

## Program Materials for Connected Solutions for Commercial / Industrial Customers

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## Summary

The ConnectedSolutions Active Demand Response Program incentivizes commercial and industrial customers of Eversource’s service territory to curtail their energy when the grid is forecasted to be at its peak. Customers and their curtailment service providers are compensated on a pay-for-performance basis for every average kW they curtail. The ConnectedSolutions Program offers customers 3 options to participate, as shown in the table 1 below:

- Targeted Dispatch aims to reduce the load on the electrical grid at the one peak hour of the year.
- Daily Dispatch Demonstration aims to reduce the one peak hour of the year, and daily peaks in July and August.
- Targeted Winter Dispatch aims to reduce up to five peak hours in the winter. PA’s can call up to five events over the Winter.

Table 1: 2020 ConnectedSolutions Program Design for Eversource Energy Affiliate Companies Customers

Initiative	Program	Technology	Season	Incentive	Metering*	Data requirements
Curtailment	Targeted Dispatch	Neutral	Summer	\$ 35 / kW-Season	Site Level	Interval data
			Winter	\$ 25 kW-Season		
Storage	Targeted Storage	Batteries	Summer	\$ 100 kW-Season	Asset Level	Charge, Discharge and State of Charge
			Winter	\$ 50 kW-Season		
	Daily Dispatch	Batteries	Summer	\$ 200 kW-Season	Asset level:**	Interval data
	Targeted Storage	Thermal	Summer	\$ 75 kW-Season		
	Targeted Storage	Thermal	Winter	\$ 50 kW-Season		
	Daily Dispatch	Thermal	Summer	\$ 100 kW-Season		

\*Utility grade meter; preferably 5 minutes resolution. Metering assistance is available for Eversource customers.

\* The equipment connected with the thermal storage asset should be individually metered (f.e.g.: compressor, fans, HVAC).

## Enrollment through a CSP and Direct Participation

Typically, customers enroll through an approved Curtailment Service Provider (CSP). The approved CSPs for each PA are listed below. CSPs provide many services that make it easier for customers to maximize their curtailment performance and incentive. However, enrolling through an approved CSP is not a requirement of the program. Customers may use any CSP they chose, or not use a CSP at all. “Direct Participation” refers to a customer enrolling without a CSP.

In the Eversource service territory, there are three approved CSP’s:

- CPower (Eversource@CPowerEnergyManagement.com)
- Enel X (EversourceNE@enel.com)
- Voltus (EversourceNE@voltus.co).

If a customer enrolls through a CSP, they may take advantage of the integration between the CSP and the PA. This integration will provide PAs with on-site telemetry and automatic scheduling, which may ease the settlement of performance and consequent payment of incentives.

Direct Participants will have to provide interval meter data and report on event participation during the season and should expect settlement of performance to be done no less than 4 months after the season ends. The PAs will share an event communication protocol with the Direct Participants. PAs will not be responsible if the Customers do not receive or act upon an event notification or if a customer doesn't follow the event communication protocol.

## Shared Savings

Typically, customers share the incentive with CSPs. This is a common practice in other demand response programs, such as ISO-NE's programs. How or if the incentive is split between the customer and the CSP is up to the customer and the CSP. The PA does not require or reject how or if the incentives are split. Direct Participants will receive the full incentive amount directly.

## Annual Payment Process

Incentive payments for the summer programs, Targeted Dispatch and Daily Dispatch Demonstration, will be made after the Season ends. Incentive payments for the Summer will be paid before the end of the Winter, and incentive payments for Winter will be made before the end of the following Spring. Customers will be able to elect their payment option when applying for the program. The 3 options available include:

1. Payment to their CSP vendor. This allows the CSP to remove their shared savings portion of the customer incentive before the customer gets paid. This is also common practice for customers who participate in ISO-NE's demand resource programs through a CSP.
2. Payment to the customer only. This will be typical for Direct Participants.
3. Split payment to customer and vendor. The customer portion of the incentive will be paid directly to the customer, and the CSP portion will be paid directly to the CSPs, based on the PERCENTAGE OF INCENTIVE value entered in the customer application.

## Number of Events

### Targeted Dispatch

Although the intent of this program is to decrease electricity use at the one ISO-NE peak hour of the year, more than one event will be called per summer due to uncertainty in forecasting when the peak hour will be. We will limit the number of events as best as our forecasting allows. As such, the PAs may call events when the system load is particularly high, for example, during a heat wave. We will never call more than 8 events in a summer.

