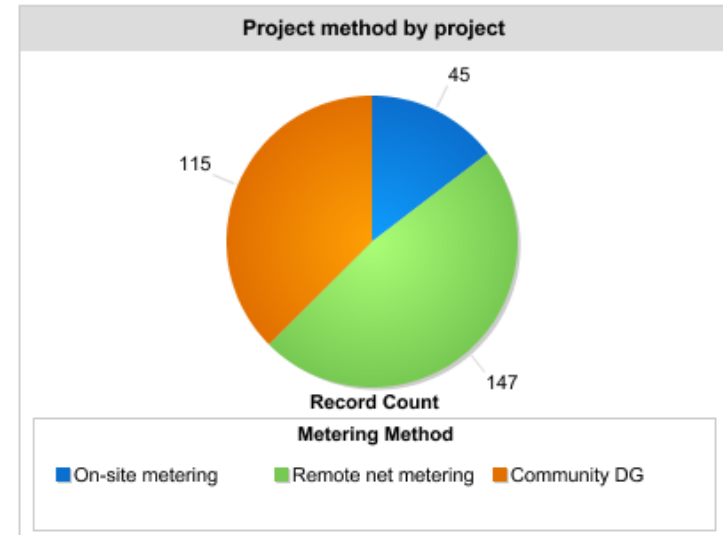
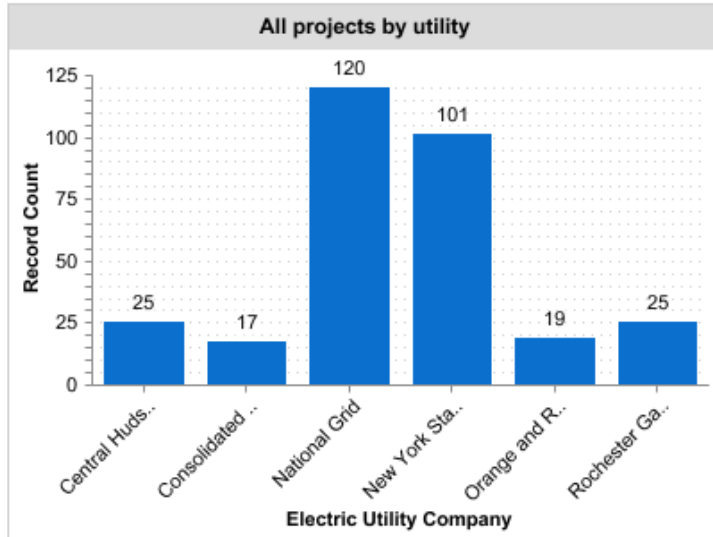
Current State Audience Question

1. How many vendors in the room are currently selling PV or an ES storage solution?
2. How many are selling an integrated product?
 - How many have sold an integrated product in NYS?

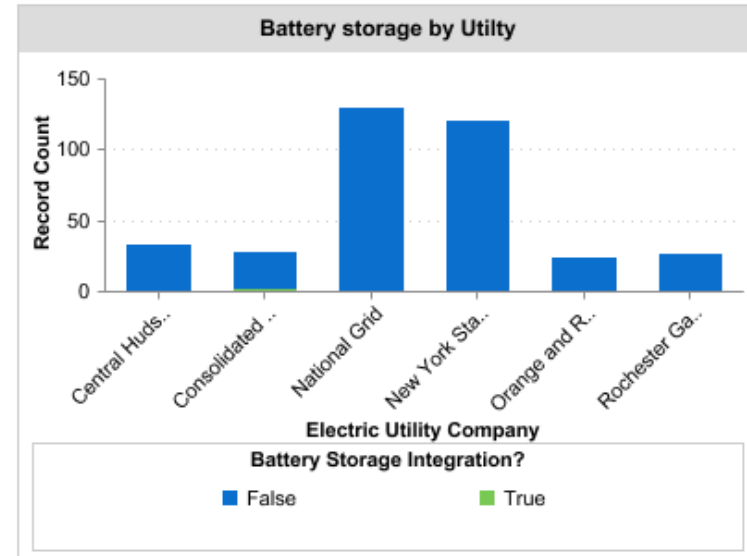
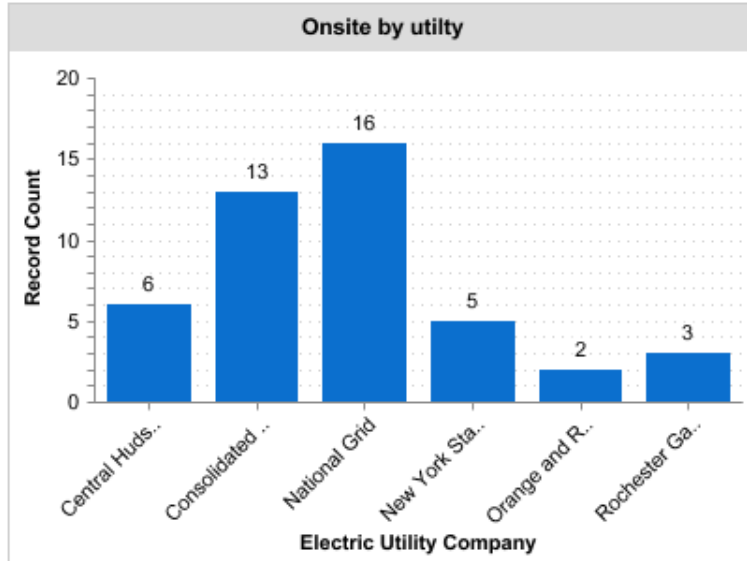
NY-Sun MW Block C&I Trends



