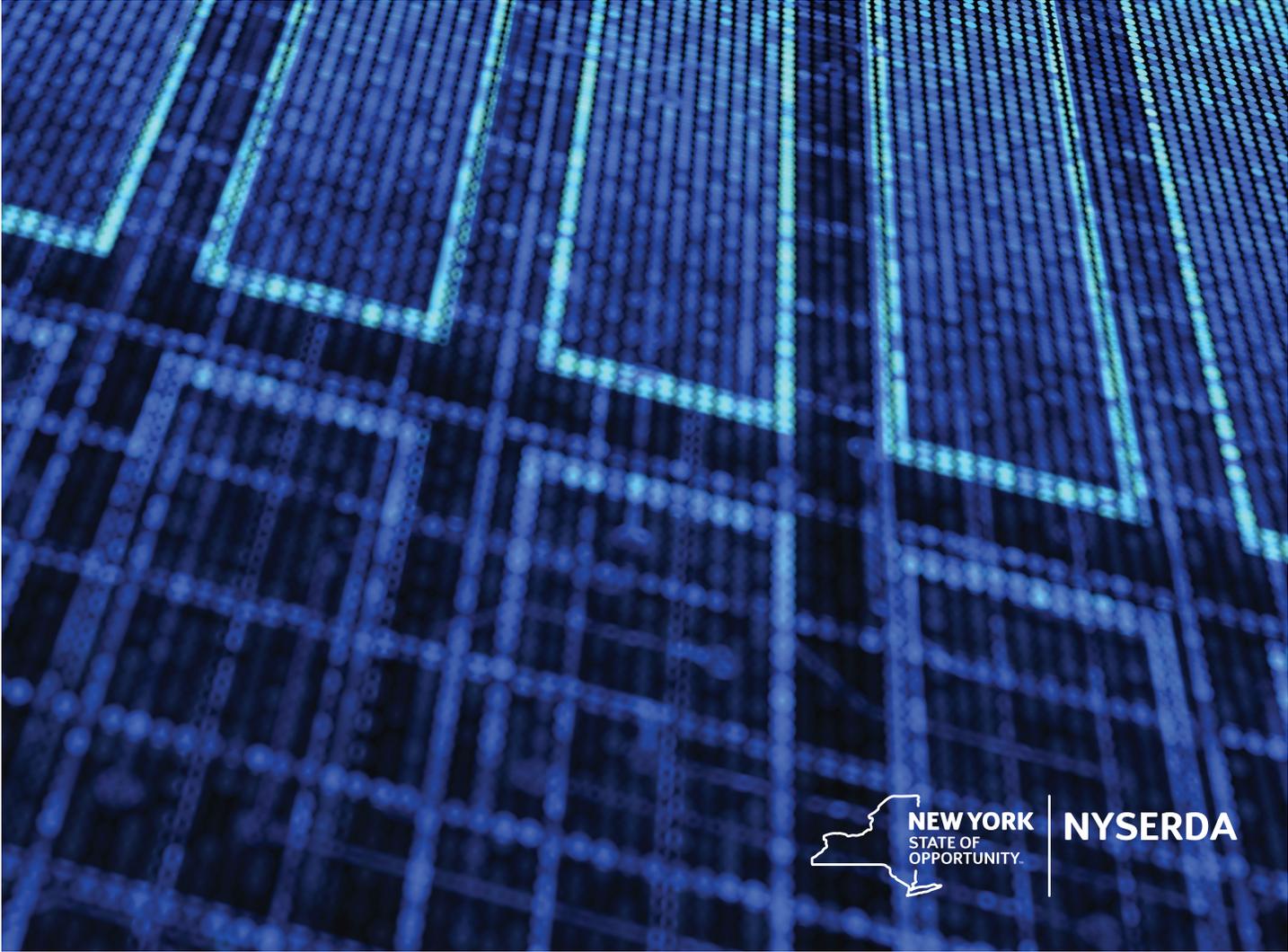
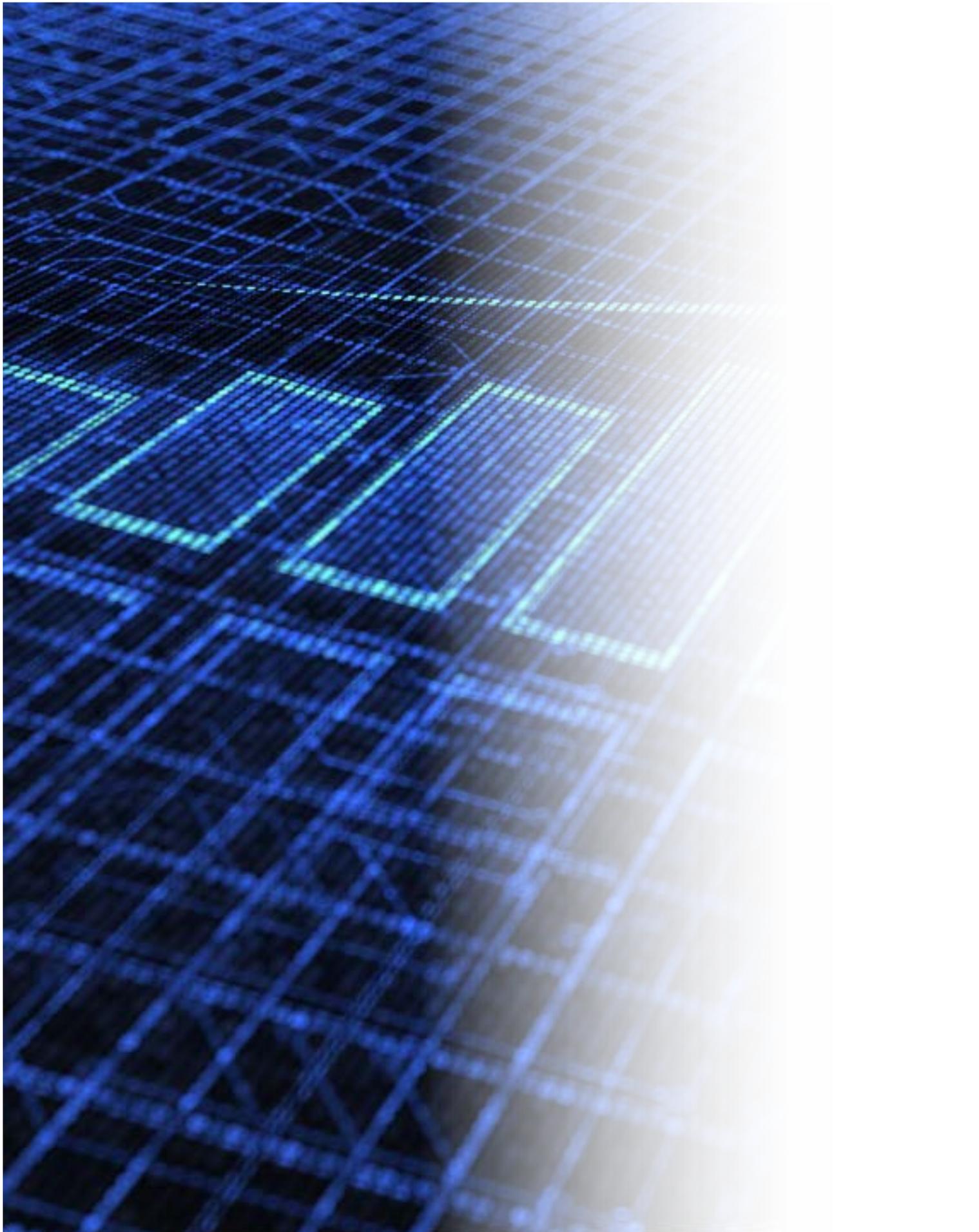


