

Energy Storage Technology Advancement Partnership
(ESTAP) Webinar

New York's Energy Storage Roadmap and Other Initiatives

Hosted by
Val Stori, Project Director, CESA

August 21, 2019



U.S. DEPARTMENT OF
ENERGY

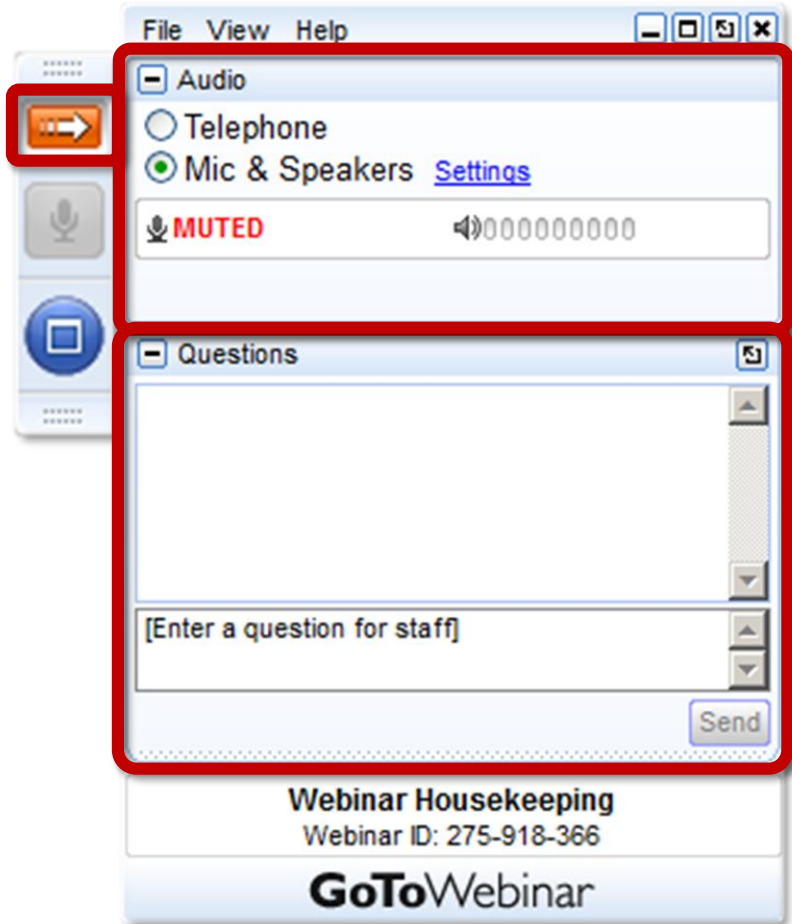


Sandia
National
Laboratories



CleanEnergy
States Alliance

Housekeeping



Join audio:

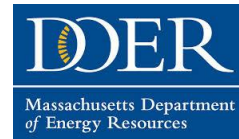
- Choose Mic & Speakers to use VoIP
- Choose Telephone and dial using the information provided

Use the orange arrow to open and close your control panel

Submit questions and comments via the Questions panel

This webinar is being recorded. We will email you a webinar recording within 48 hours. This webinar will be posted on CESA's website at www.cesa.org/webinars

CleanEnergy States Alliance



Energy Storage Technology Advancement Partnership (ESTAP) (bit.ly/ESTAP)

ESTAP is supported by the U.S. Department of Energy Office of Electricity and Sandia National Laboratories, and is managed by CESA.

ESTAP Key Activities:

1. Disseminate information to stakeholders

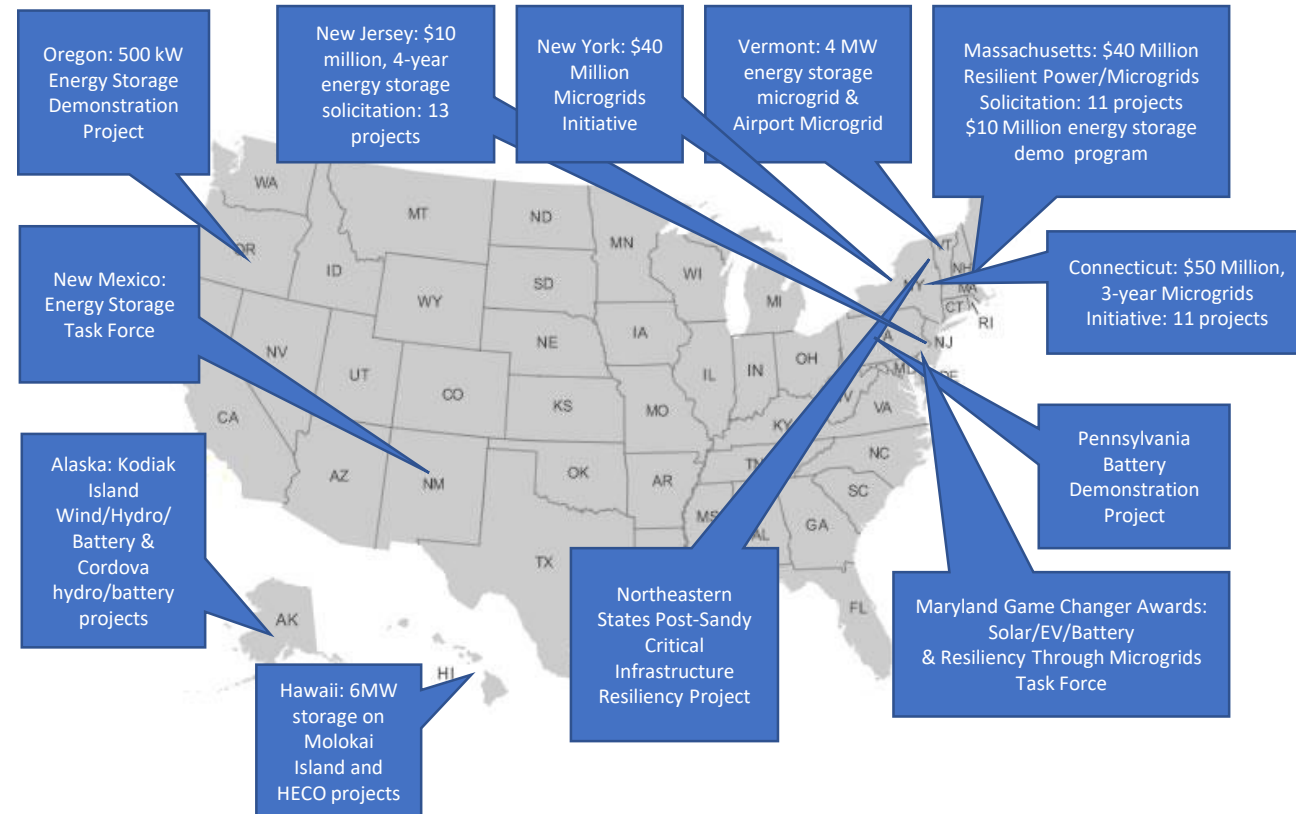
- ESTAP listserv >5,000 members
- Webinars, conferences, information updates, surveys.

2. Facilitate public/private partnerships to support joint federal/state energy storage demonstration project deployment

3. Support state energy storage efforts with technical, policy and program assistance



ESTAP Project Locations:



Webinar Speakers

- **Dr. Imre Gyuk**, Director, Energy Storage Research, U.S. Department of Energy
- **Marco L. Padula**, Director, Markets and Innovation, New York Department of Public Service
- **Jason Doling**, Assistant Director – DER Solutions, New York State Energy Research and Development Authority (NYSERDA)
- **Schuyler Matteson**, Project Manager, New York State Energy Research and Development Authority (NYSERDA)
- **Val Stori**, Project Director, Clean Energy States Alliance (moderator)



Energy Storage: NYSERDA – DOE

A bit of History

IMRE GYUK, DIRECTOR,
ENERGY STORAGE RESEARCH, DOE-OE

September 2003

Joe Sayer, NYSERDA Program Manager

Invited as Peer Reviewer

to EESAT 2003, DOE Energy Storage Program Review

Agreement to do joint Solicitation

March 2004
NYSERDA / DOE MOU
signed with intent for a
Joint Energy Storage Initiative

Also: CEC / DOE MOU

June 2004
NYSERDA issues \$3.5M PON 846
as Joint Solicitation

A Beacon Flywheel being assembled



Containerized 7 Flywheel System



- **NYSERDA / DOE PROJECT:**
- **CEC / DOE PROJECT:**

Beacon Power 100 kW
Flywheel System for
Grid Frequency Regulation (2006)