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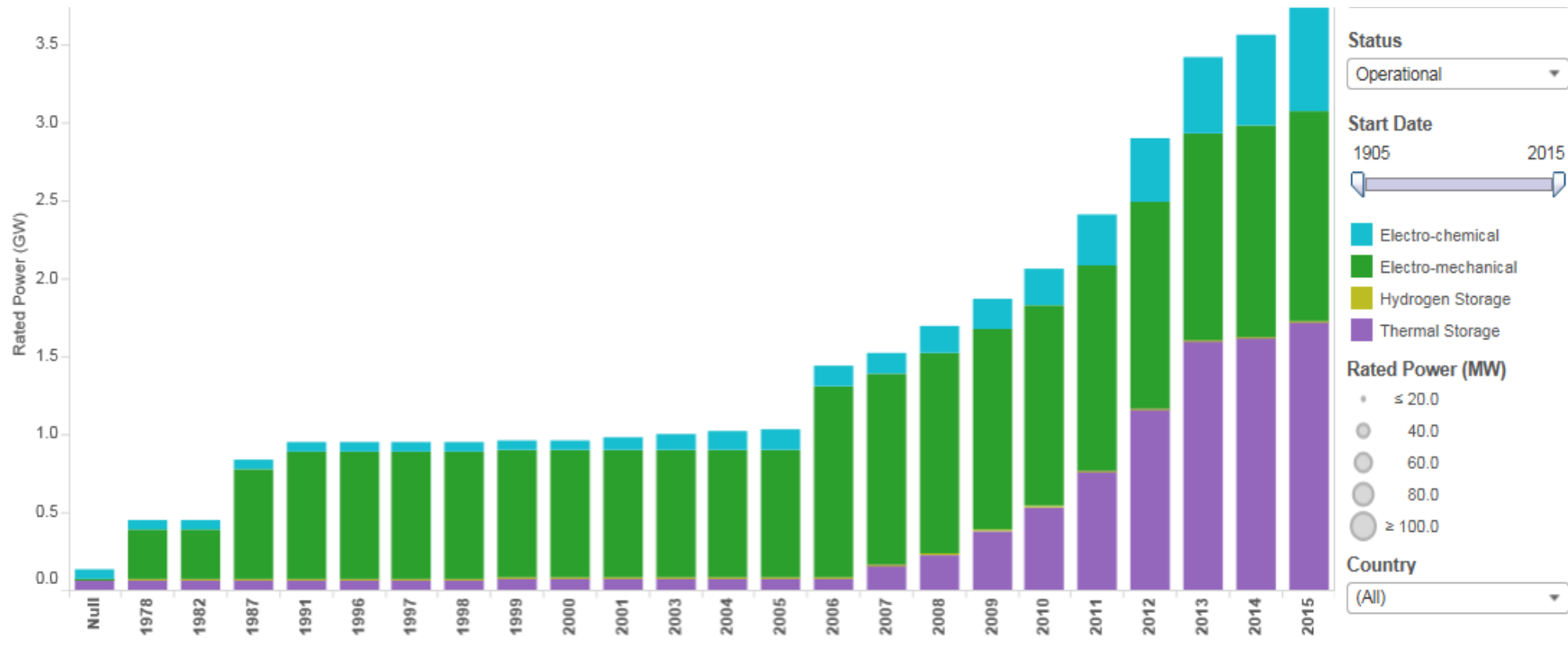
Current DER Valuation