# New York Energy Storage Value Stream Reference Guide **for Developers and Contractors**



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NYSERDA



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The New York Energy Storage Value Stream Reference Guide provides developers and contractors a consolidated resource that summarizes the value streams available for energy storage systems installed in New York State. You will find detailed information broken down by retail storage (customer and electric distribution utility) and wholesale market (NYISO) opportunities. However options to combine retail and wholesale markets are limited.

**For questions related to information found in this reference guide, please contact [energystorage@nyserda.ny.gov](mailto:energystorage@nyserda.ny.gov).**

# Value Streams – Retail Services (customer-sited or electric distribution system sited installations)

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## > Customer Demand Delivery Charge Reduction

### **Service Availability**

The storage system must be located with customer load.

**Note:** For information on Con Ed's Rider Q Tariff, which assesses a sub-daily demand charge and can be advantageous to energy storage, please see the [Rider Q Fact Sheet](#).

### **Compensation Mechanism**

This revenue stream is applicable only for electricity customers who are charged for their instantaneous demand on a \$/kW basis (i.e., demand charges). Energy storage can provide bill savings by lowering the peaks in a customer's electric consumption, thereby reducing the demand charge component of their electric bill.

**Note:** The distinction between the standby charge (based on daily peaks) and the standard demand charge (based on monthly peaks) can be quite significant for this revenue stream and earning demand response. A 5/16/19 [PSC Order](#) allows any customer to now opt into standby rates.

### **Price**

Prices are stable and predictable for each service class, but service classes among different utilities vary greatly.

### **Constraints and Regulations**

Can be stacked with demand response, especially when using standby or Rider Q tariff; requires control strategies to maximize benefits and revenue in concert with tariffs or a utility program (e.g., deciding when demand reduction is more profitable than serving other needs).

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## > Utility Demand Response Programs

### **Service Availability**

The storage system must respond to signals from the utility. As of 2/22/18, energy storage systems in Con Ed's service territory are allowed to export energy onto the distribution grid as part of DR programs.