## Daily Dispatch Demonstration

The goal of Daily Dispatch Demonstration is to not only hit the ISO-NE peak hour, but also the highest daily peaks in July and August. Events will only be called in June and September if the annual peak is forecasted to be in those months. Events will be called in July and August to try to hit the highest 40 peak hours. We will never call more than 60 events in a summer.

## Winter Dispatch

The goal of Winter Dispatch is to hit the top 5 peak hours each year between December 1 and March 31 of the following year. We will never call more than 5 events in a winter.

## Eligibility Requirements

To be eligible for this program, the customer must have an Eversource electric service account in Massachusetts<sup>1</sup>, Connecticut or New Hampshire, where the demand response offerings will be delivered. The customer must also pay into the energy efficiency fund on their electric bill. Most electric customers pay into the energy efficiency fund. Customers whose electric service monthly bill has a line for “Energy Efficiency Prgms” and pay into this line item over the course of a year are eligible for this program.

## Enrollment Deadlines

To participate in that summer’s program, a customer should enroll in Targeted Dispatch or Daily Dispatch Demonstration by 11:59 p.m. on May 31 of that year. Customers may enroll later than May 31<sup>st</sup>, but for settlement purposes, any event called before the enrollment date will still count towards settlement of performance and will be included in the Customers’ performance calculations as a nonperformance event.

To participate in that winter’s program, a customer should enroll in Winter Dispatch by 11:59 p.m. on November 30 of that year. Customers may enroll later than November 30<sup>th</sup>, but for settlement purposes, any event called before the enrollment date will count towards settlement of performance and will be included in the Customers’ performance calculations as a nonperformance event.

## Withdrawal from the Program

Customers who enroll in the Connected Solutions program will remain in the program year to year until they provide written notice to their CSP or PA that they would like to be removed from the program. Once a season (summer or winter) starts the customer must stay enrolled for the entire season to receive the incentive. A customer cannot unenroll part way through a season and receive the performance incentive for fewer events than all the other program participants.

## Cancellation of the Program

Due to regulatory or other reasons, the PA may cancel their Connected Solutions Program or subsets of their program at any time.

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<sup>1</sup> Customers in Barnstable County should enroll with Cape Light Compact

### Notification of Demand Response Events

Notification of demand response events will be given at 1pm the day before the event. For customers who sign up through a pre-approved CSP, these notifications will be sent to the customer’s CSP. The CSP is then responsible for notifying the customers. Notification emails will be sent directly to Direct Participants using the email address given in the customer’s application. Typically, CSPs offer a variety of ways of notifying customers of events. These can include email, voicemail, phone call, text message, and/or machine-to-machine communication. Customers and CSPs are responsible for implementing the necessary communications so that customers are notified of events.

### Length and Time of Demand Response Events

Targeted Dispatch and Winter Dispatch events last 3 hours. Daily Dispatch Demonstration events can last 2 or 3 hours. All events happen between 2pm and 7pm, and all events start and end at the beginning of the hour (i.e. 2pm, 3pm, or 4pm).

### Days for Demand Response Events

Targeted Dispatch program events are generally called on weekdays. However, there is a Weekend Bonus available for customers who curtail if we do call a weekend event during the summer. Please see the Weekend Bonus section below. The Winter Dispatch measure is only called on weekdays. The Daily Dispatch Demonstration events are called on both weekdays and weekends and can be called on holidays. Targeted Dispatch and Winter Dispatch events will not be called on the following holidays.

Dispatch Season	Holiday	Date
Winter	New Year’s Day	January 1
Winter	Birthday of Martin Luther King Jr.	January 21
Winter	Birthday of George Washington (President’s Day)	February 18
Summer	Independence Day	July 4
Summer	Labor Day	First Monday of September
Winter	Christmas Day	December 25

Demand response events can be called for a Monday. In this case the event notification will still be given the day before the event, Sunday, which is a weekend day.

### Performance Calculation

The incentive rates refer to the average curtailment amount across every event of the demand response season. If a customer chooses not to participate in an event, the baseline method and performance calculation will be done as if the customer had participated. This will likely result in a low calculated performance for that event, which would lower the customers average performance for the season and lower the incentive for the season.

Performance for an event may not be increased by curtailing solar or CHP production to increase the battery discharge rate. For example, if the total production of the solar system and battery system is limited by the inverter size, the solar system cannot be limited during demand response events so that the battery can discharge more. Doing this would not decrease the load on the grid and would be against the goals of this program. For example, the table below shows the results of a fictional customer’s curtailment performance over a Targeted Dispatch season that had 3 demand response events over the whole summer.