Design for a 20MW Facility with
100kW flywheels funded by DOE

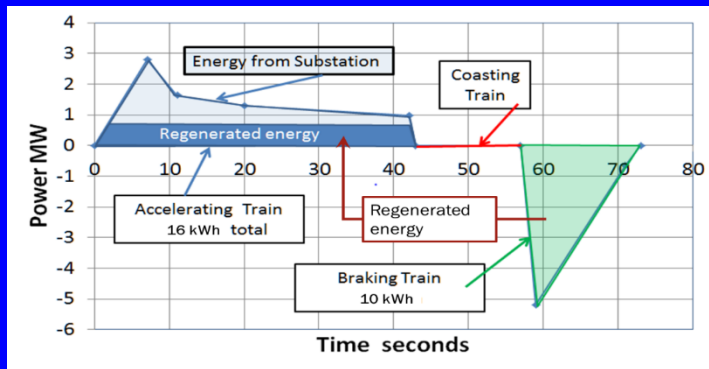


2011: FERC Order 755
mandates Pay for Performance

Frequency Regulation using
Energy Storage is now
a Commercially viable Business
in FERC compliant Regions!

Helix Power: Regenerative Metro Train Braking

Metro trains have used regen braking since the '80s.



Why is this important?

1. \$10+B market
2. Metros are usually highest power usage customer

i.e. NYC Transit Benefits

- 50% (\$115M) annual savings
- 350K tons of CO2 reduction
- Additional ~100MW peak shaving virtual capacity in NYC



Building Strong Partners

- DOE --\$450K grant for market study, prelim. design, risk reduction
- NYC Transit / ConEd
 - develop requirements
- NYSERDA - \$2.5M award for flywheel
- DOE matching with \$2 million grant

Helix Power Technology

- Flywheel stores 1MW – 90 seconds
- 1 million full cycles in 20 years
- Can operate continuously at full power
- 10x-100x faster than batteries
- 50% of Train Energy can be recycled!

Future Collaborations?



NYSERDA

**Department
of Public Service**

Clean Energy States Alliance Energy Storage Technology Advancement Partnership Webinar

New York's Energy Storage Roadmap

August 21, 2019

Agenda

1. New York's Climate Leadership and Community Protection Act
2. New York Energy Storage Roadmap & Deployment Policies
3. NYSERDA Market Acceleration Incentives
4. NYSERDA Soft Cost Reduction and Technical Assistance
5. Q&A



New York State Climate Leadership and Community Protection Act

- 70% renewable electricity by 2030
- 100% zero emission electricity by 2040
- Statewide GHG emissions reduced 85% by 2050, compared to 1990 levels
 - 185 TBTU end-use energy savings by 2025
 - 6 GW of Distributed Solar by 2025
 - 3 GW of Energy Storage by 2030
 - 9 GW of Offshore Wind by 2035



New York Energy Storage Roadmap & Deployment Policies



NYSERDA

**Department
of Public Service**

NYS Energy Storage Roadmap Implementation Timeline

1Q18

- Governor Cuomo announces 2025 storage goal of 1,500 MW in State of State
 - Customer/stakeholder meetings to seek input on potential policy, regulatory and programmatic actions
 - Energy Storage Study is completed
-

2Q18

- Storage Roadmap is released for formal public input
-

3Q18

- Technical conferences held, stakeholder outreach, public comments submitted and reviewed
-

4Q18

- PSC issues Storage Order on December 13, 2018
-

1Q19

- Implementation plans are filed by Utilities and NYSERDA
-

2Q19

- NYSERDA incentives are launched, implementation underway of PSC Storage Order requirements



NYSERDA

**Department
of Public Service**

Roadmap Primary Use Cases by Market Segment

Customer-Sited: customer retail bill management and demand response, customer resiliency

Distribution System: Value Stack (export tariff), non-wires alternatives (NWA) including wholesale market participation, PV paired with storage

Bulk System: wholesale market services including energy arbitrage, capacity, spinning reserves and frequency regulation, large scale renewables paired with storage