### **Compensation Mechanism**

#### ***The Commercial System Relief Program (CSRP)***

CSRP aims to reduce demand systemwide. Customers are given 21 or more hours' notice and can be enrolled in either the voluntary or reservation program. Resources must enroll a minimum of 50 total kW to participate in the program directly. Resources that can provide less than 50 kW in load reduction must enroll through an aggregator.

#### ***The Distribution Load Relief Program (DLRP)***

DLRP aims to reduce load at the network level. Customers receive two hours' notice for a contingency event and less than two hours prior to an immediate DLRP event.

## Price

Prices are stable and predictable, but vary depending on location and the needs of the grid in that region. (see Appendix A).

### *Prices ranges:*

**Performance payments:** \$0.15 to \$1/kWh for scheduled events; as much as \$10.00/kWh for emergency events

**Monthly payments:** \$6 to \$25/kW/month

## Constraints and Regulations

Could be stacked with other values. The storage system must be operated to respond to calls from utility for demand reduction over other grid services. Compensation is tied to previously established baselines, so system operation for other services, such as demand charge reduction, can affect compensation. Facilities can be enrolled in both programs. More information on utility demand response programs is available [here](#).

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## > VDER (Value of Distributed Energy Resources)

### Service Availability

The storage system may be standalone storage or co-located with another VDER (value of distributed energy resources also known as the Value Stack) eligible technology, such as solar, and can be located with customer load or remote net metered/community distributed generation.

### Compensation Mechanism

Projects are compensated for electricity exported to the grid, based on when and where the export occurs. VDER is the successor tariff to New York's net metering program for the largest customers. More information on the value stack can be found [here](#).

### Price

Price varies depending on location. There are various components of the compensation. Compensation will take the form of customer bill credits.

### Constraints and Regulations

This can be a very attractive revenue stream based on location and compensates through bill credits to a customer(s) for energy (LBMP), capacity, and distribution relief value. Solar also receives a REC value.

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## > ConEd's Demand Management Program

### Service Availability

Storage system projects must be installed by 11/15/19 and located with customer load. The building owner receives the incentive to aid project installation (up to 70% of project cost).

### Compensation Mechanism

Project developers are also eligible to receive an additional incentive payment to help cover the cost of certification to the UL standards (including the UL 9540A test method) at a certified testing laboratory. Projects can only receive this funding if they are in a location where certifications are required.

### Price

The incentive rate for projects is \$1,620/kW. Projects are expected to achieve Peak Demand Reduction for a minimum of 10 years. Peak Demand Reduction hours are 2 p.m. to 6 p.m. on ConEd or NYISO demand response days, Monday through Friday, from June 1 through September 30.

### Constraints and Regulations

This project would be eligible for multiple value streams. Projects cannot receive any other incentives.

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## > Energy Supply Arbitrage (Energy Shifting and ICAP Tag Reduction)

### **Service Availability**

The storage system must be located with customer load for this value. Other forms of energy arbitrage are available to storage systems located directly on the distribution or bulk power system.

### **Compensation Mechanism**

Compensation would occur through reduced energy supply costs by buying (or charging) at a lower cost than when sold (or discharged) during peak demand periods. Further, this operation of the system may result in a reduction of a large electric customer's capacity tag (known as the ICAP tag) on their supply charges. These benefits may occur together through energy arbitrage and result in a reduction of the customer's energy bill.

### **Price**

Price is dependent on the difference in electricity prices in a service territory (e.g., peak vs. off-peak hours). The value would be highest in the NYC service area where electric costs are the highest. Only the largest customers have individual capacity costs allocated on their bill based on the customer's contribution to the peak load during the prior year.

### **Constraints and Regulations**

This can be stacked with other values, often as a secondary benefit of demand charge reduction for behind-the-meter installations. ConEd's Retail Access System provides additional information on capacity tag reduction.

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## > Service Class 11 – Buyback Service (Con Ed only)

### **Service Availability**

The storage system may be located with customer load or directly on the distribution system. The customer must opt-in to Service Class 11 (SC-11).

### **Compensation Mechanism**

Projects are compensated for the energy they export onto the electric grid. The system receives both a capacity and volumetric payment.

### **Price**

Projects receive the wholesale local marginal pricing for energy exported onto the grid as well as a capacity payment from the NYISO, based on the marginal clearing price.

### **Constraints and Regulations**

The resource must be at least 1 megawatt and located in a suitable location in Con Ed's service territory to be eligible for SC-11. Since the storage system would pay retail electricity costs for charging and receives wholesale payments for exported electricity, this value stream will only be relevant for certain exporting projects when stacked with other values, like demand response. More information is available [here](#).

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## > NYISO Demand Response Programs

### **Service Availability**

The storage system must be located with customer load and offer capabilities into the wholesale electricity markets.

### **Compensation Mechanism**

Compensation varies greatly depending on location and service provided to the ISO. The storage system must be optimized to fulfill its specific role.