Event	Performed Curtailment Amount
Event 1	100 kW
Event 2	200 kW
Event 3	300 kW

The customer's average performance over the summer would be:

$$\text{Average Performance} = \frac{100 \text{ kW} + 200 \text{ kW} + 300 \text{ kW}}{3} = 200 \text{ kW}$$

The total incentive amount to be paid for this fictional customer would be:

$$200 \text{ kW} \cdot \frac{\$35}{\text{kW}} = \$7,000$$

The average performance for Daily Dispatch Demonstration and Winter dispatch would be calculated by the same process.

### Weekend Bonus for Targeted Dispatch Measure

Although it is rare, weekend events may be called in the Targeted Dispatch program. If a weekend event is called in a summer, customer will be paid an additional \$10/kW-performed incentive for their average performance over all weekend events for the summer. This incentive is in addition to the \$35/kW-performed incentive paid for weekday performance. A customer performance on a weekend will not impact their weekday performance calculation or vice versa.

For example, for a hypothetical summer in which there are 2 weekend events and 2 weekday events a customer who curtails 100kW for each event would be paid the following in the Targeted Dispatch measure.

Day Type	Incentive Rate	Incentive for a customer with a 100kW Performance for All Events
Weekday Standard Measure	\$35/kW	$100\text{kW} \cdot \frac{\$35}{\text{kW}} = \$3,500$
Weekend Bonus	\$10/kW	$100\text{kW} \cdot \frac{\$10}{\text{kW}} = \$1,000$
Total Incentive for the Summer		\$4,000

The Weekend Bonus will use the same performance calculation and baseline method as the weekday Targeted Dispatch measure. Please see the Performance Calculation section below for more details.

## Co-Participation in ISO-NE Demand Resource Programs

Customers may co-participate in ISO-NE Demand Resource Programs and Connected Solutions. It is possible that a Connected Solutions demand response event could fall within the 10-day baseline period used by ISO-NE. In this case the customer's baseline may be eroded by participating on the Connected Solutions event. Customers and their CSP should consider this risk before enrolling in Connected Solutions.

Although rare, it is possible that both Connected Solutions and ISO-NE will call on a customer to curtail on the same day. This will not affect how the customer performance is calculated in the Connected Solutions program. If the Connected Solutions event starts before the ISO-NE event, it may decrease the same-day-adjustment calculated by ISO-NE. Customers and their CSP should consider this risk before enrolling in Connected Solutions.

If demand response assets are called by ISO-NE because of real-time market prices exceeding \$950/MWh at any time during a day or an ISO-NE OP4 event is called during the baseline period of a Connected Solutions event, this day will not be counted in the baseline. Please see the Baseline section below.

One of the benefits of the Connected Solutions program is the decrease in the long-term requirement for capacity (generation) in the ISO-NE markets, also known as the installed capacity requirement (ICR). Customers are not allowed to co-participate in Connected Solutions and any ISO-NE program that would cause the customer's curtailment in the Connected Solutions program to be reconstituted in the ICR, because this would negate one of the core goals of Connected Solutions.

## Co-Participation in SMART

Customers may co-participate in SMART (Solar Massachusetts Renewable Target) Program and Connected Solutions. SMART provides an energy storage adder for applicable technologies.

The energy storage system adder in the SMART program is dependent on the customer completing 52 full discharge cycles of their energy storage system per year.

## Exporting Power to the Electrical Grid

### Renewable Energy Only Systems

Customers with interconnected renewable energy systems, such as solar PV and wind turbines, may participate in Connected Solutions. Renewable energy systems, especially solar PV, provide somewhat predictable performance. Curtailment performance of customers with renewable energy systems will be calculated like every other program participant. When a customer's interconnected renewable energy system produces more electricity than the customer's facility, that excess electricity is sent, exported, to the electrical grid. If the customer is already exporting power to the grid during a demand response

event, the customer can still participate in Connected Solutions by reducing the facility electrical load during events so that even more power is sent to the grid. The baseline methods used in this program will compensate the customer for this facility's curtailment.

### Renewable Energy Plus Storage

Customers with interconnected renewable energy systems, such as solar PV and wind turbines, and energy storage systems, like batteries, may participate in Connected Solutions. The SMART Program and the federal investment tax credit (ITC), also known as the federal solar tax credit, provide added incentives for energy storage systems that are charged by renewable energy systems. Before exporting power to the grid, customers must go through the interconnection process. Participation in the Connected Solutions program does not alter a customer interconnection service agreement (ISA).