- Net Energy Metering (NEM) has been an effective mechanism for growing the solar market in NYS
- However, it is a blunt method for valuing distributed energy resources
- Storage has not been able to capture additional values with NEM

Future DER Valuation

- As one of the central components of REV, the NYS PSC has begun the process of developing a more precise approach to evaluate Distributed Energy Resources (VDER)
- Could be a benefit for Storage when paired with DER to capture additional distribution and capacity based values

Worldwide Energy Storage Deployments



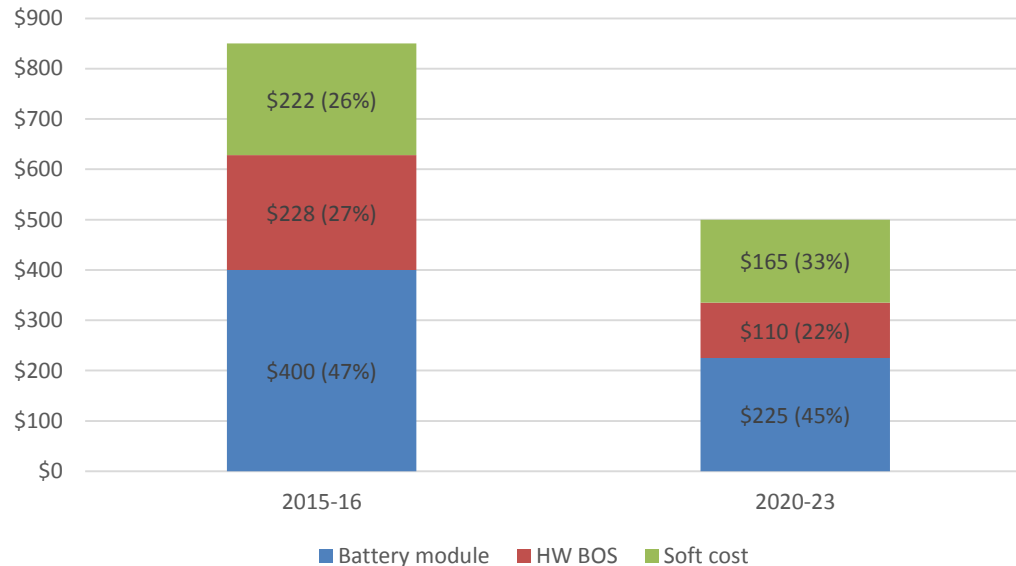
Source: DOE Global Storage Database – operational systems

Installed Energy Storage System Cost

- ❑ **Utility scale advanced batteries:** about \$665/kWh installed, almost 50/50 battery cost and BOS cost (US figures from 2015-16, GTM Research)
- ❑ **Behind-the-meter advanced batteries:** about \$800-\$900/kWh in NYC
- ❑ **Battery costs have recently been declining** by about 10%+ per year (total battery hardware cost excluding inverter)
- ❑ **Installed costs** expected to decrease by about 7% per year through 2020 for li-ion (Navigant Research).

Example of Installed Cost BTM in NYC

Procured Cost for Installed Lithium-Ion System in NYC
per kWh, based on a 4 hour system



Sources: Navigant and GTM Research data, Grid Market, DMP, NYSERDA customer engagement
2016 is adjusted for actual experience in DMP and customer conversations, 2020-23 reflects
Navigant and GTM forecasted costs