#### ***Installed Capacity Special Case Resources (ICAP-SCR)***

This is the most popular program with monthly capacity payment, based on total facility load reduction, plus an energy payment for actual load reductions during tests and load relief events. SCRs are subject to penalty if they do not meet their obligated load reduction. (Reliability-based program)

#### **Price**

The resource LBMP for actual load reductions with a daily guarantee of minimum payment nomination (the strike price) recovery. The resource must achieve at least a 100-kW demand reduction, which can be achieved through aggregation.

#### ***Emergency Demand Response Program (EDRP)***

Provides an energy payment based on actual load reductions during tests and events. (Reliability-based program)

#### **Price**

Customer receives greater of real-time location-based marginal prices (LBMP) or \$500/MWh for actual load reductions. The resource must reduce demand at least 100 kW.

#### ***Day Ahead Demand Response Programs (DADRP)***

Customers submit day ahead bids by indicating the load reduction amount and time of day. (Economic-based program)

#### **Price**

There is an offer floor of \$75/MWh, and resource is paid day-ahead LBMP for actual performance. Resource must be able to reduce demand at least 1 MW and can aggregate resources to meet reduction.

#### ***Demand Side Ancillary Service Program (DSASP)***

Participate in an ancillary service market to provide operating reserves and/or regulation service to the grid. (Economic-based program)

#### **Price**

Resource must have a minimum reduction of 1 megawatt (in aggregate in a load zone). Resources are paid marginal clearing price of ancillary service provided.

### **Constraints and Regulations**

All programs meet the minimum load reduction requirements or aggregate with other customers to fulfill the minimum megawatt reduction.

Can participate as one of four types of demand-side resources (SCRs, DSASP, DADRP, and EDRP) and participate in one reliability-based and one economic-based demand response program simultaneously. Demand-side resources are not permitted to supply electricity to the wholesale market.

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## > NYSERDA Project Feasibility Study Support

### **Service Availability**

[PON 1746](#) is the NYSERDA Flexible Technical Assistance (FlexTech) Program, which supports feasibility studies for customers on potential energy storage installations.

### **Compensation Mechanism**

NYSERDA will fund up to 75% of eligible study costs, up to \$100,000, to examine the technical and economic feasibility of energy storage at a specific customer site.

### **Price**

N/A

### **Constraints and Regulations**

Customers must pay System Benefit Charge (SBC) on their utility bill.

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## > Non-Wire Alternatives (NWA)

### **Service Availability**

Storage system may be located with customer load or directly on the distribution system for the NWA, which is selected through a utility RFP process.

### **Compensation Mechanism**

Compensation amount and structure varies as agreed upon in the RFP process or competitive solicitation and is paid to the project owner or developer. Opportunities are available in all utility service territories.

### **Price**

Compensation depends on the location and benefits provided to the grid and is limited in size, based on the utility NWA needs. Visit <https://jointutilitiesofny.org/utility-specific-pages/nwa-opportunities/> for current solicitations.

### **Constraints and Regulations**

The project is designed to meet requirements of the NWA solicitation (this is the priority service and may limit other opportunities).

# Incentive

## Value Streams — Retail Services

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### NYSERDA Retail Energy Storage Incentive Program

#### **Availability**

Incentives are available statewide for energy storage 5 MW or less, compensated under a utility tariff for standalone storage or storage paired with on-site generation, including solar.

#### **Compensation Mechanism**

Incentive is a \$/kWh incentive in declining MWh blocks paid directly to pre-approved participating contractors after completion of all deliverables and resolution of any issues identified during quality assurance field inspections.

#### **Price**

Incentives decline based on [block available](#) in specific region and paid as a single payment per usable kWh of installed storage capacity measured in AC upon entering commercial operation.

#### **Constraints and Regulations**

Energy storage must be used primarily for peak load reduction or grid services, with resiliency a secondary benefit. Incentive is capped at 15 MWh.

# Value Streams – Wholesale Services

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## > NYISO Capacity

### **Service Availability**

Compensation is received in exchange for capacity provided to the capacity market.

### **Compensation Mechanism**

Compensation is from the NYISO, based on the market clearing price, and utilities/LSEs are obligated to purchase capacity at this cost. The ICAP market is open to all registered NYISO customers. The resource must meet a 1 MW, four-hour minimum bid, until new market rules for smaller DERs and partial capacity are implemented in 2021.

**Pricing and Data:** <https://www.nyiso.com/installed-capacity-market>

### **Price**

Price is paid in \$/kW/month and varies greatly depending on the location/time.

**Amount ranges:** \$3.88 - \$10.24/kW/month

**Average Spot Auction Price for June through August 2018:**

- G-J Locality (Lower Hudson Valley) - \$9.99/kW - Month
- NYCA (New York Control Area) - \$4.13/kW - Month
- NYC - \$9.99/kW - Month
- Exact price determined during monthly auctions.

**Note:** capacity prices were higher in May 2018 than during the summer period.

### **Constraints and Regulations**

The resource must fulfill its contribution to peak load or face a penalty. In New York State, capacity is acquired through six-month contracts.

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## > Energy (LBMP) Arbitrage

### **Service Availability**

The storage system must be located directly on the distribution or bulk power system and receive a payment from NYISO in exchange for the grid service provided.