PSC Order – Goals and Deployment Policies

- Comprehensive strategy to enable deployment of 1,500 MW of energy storage by 2025 expanding to 3,000 MWs by 2030
- The [Order](#) does this by:
 - Addressing barriers
 - Accelerating the energy storage market learning curve
 - Driving down energy storage costs
 - Speeding the deployment of the highest-value energy storage applications
- Authorized bridge incentive funds to be deployed by NYSERDA, bringing total authorized funds to \$350 million outside Long Island, and required NYSERDA to work with LIPA to develop equivalent set of incentives on Long Island
- Addresses near-term improvements to economics and long-term changes required to enable a self-sustaining market



Retail Rate Actions

- **Standby, Buyback, Charging Cost:** VDER Rate Design Working Group to examine standby and buyback tariffs, charging and discharging delivery costs, expanding sub-daily demand charge pilots
- **Value stack changes to enhance project bankability:** DPS staff white paper released in December is seeking comments to change DRV to a defined set of known hours coinciding with capacity option 2; staff will issue a white paper on shaping E value
 - *On April 18, 2019, an updated [Value Stack Order](#) was issued*
- **Dynamic load management:** Utilities to hold a DLM procurement for a minimum 3 year term, and recommends 3-5 years or longer, beginning with the 2020 capability period



Direct Procurement

- **Expands NWAs** beyond T&D deferral to focus on entire customer bill including reducing ICAP through load reduction; requires NWAs include clear conditions for extensions; developer maintains interconnection after NWA
- IOUs must competitively procure a minimum of 350 MW of **bulk storage dispatch rights** (in collaboration with NYSERDA bulk incentives)
- NYSERDA to continue evaluating refinements to **Renewable Energy Credit (REC)** procurements to optimize operational flexibility of bids that pair an eligible renewable resource with energy storage
- NYSERDA to continue to work with State agencies and NYPA to **Lead by Example** to inform procurements in furtherance of Executive Order 166

(Redoubling New York's Fight Against the Economic and Environmental Threats Posed by Climate Change and Affirming the Goals of the Paris Climate Accord)



NYSERDA

**Department
of Public Service**

IOU Bulk Storage Dispatch Rights

- Each Investor Owned Utility is required to issue an RFP to competitively procure dispatch rights for bulk storage (> 5 MW) sited in their service territory.
- Each utility is required to procure a minimum amount of storage to be operational no later than December 31, 2022.
 - Con Edison at least 300 MW and other IOUs at least 10 MW each
 - Anticipate mainly 4 hour duration systems
 - RFPs issued annually until MWs procured or incentive budget is exhausted
- Up to a 7-year dispatch rights term, storage remains property of the developer.
- Con Ed and O&R's final RFP issued July 15, 2019; remaining utilities issued in draft form for comments on July 30, 2019; [additional details](#).



Clean Peak Requirements

- **Analyze peaker operational and emission profiles** on a unit-by-unit basis to determine potential candidates for repowering or replacement. DPS to consult with NYISO, NYSERDA, DEC, LIPA, and Con Ed to develop a methodology and file [results with PSC](#) by July 1, 2019.
- PSC will institute a proceeding where utility **Peaking Unit Contingency Plans** in response to anticipated DEC NOx regulations will be filed.
- **Other actions to inform a clean peak:** examine time differentiating E value in VDER value stack, calibrate incentives to maximize peak reduction, encourage storage with renewables through REC procurements



Wholesale Market Recommendations

- Reaffirms that DPS and NYSERDA will continue to be active participants in NYISO working groups to adopt Storage Roadmap recommendations
- **Urges NYISO to exempt energy storage from Buyer Side Mitigation** and accelerate NYISO “**dual market participation**” rules, which currently calls for design components completed in 2020 and deployment in 2023
- **Establishes principles for dispatch priorities** in dual market participation
- Directs DPS and NYSERDA with the IOUs and NYISO to convene a **Market Design and Integration Working Group** to establish the necessary planning, coordination, control, and dispatch to enable dual market participation.



Data Requirements

- DPS and NYSERDA to work with IOUs, LIPA, NYPA, and stakeholders to **develop a Pilot DER Data Platform** containing anonymized customer data, asset data and system data that can be queried to produce information useful to developers for planning and developing DER solutions.
- Pilot Platform will allow DER developers to query anonymized data to identify potential candidates for storage and DERs.