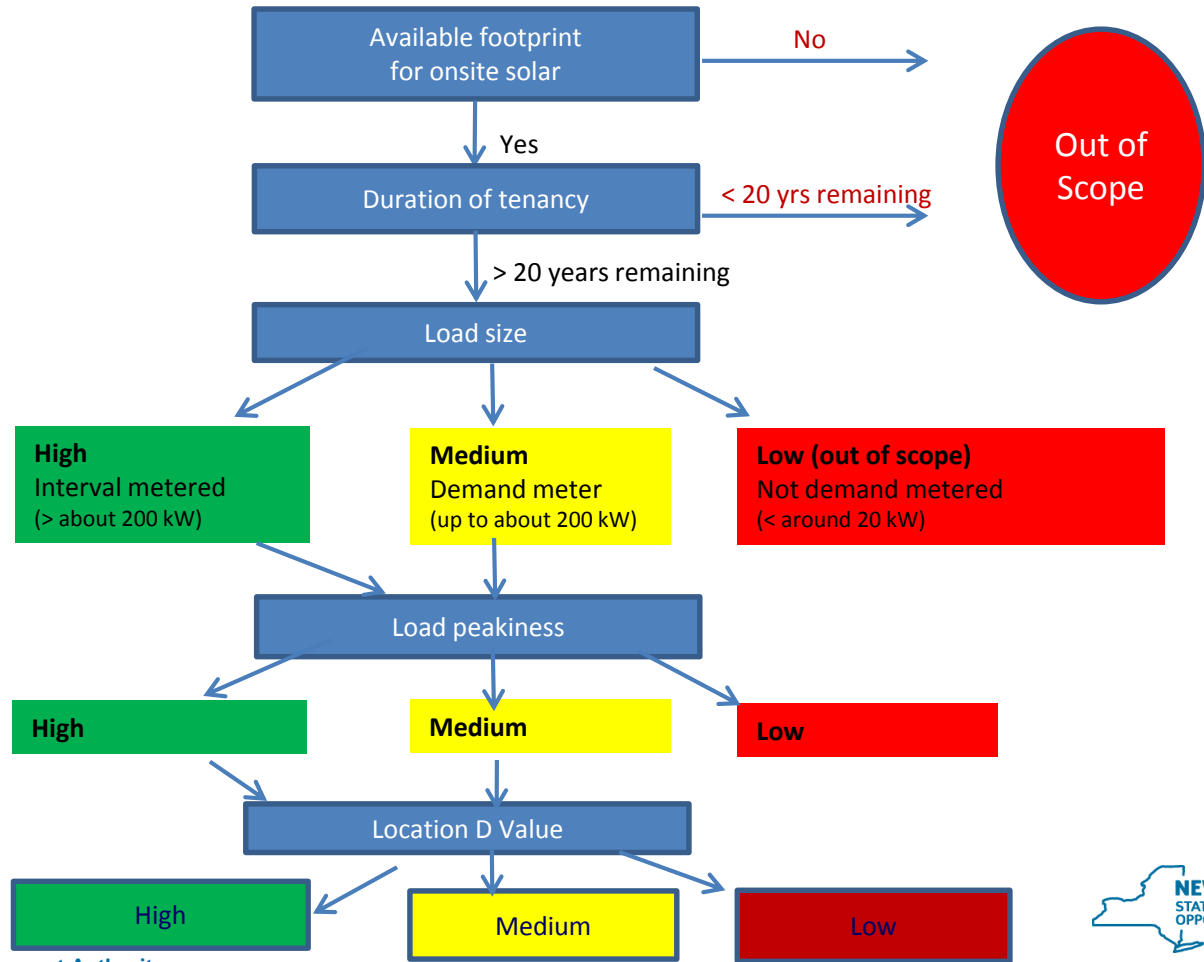
PV + Storage Benefits

- ITC
- Ride the PV wave
- Possible additional values with VDER
- Holistic solutions for commercial customers
- Modest resiliency benefits

PV + Storage Challenges

- Storage prices
- Complicating a sale
- Not beneficial everywhere
- More complicated system operation

Customer Segmentation for On-Site PV



PV + Storage Intervention Focus

High value locations on distribution system

For on-site PV systems, many C&I customers have roof space but value proposition for PV alone had not been compelling under NEM.

For off-site PV systems such as CDG (Community Distributed Generation) under proposed VDER, high LSRV locations and those where MTC could be exhausted quickly.

Potential Intervention Strategy for Integrated Systems both On and Off-Site

UNIVERSAL NEEDS:

- Permitting and Code official training
- Financial performance de-risking for high value locations
- Interconnection easing

NEEDS FOR LARGE REGIONAL PV OR STORAGE INSTALLERS:

- System design and engineering
- Sales and value proposition
- Financial optimization development
- Financeability / business models
- Best fit customer segmentation

Key Questions for Audience Input

- What barriers do you foresee in selling an integrated system?
- How would selling an integrated solution change your business and financing models? What can we do to help?
- How large a market opportunity do you need to see to be interested in this space?
- Does a new tariff raise risk that would stall an otherwise financeable deal? If yes, what could be done by NYSERDA or others to mitigate this risk?
- Are there other concerns that a vendor wants to make sure are considered in developing an intervention strategy?
- What can NYSERDA do to help increase deal flow?