### **Compensation Mechanism**

Compensation would occur through reduced energy supply costs by buying (or charging) at a lower cost than when sold or discharged. This may occur in either the Day-Ahead or Real-Time Energy Markets.

### **Price**

Price is dependent on the difference in electricity prices in a service territory (e.g., peak vs. off-peak hours). The value would be highest in the NYC service area where electric costs are the highest.

### **Constraints and Regulations**

This can be stacked with other values.

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## > NYISO Reserves (Spinning Reserves)

### **Service Availability**

The storage system must be located directly on the distribution or bulk power system and receive a payment from NYISO in exchange for the grid service provided.

### **Compensation Mechanism**

The compensation is from the NYISO, in the form of \$/MWh, but can vary greatly depending on time and location. Reserve providers must bid into a NYISO day-ahead market as a flexible supplier to receive compensation. The criteria considered include energy bids, reserve availability bids, response rate, and the upper operating limit.

**Pricing and Data:** <https://www.nyiso.com/custom-reports>

**NYISO Ancillary Services Manual:**

<https://www.nyiso.com/documents/20142/3625950/mpug.pdf/c6ca83ca-ee6b-e507-4580-0bf76cd1da1b>

### **Price**

Price is paid in \$/MWh. Values vary widely and has regularly been as low as \$1.85/MWh, but as high as \$42.48/MWh (from June 1, 2018 to August 31, 2018). Average was \$4.50/MWh (for the same time period).

### **Constraints and Regulations**

Short duration/high output batteries are best for this specific service—it is difficult to stack these values. Spinning reserves respond in 10 or 30 minutes while other resources are brought on line, filling the gap between frequency regulation and peaker plants.

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## > NYISO Frequency Regulation

### **Service Availability**

The storage system must be located directly on the distribution or bulk power system and receive payment from the NYISO in exchange for the frequency regulation service.

### **Compensation Mechanism**

Compensation is from NYISO in the form of \$/MWh based on the regulation capacity awarded and the regulation movement provided—the value can vary greatly depending on the needs of the grid.

**Pricing and Data:** <https://www.nyiso.com/custom-reports>

**NYISO Ancillary Services Manual:**

<https://www.nyiso.com/documents/20142/3625950/mpug.pdf/c6ca83ca-ee6b-e507-4580-0bf76cd1da1b>

### **Price**

Price is paid in \$/MWh with the highest value in more volatile areas of the State where energy needs shift more frequently. From June 1, 2018 to August 31, 2018, the price has varied between \$3/MWh and \$37.19/MWh—the avg. was \$8.73/MWh (for the same time period).

### **Constraints and Regulations**

It is challenging to combine with other wholesale values, since the service requires short duration/high output operation following a control signal varying on a timescale of seconds. Projects must be 1 MW or larger to participate. This is the only wholesale market that can be satisfied by LESRs (storage systems with less than an hour duration).

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## > NYISO Volt Var Optimization (Reactive Power)

### Service Availability

Volt Var Optimization is the process of managing voltage levels in the grid, allowing the grid to operate at an optimal level. The storage system must be located directly on the distribution or bulk power system and receive a payment from NYISO in exchange for the grid service provided.

### Compensation Mechanism

The compensation is from NYISO and based on two formulas that determine the value the resource is providing to the grid. A competitive bidding process determines participation and compensation amount.

**Pricing and Data:** <https://www.nyiso.com/custom-reports>

**NYISO Ancillary Services Manual:**

<https://www.nyiso.com/documents/20142/3625950/mpug.pdf/c6ca83ca-ee6b-e507-4580-0bf76cd1da1b>

### Price

Price is determined by the contribution to the grid and the lost opportunity cost:

**Contribution to grid** = VSS Compensation rate \* (lagging MVar capacity + abs value leading MVar capacity).

**Lost Opportunity Cost** = max MW output (real time LBMP \* (EOP – max (Actual Energy Injection) \* (fraction of an hour the reduction is necessary).

### Constraints and Regulations

It is difficult to combine this with other services; hence the payment for lost opportunity cost that is given to resources that participate in the VVO market.

Storage systems that want to receive this value would need to be located in a service area where storage systems can export energy onto the grid.

## Incentives

### Value Streams — Wholesale Services

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#### NYSERDA Bulk Energy Storage Incentive Program

**Availability**

Available for energy storage above 5 MW providing wholesale energy, ancillary services, and/or capacity services.

**Compensation Mechanism**

NYSERDA incentive is a \$/kWh incentive (not currently available in Con Ed/Long Island).

**Price**

Incentives offered at a fixed amount per usable kWh of installed storage capacity measured in AC upon entering Commercial Operation.

**Constraints and Regulations**

Projects providing only energy arbitrage and/or ancillary services will receive 75% of the stated incentive rate. The total NYSERDA incentive will not exceed \$25 million on a single project.

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#### Investor-Owned Utilities Bulk Dispatch Rights

**Service Availability**

All Investor Owned Utilities (IOU).