Accountability

- **Annual State of Storage report** by DPS that tracks storage deployments, progress in meeting the 2025 and 2030 storage targets, impediments and recommended solutions including to utility procurement process, wholesale market design changes, utility rate design, data platform development, retail and wholesale market coordination.
- **PSC triennial review** of progress beginning in 2020
- **Storage deployments** by zone/utility, technology and use cases are listed on NYSERDA DER Portal <https://der.nyserda.ny.gov/>
- **Real-time dashboard** of bridge incentive availability

NYSERDA Market Acceleration Incentives



NYSERDA

Department
of Public Service

NYSERDA Market Acceleration Incentives

\$405 million in incentive funding available through 2025

- \$350M for Investor Owned Utility service territories
- On Aug 1, 2019 NYSERDA filed an updated [implementation plan](#) which includes the following initial allocations:
 - \$149M for retail storage incentives < 5 MW project size
 - \$150M for bulk storage incentives
 - \$51M is currently unallocated
 - Flexibility to adopt to market conditions and project economics
- Approximately \$55M in funds were also made available by NYSERDA for use on Long Island



Retail Storage Use Case Incentives

www.nyserda.ny.gov/retailstorage



NYSERDA

Department
of Public Service

Retail Energy Storage Incentive Design

- Primary use case must be load management or shifting on-site electric generation to more beneficial time periods (resiliency may be secondary)
- Systems up to 5 MW of alternating current, located behind a customer's utility meter co-located with load or connected into the distribution system
- For customer-sited systems, the customer must be enrolled and participate in one of the following for five years:
 - Distribution utility demand response
 - NWA contract
 - Granular delivery rate (currently Standby tariff or Con Edison's Rider Q)
 - VDER Value Stack tariff



Incentive Structure

- A \$/kWh incentive in declining MWh blocks in three regions: NYC, Long Island, and Rest of State
- Entire incentive is paid upon entering commercial operation and NYSERDA's quality assurance inspection
- Based on usable installed storage capacity in kWh measured in AC power; incentive is capped at 15 MWh
- 100% of incentive for first 4 hours duration, 50% for 5th and 6th hour, 0% thereafter
- Incentive is paid directly to the participating contractor



Incentive Structure

- NYSERDA's dashboard shows available incentives nyserdera.ny.gov/retailstorage
For example, shown below is the Rest of State commercial blocks

Block	Incentive	MWh	Allocated Budget	Committed Budget	Available Budget
1	\$350/kWh	100 MWh	\$35,000,000	\$35,000,000	Closed
2	\$250/kWh	125 MWh	\$31,250,000	\$31,250,000	Closed
3	\$200/kWh	150 MWh	\$30,000,000	\$0	\$30,000,000
4	\$125/kWh	150 MWh	\$18,750,000	\$0	\$18,750,000

- Current incentive levels:
 NYC \$300/kWh
 Long Island commercial and residential \$250/kWh
 Rest of State \$200/kWh



NYSERDA

Department
of Public Service

Project Application Requirements

- Site plan, electrical drawing, product description, customer load data if located with load, intended use of the storage system, estimate of total project cost
- Must comply with the requirements in NYSERDA's [Battery Energy Storage Guidebook \(2021 International Fire Code\)](#)
- Completed Utility Coordinated Electric System Impact Review (CESIR) with 25% interconnection upgrade payment made
- If required, presented to Planning and Zoning board



Project Application Technical Requirements

- Equipment must consist of commercial products carrying at least a 10-year manufacturer warranty
- UL 9540 or CAN 9540 (Standard for Energy Storage Systems and Equipment) with subcomponents meeting each of the following as applicable:
 - UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications)
 - UL 1642 (Standard for Lithium Batteries)
 - UL 1741 or UL 62109 (inverters and power converters)
 - UL 9540 can be completed with a field evaluation
 - Safety certifications required before payment
- Must be designed to maintain a minimum 70% round-trip efficiency over a single charge/discharge cycle



Bulk Storage Use Case Incentives

www.nyserda.ny.gov/bulkstorage



NYSERDA

**Department
of Public Service**

Two Paths to Receive a Bulk Incentive

1. NYSERDA Standard Offer declining incentive (not currently available in Con Ed / Long Island), **or**
 2. Utility Bulk Dispatch Rights contract
- Both offerings draw from same budget
 - In addition, projects may alternatively seek a NYSERDA REC payment for a paired renewable + storage project



Incentive Structure

- Incentives offered at a fixed amount per usable kWh of installed storage capacity measured in AC upon entering Commercial Operation
- Projects providing only energy arbitrage and/or ancillary services will receive 75% of the stated incentive rate
- No maximum project size; total NYSERDA incentive will not exceed \$25 million on a single project
- Projects lock incentive rate at the time a complete application is submitted. Projects 20 MW and less have 18 months to achieve commercial operation. Projects exceeding 20 MW have 24 months to achieve commercial operation after completion of NYISO Class Year.