### Storage Only Systems

Customers who don't have a renewable energy system but do have an energy storage system may participate in Connected Solutions. Before exporting power to the grid, customers must go through the interconnection process. Participation in the Connected Solutions program does not alter a customer interconnection service agreement (ISA).

### Reloading Effect – Recharging Energy Storage Systems with Renewable Energy Systems

There are several financial benefits of charging energy storage systems with renewable energy systems. The SMART program energy storage system adder requires that energy storage systems be charged by a solar system. The ITC also has requirements around charging from applicable renewable energy systems.

Energy storage systems that participate in Daily Dispatch Demonstration have the option of sending state-of-charge information to the customer's PA so that the customer's energy storage system can be monitored.

The customer's PA will not call on an energy storage system for up to 5 demand response events per summer if the state-of-charge is less than 90%. After the 5 demand response events, the customer's energy storage system will be called for all Daily Dispatch Demonstration demand response events. If the energy storage system is not fully charged, this may impact the customer's average performance. It is the customer's responsibility to size their renewable energy system and energy storage system so that the energy storage system can be recharged in time to participate in Connected Solutions. This includes accounting for cloudy days for solar PV and windless days for wind turbines.

Customers must coordinate how the discharge rate and state-of-charge information from their energy storage systems will be monitored and transmitted to their program administrator on a case-by-case basis. After these methods are developed, they may be added to the Program Materials to be used on a prescriptive basis.

## Performance Calculation

### Shutdown reporting requirement

Customers or their CSP must inform their PA of the shutdown with a week’s notice. There is a limit of 10 shutdown days per season.

### Targeted Dispatch and Winter Dispatch

Performance in Target Dispatch and Winter Dispatch is calculated using a “last 10-of-10 baseline model” or “last 5-of-5 baseline model” with a same-day asymmetric adjustment

For Eversource customers, battery performance is measured at the asset level and doesn’t require a baseline methodology. For Eversource customers, please see below for more information about thermal storage. Customers in this program will never be charged a fee for poor performance. However, since this is a pay-for-performance program, poor performance on any or all events will decrease the incentive amount paid. Not participating on an event may count as a zero for that event in the customer’s seasonal average performance calculation.

### Baseline

To calculate a customer’s performance during a demand response event, it is necessary to calculate what a customer’s typical power use is in order to estimate what the power use would have been if no demand response event was called.

ISO-NE uses a similar last 10-of-10 model in their active demand response programs. This method looks at the customer’s last 10 similar days. Similar days are weekdays that are not holidays and where no other DR event from either ISO-NE (OP4) or the program administrators was called. Days where a customer has a scheduled shutdown are not considered similar days. For shutdown days to be excluded from the baseline calculations, customer’s or their CSP must inform their program administrator of the shutdown with a week’s notice. There is a limit of 10 shutdown days per season.

Example of baseline set by loads in the 10 similar days before a DR event

Time Interval	10 similar days before event	...	2 similar days before event	holiday	weekend	weekend	Day of another DR event	1 similar day before event	Customer’s Baseline
Noon – 1pm	500kW	...	500kW	Not counted in average				500kW	500kW
2pm – 5pm	500kW	...	500kW					500kW	500kW

Weekend event performance is calculated using the last of 5-of-5 baseline model with a same-day asymmetric adjustment.

For Eversource customers, battery performance is measured at the asset level, and there is no need for a baseline. For Eversource thermal storage participants, all equipment connected to the thermal unit (f.eg. compressor, fans, HVAC, etc.) needs to be measured at the asset level. In this case, the baseline is calculated using a regression method over non-event days. If the customer is enrolled in generic targeted dispatch also, the thermal component is evaluated using a regression adjusted method over all non-event hours. Please refer to the Eversource application for more detail, or email [connectedsolutions@eversource.com](mailto:connectedsolutions@eversource.com).

### Baseline Adjustment

Demand response events are called during extreme weather (very hot or cold). The day of the event may be hotter/colder than the last 10 similar days, and the customers load may be higher that day. To account for this, the baseline is adjusted to reflect to customers load during the demand response event day. This is called the baseline adjustment. The baseline adjustment is the difference between the customer’s average load during the hour starting the 2 hours before the event start and the load during the event day. However, the customer’s load may be lower during an event day than the last 10 similar days because the customer is responding to the demand response event. Therefore, the adjustment can only be positive. It will never penalize the customer.