**Compensation Mechanism**

Competitively awarded through an IOU RFP seeking dispatch rights over the storage system for a period up to seven years.

**Price**

NYSERDA will work with IOUs to provide incentive funding as required based on an economic evaluation of bids, at an amount not exceeding the NYSERDA Bulk Energy Storage Incentive Program.

**Constraints and Regulations**

Con Ed is required to procure 300 MWs and each other IOU at least 10 MWs.

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#### NYSERDA Large Scale Renewable Program

**Service Availability**

All IOUs for storage paired with an eligible renewable generation source.

**Compensation Mechanism**

Storage is not directly compensated, but may be compensated in the form of a paired Renewable Energy Certificate (REC) that compensates the eligible renewable generation; storage need not be colocated with the renewable.

**Price**

Varies

**Constraints and Regulations**

Up to six additional points are awarded in REC bid scoring for paired renewables that have operational flexibility provided by the storage.

# Dual Participation Issues

Currently, options for combining retail and wholesale market values are not available, with the exception of resources participating in NYISO demand response programs (Special Case Resource or Emergency Demand Response Program) also providing retail demand response or peak load reduction services. The VDER value stack tariff compensates for wholesale capacity benefits, although it is under a retail tariff and not directly in the wholesale market. The NYISO is in ongoing conversations with utilities to explore the possibility of additional dual participation opportunities, including how a resource on the distribution system could provide supply-side wholesale market services (e.g., NYISO will explore whether Non-Wires Alternative (NWA) resources are eligible to provide wholesale market services). However, to ensure grid reliability and energy security, many operational, market, and legal challenges must be addressed prior to defining further opportunities for dual participation. These challenges are currently being addressed in the [NYISO DER Roadmap](#) proceeding and in the recently released document: [The State of Storage: Energy Storage Resources in New York's Wholesale Electricity Markets](#). In December 2018, the NYISO submitted its compliance plan for FERC Order 841 to allow energy storage to participate in all ISO markets that it is capable of serving. Numerous stakeholders have submitted comments raising concerns with NYISO's compliance filing. Among the most important of these shortcomings is the effective date. NYISO requested the effective date for their compliance filing be delayed until May 1, 2020, to give them time to implement software changes to enable the proposed ESR participation model. Additionally, NYISO did not propose a dual participation model for energy storage resources in the distribution and wholesale markets, creating a roadblock for the effective deployment of energy storage systems throughout the State. The FERC Order 841 Filing is still under review.

# Behind-the-Meter vs. Front-of-the-Meter

Project developers should understand the different roles that Behind-the-Meter (BTM) and Front-of-the-Meter (FTM) resources can play and the different opportunities that are available for each. The following chart describes different pathways by which BTM and FTM energy storage resources can serve the grid. BTM energy storage systems are those located with a host load. The primary benefits of an energy storage system to a host load may include demand charge management, utility demand response program participation, and responding to time-of-use commodity supply prices. FTM distributed energy storage systems are those typically injecting energy into the distribution system where there is no customer load. FTM applications may take one of these three forms: stand-alone energy storage; energy storage with a DER, such as community solar; or energy storage connected directly to utility distribution system equipment, such as a substation.

The table on the next page highlights applicable value streams for FTM and BTM systems. Please note, "limited" is used to indicate the value stream is potentially accessible but there are limitations either in the form of being only partially accessible or accessible only in certain cases. See the appropriate footnotes for each value stream that is identified as "limited" for more details.

Value Stream	Value Stream Available if Located Behind-the-Meter?	Front-of-the-Meter	
		Value Stream Available if Located on the Distribution System?	Value Stream Available if Located on the Transmission System?
Customer Demand Charge Reduction	Yes	No	No
Energy Arbitrage	Yes	Yes	Yes
Utility Demand Response Programs	Yes	Limited <sup>2</sup>	No
Con Ed Demand Management Program	Yes	No	No
NYISO Demand Response	Yes	Limited <sup>3</sup>	Limited <sup>2</sup>
NYISO ICAP	Yes	Yes	Yes
NYISO Frequency Regulation	Limited <sup>4</sup>	Limited <sup>4</sup>	Yes
NYISO Reserves	Limited <sup>4</sup>	Limited <sup>4</sup>	Yes
NYISO VVO	Limited <sup>4</sup>	Limited <sup>4</sup>	Yes
NWA	Yes	Yes	No
Emergency Power	Yes	Limited <sup>5</sup>	No
NYSERDA Programs	Yes	Yes	Yes
VDER	Yes	Yes	No
Hosting Capacity	TBD	Yes	No
EV Integration	TBD	TBD	TBD

<sup>1</sup> Another option for FTM systems focusing on utility DR would be to participate in Con Ed's SC-11 Buyback, which permits systems to export energy onto the grid, receiving wholesale LMP for the energy produced. Unfortunately, this is not economic since the retail rates are higher than their wholesale counterparts, resulting in a negative value stream in most cases.