Incentive Structure

Incentive Levels for Projects *Up to 20 MW* in Total Size

2019	2020	2021	2022	2023	2024	2025
\$110/kWh	\$100/kWh	\$90/kWh	\$80/kWh	\$70/kWh	\$60/kWh	\$50/kWh

Incentive Levels for Projects *Greater than 20 MW* in Total Size

First NYISO Class Year to Begin After Filing of Plan (2019 Class Year)	Second NYISO Class Year to Begin After Filing of Plan (estimated to begin in 2021-22)
\$85/kWh	\$75/kWh

Project Eligibility

- Above 5 MW providing wholesale energy, ancillary services, and/or capacity services
- Compliant with requirements in NYSEDRA [Battery Energy Storage System Guidebook](#)
- Commercially available systems physically located in NY and interconnected into NY's bulk transmission system or an IOU's transmission or distribution system; currently not available in Con Ed service territory or Long Island
- Stage 9+ of NYISO interconnection queue, or equivalent maturity if connecting directly into distribution system

NYISO Interconnection Queue Stages

1. Scoping Meeting with NYISO Pending
2. Feasibility Study Pending
3. Feasibility Study in Progress
4. System Impact Study Pending
5. System Impact Study in Progress
6. System Impact Study Approved
7. Facility Study Pending
8. Rejected Cost Allocation/Next Feasibility Study
- 9. Facility Study in Progress**
10. Accepted Cost Allocation
11. Interconnection Agreement
12. In Construction
13. In-Service for Test
14. In-Service



NYSERDA

Department
of Public Service

Payment Terms

- Four payments of 25% each after NYSERDA Quality Assurance inspection
 - Payment 1 upon Commercial Operation when project has begun being dispatched by NYISO into wholesale day-ahead, real-time, or ancillary services markets
 - Payments 2, 3, and 4 after each of the next 12 months of Commercial Operation and following submission of required interval meter data
- If the system is moved to another location in NYS that is not eligible for incentives or relocated outside NYS, NYSERDA will seek a return of its incentive funding from the developer or asset owner of record, calculated based on a pro-rata share of a 20-year life that the storage system does not remain in an eligible location



NYSERDA Soft Cost Reduction and Technical Assistance Initiatives



NYSERDA

**Department
of Public Service**

NY Green Bank – Overview

Mission:

To accelerate clean energy deployment in New York by working in collaboration with the private sector to transform financing markets

- **What:** A \$1 billion State-sponsored investment fund that is a division of NYSERDA
- **Why:** To alleviate financing gaps in New York's clean energy markets and create a cleaner, more resilient and affordable energy system
- **How:** By mobilizing greater private sector activity to increase the availability of capital for clean energy projects