Example of a same day baseline adjustment.

Time Interval	Customer’s Baseline	Event Day Load	Baseline Adjustment
Noon – 1pm	500kW	600kW	100kW

### Demand Response Performance

Performance is calculated by subtracting the event day load during the demand response event from the sum of the customer’s baseline and baseline adjustment.

Example of an event day performance:

Time Interval	Customer’s Baseline	Event Day Load	Baseline Adjustment	Event Day Performance
Noon – 1pm	500kW	600kW	100kW	Performance = Baseline + Adjustment – Event Day
2pm – 5pm	500kW	400kW		500kW + 100kW – 400kW = 200kW

If the customer produces more energy than they consume during the baseline period or the event day through permitted and interconnect onsite generation or discharging energy storage, the net energy use will be used to calculate the customers performance in the same process detailed above.

### Curtailement Limit

Although it is rare, sometime the baseline adjustment causes the baseline to be adjusted to a level higher than the customer ever uses. A customer cannot curtail more load than they use. To prevent this, the Event Day Performance must be smaller than the maximum load of the customer during the last 10 similar days.

Performance for an individual demand response event is calculated by subtracting the customer’s adjusted baseline power from average power (kW) use during the demand response event.

For example:

Time	Customer’s Adjusted Baseline	Customer’s Power Use During the DR Event	Performance
2pm to 3pm	500kW	400kW	100kW
3pm to 4pm	500kW	400kW	100kW
5pm to 6pm	500kW	400kW	100kW
Average Performance for Event			100kW

The Customer’s Adjusted Baseline is calculated by taking the customer’s average power use during the demand response event hours and adding the baseline adjustment. Performance during the demand response event is the average Customer’s Adjusted Baseline minus the Customer’s Power Use During the DR Event, over the whole event. Negative performance is not penalized, for example:

Time	Customer’s Adjusted Baseline	Customer’s Power Use During the DR Event	Performance
2pm to 3pm	300kW	400kW	-100kW → 0
3pm to 4pm	500kW	400kW	100kW
5pm to 6pm	500kW	400kW	100kW
Average Performance for Event			$(0 + 100 + 100)/3 = 67\text{kW}$

### Daily Dispatch Demonstration

In the case of energy storage devices such as batteries<sup>2</sup>, performance is measured at the asset level and no baseline is needed or and the same day adjustment is not applied.

In the case of thermal storage<sup>3</sup> or other curtailment methods enrolled in Daily Dispatch Demonstration, a custom baseline method must be applied. All equipment connected to the thermal unit (f.eg. compressor, fans, HVAC, etc.) needs to be measured at the asset level. In this case, the baseline is calculated using a regression method over non-event days. If the customer is enrolled in generic targeted dispatch also, the thermal component is evaluated using a regression adjusted method over all non-event hours. Please refer to the Eversource application for more detail, or email [connectedsolutions@eversource.com](mailto:connectedsolutions@eversource.com).

<sup>2</sup> Electrochemical rechargeable batteries

<sup>3</sup> Rechargeable thermal batteries

## Customer Interval Data

With the exception of Storage for Eversource customers, as described above, the interval data to be used to measure a customer performance in Targeted Dispatch and Winter dispatch must be measured at the utility meter.

All customers are required to install metering capable of sending real time interval data to Eversource. Customers may apply for an added incentive of up to \$1,500 per meter to pay for metering costs. Storage should be measured at the asset level. Refer to the Eversource application for more detail.

## On-Site Generation

Some PAs allow customers to use onsite non-renewable generation for demand response. This includes backup generators, standby generators, co-generation, etc. However, in such cases, the generation asset must comply with all federal, state, and local laws and permitting required for operation and participation in demand response programs.

For Eversource customers

Eversource may restrict the amount and/or type of generation participating in its Connected Solutions offering. Generators may be allowed to participate in targeted dispatch. Contact the approved CSP or Eversource for more information.

## Enrollment Process

To enroll in the program, the customer or their vendor must complete an application form. For Eversource customers, customers should download the application on Eversource's C&I website. An updated version of the 2020 application will be available here:

<https://www.eversource.com/content/ema-c/business/save-money-energy/manage-energy-costs-usage/demand-response>

## Testing

A performance test event is not planned in this program. However, the PAMay elect to run communication tests to ensure all notification processes are functioning.