<sup>2</sup> The system would need to be connected such that it could charge from the grid and provide DR on the system's baseline load. Since it is for a FTM system, there is no load other than the battery system itself, and the compensation through DR will not be significantly more than the cost of charging the system through retail rates.

<sup>3</sup> The system would be limited by its capacity and likely need to be aggregated in order to meet the requirements of NYISO demand response programs. Since it is for a FTM system, there is no load other than the battery system itself and the compensation through DR will not be significantly more than the cost of charging the system through retail rates.

<sup>4</sup> The system would have to receive approval from NYISO, have adequate capacity, and be arranged so it could export energy onto the grid. Please see the [dual participation](#) section for more information.

<sup>5</sup> The system would need to be part of a utility-level microgrid, where it could power a limited number of critical facilities or buildings.

# Systems with Contractual Performance Requirements

Today, the storage market in New York State is being driven in large part by localized utility load relief opportunities. These can provide significant funding for the design and construction of energy storage resources. However, these programs include contractual obligations that may limit the accessible value streams. It is important for project developers to understand how participation in these programs will impact access to various value streams. Additionally, participation in Con Edison's Demand Management Program ([Con Ed DMP](#)), which provides a per kW incentive for the installation of energy storage systems in their service territory, precludes energy storage systems from receiving compensation from any programs except utility and NYISO demand response programs.

## Interconnection Process

NYISO individually evaluates the interconnection of all DERs over 5 MW. Until streamlined by the NYISO, project developers should familiarize themselves with the requirements and procedures to efficiently proceed through [interconnection](#).

DERs under 5 MW must abide by the Standardized Interconnection Requirements (SIR), which is approved by the NYS Public Service Commission (PSC) and implemented by distribution utilities in New York. The SIR provides a streamlined interconnection process for connection to the distribution grid. In late December 2017, the PSC changed the Standard Interconnection Requirements (SIR) to include energy storage. The changes were implemented in April 2018 and are currently in effect. More information on the SIR process can be found at the [DPS website](#). An expedited review is available for storage systems that are 50 kW or less, with some exceptions. Some storage resources up to 5 MW may require a more complex utility interconnection process if their impact on the grid is found to need further research or controls, such as when they are being installed on secondary or constrained networks.

## Optimizing Demand Charge Reduction

Reducing demand delivery charges ("demand charges") can provide a significant source of compensation for energy storage systems and is a familiar mode of operation to most project developers. The storage system operates such that it reduces a facility's peak demand, resulting in a lower electric bill from reduced demand charges. This opportunity is greatest in areas where the distribution grid is most constrained and demand charges are the highest.

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### Service Class Selection for Demand Response – Receiving Standby Service

Project developers should evaluate and ensure the host facility is billed under the optimal rate for that customer's service classification. This decision should be approached holistically and with a firm understanding of the impact of energy storage on a customer's electricity bill. The standby rate changes how delivery charges are billed. Most significantly, it calculates demand based on daily, rather than monthly, peaks. Another opportunity, similar to the standby rate, but in some cases superior, is the Rider Q Tariff in Con Edison's territory.

The demand charge is a \$/kW item on a customer bill based on the customer's peak demand during certain hours of the month. For the majority of demand-billed customers, this charge is based on the highest single peak each month, or for customers on a time-of-day rate, the single highest peaks during certain time intervals. Certain vendors have found it optimal to switch their customer to the standby rate. When on the standby rate, a customer's demand charge is based on the sum of daily demand peaks (Monday–Friday, 8 a.m to 10 p.m in Con Edison's service territory). Select vendors have found that switching their customers to standby rates can optimize demand response participation and demand charge reduction. For example, electing to switch to the standby rate can allow for the flexibility to respond to a demand response event while neglecting the facility peak on a given day that the demand response event

and facility peak do not coincide. If the demand charge is based on daily peaks rather than a monthly peak, and a vendor forgoes dispatching during the facility’s highest peak during a particular month in order to participate in a utility or NYSIO program, then the potential economic impact to the demand charge savings will most likely not be as significant.

DR programs are compensated based on the amount a facility reduces its energy consumption from the facility’s baseline during DR events. DR programs are established in tariff proceedings, but the contract for DR only lasts for one year and must be renewed. The baseline calculation varies depending on the program. Routine operation of an energy storage system can have the unintended effect of reducing this baseline, and thereby, the compensation for DR participation. Since standby rates have the maximum demand measured on a daily as opposed to monthly basis, one day without the storage system operating will have less of a negative impact on the electricity bill. This can allow operators to forgo demand charge reduction on certain days, preserving the baseline and optimizing DR revenue.

## Understanding NYISO Demand Response

The NYISO uses three types of baselines between the four DR programs, as shown in the following table.