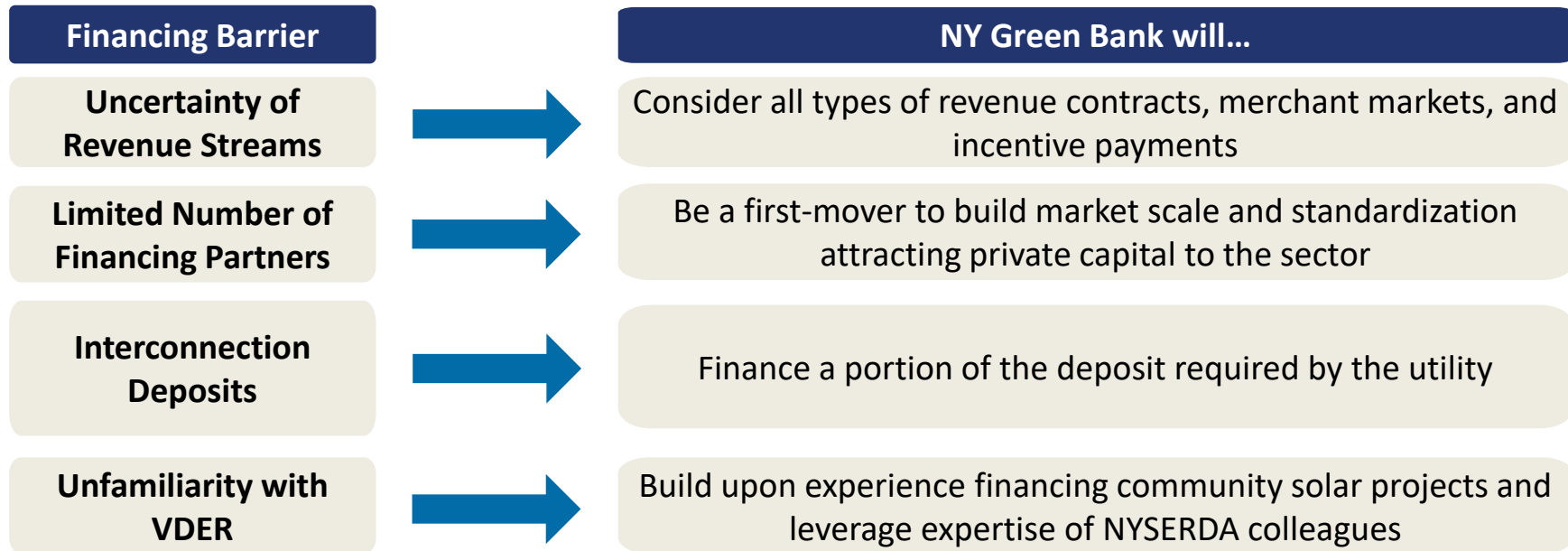
Supporting the expansion of energy storage in New York State
is a strategic priority for NY Green Bank



NYSERDA

Department
of Public Service

NY Green Bank – Overcoming Barriers to Financing Energy Storage



NY Green Bank – Financing Options

- Interconnection financing
- Construction financing
- Term debt, including:
 - Senior project-level debt
 - Backleverage
 - Subordinated / mezzanine
- Revolving warehouse and aggregation facilities
- Credit enhancements
- Project-level equity / preferred equity

**Contact us at info@greenbank.ny.gov
to discuss potential investment
opportunities**



NYSERDA

**Department
of Public Service**

NYSERDA's soft cost reduction work



Siting

- Help local AHJs with developing permitting processes and considering applications
- Statewide storage guide and best practices



Customer Assistance

- Customer outreach and education
- Technical assistance: high-level assessment of fit for energy storage



Vendor Assistance

- One on one outreach on market rules, opportunities, and project guidance
- Digital resources, and informational events also made available



Quality Control

- Measurement and verification for energy storage installations
- Increase confidence in deployed systems
- Deployed systems listed on [DER Data System](#)

Energy Storage Feasibility Studies (PON 1746 - FlexTech)

- Technical (sizing/potential) and economics examined
- NYSERDA will contribute up to 75% of study costs, up to \$100,000
- Commercially available technology
- Managing customer load, deferring distribution system upgrades, or pairing with other DERs
- For behind-the-meter projects, interval data logging may be a first step
- Details available [here](#)



Clean Energy Siting

Assistance for Local Governments



New York Battery Energy
Storage System Guidebook
for Local Governments



Chapter 1 – Battery Energy Storage Model Law

Chapter 2 – Battery Energy Storage Model Permit

Chapter 3 – Battery Energy Storage Inspection Checklist

NYSERDA offers local governments free one-on-one technical assistance to help implement Guidebook Chapters.

If you have a question on the Guidebook, or need help siting your project, email cleanenergyhelp@nyserda.ny.gov and we'll respond to you within 24 hours.



NYSERDA

Department
of Public Service

Contact Information

Contact NYSERDA: energystorage@nyserda.ny.gov

Join NYSERDA's energy storage [email distribution list](#)



NYSERDA

Department
of Public Service

Thank you for attending our webinar

Val Stori
Project Director, CESA
val@cleanegroup.org

Find us online:

www.cesa.org

facebook.com/cleanenergystates

@CESA_news on Twitter