Baseline Type	Reference Period Used	Demand Response Program
<b>Average Coincident Load (ACL)</b>	Prior equivalent capability period—average of highest 20 resource loads during top forty NYCA peak load hours in the same season (summer/winter) of previous year	SCR (Special Case Resources) for capacity auctions (sets the maximum that can be bid for SCR)
<b>Customer Baseline Load (CBL)</b>	Highest five consumption days of last 10 “like” days where DR event or schedule did not occur—there is a weather sensitive adjustment option (this is most similar to the Utility baseline)	EDRP (Emergency Demand Response Program), DADRP (Day-Ahead Demand Response Program, and SCR Energy (used to determine the performance payment for SCR)
<b>Real-time Baseline</b>	Actual load just prior to the beginning of a real-time schedule	DSASP (Distributed System Ancillary Services Program)

System operators need to take different baselines into consideration when determining optimal operation.

Compensation from NYISO DR programs depends greatly on ensuring the system receives a favorable baseline.

# Considerations for Future Value Streams

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## Distributed System Implementation Plans (DSIPs)

The DSIPs are a source of public information updated every two years that provide a comprehensive and holistic view of utilities' statuses and their plans to improve processes and decision-making regarding distributed resources such as energy storage. The DSIP process does not include discussions of project approval, rate design, or cost recovery mechanisms. The DSIPs focus on how the utilities will facilitate, integrate, and manage the increasing presence of distributed energy resources on the grid. More information on each utility-specific DSIP can be found [here](#). These documents can shed light on future value streams, as the utilities respond to the increasing penetration of distributed resources on the grid.

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## NYISO Distributed Energy Resources (DER) Roadmap

This [document](#) lays out the ISO's plan for integrating DERs into the grid. It should serve as a guide for interested parties to understand how future value streams may develop. The ISO plans to implement market enhancements that permit dispatchable DERs to be compensated for their specific capabilities, and to permit their participation in the wholesale markets. Among the biggest challenges for energy storage is that it currently cannot participate simultaneously in both wholesale and retail markets, except for certain DR programs, which was previously discussed in the dual use section. This prevents storage from maximizing its compensation and presents a barrier to the adoption of these technologies. Additionally, the roadmap lays out plans for more aggregation of DERs as a wholesale resource. While implementation is likely further down the road than other value streams, it is important for project developers in the State market to keep track of this process and participate in the development of new compensation mechanisms for energy storage systems.

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## Additional Resources

The following resources provide greater detail on the available programs and opportunities for energy storage in New York State:

- [NYSERDA Energy Storage Program](#)
- [NYSERDA NY-SUN Solar Plus Storage Program](#)
- [NYISO Distributed Energy Resources](#)
- [NYISO Market Participation](#)

# Example Demand Response Program Rates

Utility	Monthly Reservation Payment	Demand Response Programs
PSEG LI CSRP	\$8/kW/month	\$.25/kWh
CHG&E – TDR Program	\$6.82/kW/month	N/A
CHG&E – CSRP	21 hours – \$1.23/kW/Month (Reservation only)	(Reservation) 21 hours – \$.11/kWh (planned) or \$.21/kWh (unplanned) ... (Voluntary) \$.11/kWh (planned) or \$.35/kWh (unplanned)
Con Ed – DLRP Reservation Payment Option: must be located in Tier 1 or Tier 2 network	<b>Tier 1 Network</b> – \$18/kW/Month for (four or less events) and \$23/kW/Month (five or more events)  <b>Tier 2 Network</b> – \$25/kW/Month for (four or less events) and \$30/kW/Month (five or more events)	\$1/kWh  (For Voluntary Participation Option there is no reservation payment. They receive \$3/kWh)
Con Ed – CSRP Reservation Payment Option	Staten Island/Westchester \$6/kW/Month (four or less events) and \$11/kW/Month (five or more events)  Brooklyn, Bronx, Manhattan, Queens \$18/kW/Month (four or less events) and \$23/kW/Month (five or more events)	\$1/kWh for a planned event, and \$6/kWh for an unplanned event  (There is also a Voluntary Participation Option, which allows for performance payments, but no reservation payment. Payment under this option is \$3/kWh during a planned event and \$10/kWh during an unplanned event.)
RG&E – CSRP	\$4.25/kW/month (four or less events) or \$4.50/kW/month (five or more)	\$.50/kWh
RG&E – DLRP	N/A	N/A
NYSEG – CSRP	\$4.25/kW/Month (four or less events) or \$4.50/kW/Month (five or more)	\$.50/kWh
NYSEG – DLRP	N/A	N/A
O&R – DLRP	Tier 1 - \$3/kW/Month  Tier 2 - \$5/kW/Month	\$.50/kWh
O & R – CSRP	\$3/kW/Month	\$.50/kWh
National Grid – CSRP	\$2.75/kW/Month (four or less events) or \$3.00/kW/Month (five or more)	Planned - \$.18/kWh Unplanned - \$.22/kWh
National Grid – DLRP: Kenmore Ave. ONLY	Reservation – \$4.69/kW/Month	Reservation – \$1.02/kWh Voluntary – \$1.20/kWh

**Note:** For those services above that say reservation (or planned); the resource is obligated to provide the reductions included in their bid, or face penalties from the utility.



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