# Program Materials for Connected Solutions for Commercial / Industrial Customers

## Contents

## Summary

The ConnectedSolutions incentivizes commercial and industrial customers of the MA Program Administrators (Eversource, National Grid, and Unitil) to curtail their energy when the grid is forecasted to be at its peak. Customer and their curtailment service provider are compensated on a pay-for-performance basis for every average kW they curtail.

The ConnectedSolutions Program offers customers 3 options to participate.

- Targeted Dispatch aims to reduce the load on the electrical grid at the one peak hour of the year.
- Daily Dispatch aims to reduce the one peak hour of the year, and daily peaks in July and August.
- Winter Dispatch aims to reduce the 5 peak hours of the winter.

A summary of each option is in the table below.

**All Program Administrators:**

| | ***Summer*** | | ***Winter*** |
|---|---|---|---|
| **Option** | **Targeted Dispatch** | **Daily Dispatch*** | **Winter Dispatch** |
| **Number of Events per Season** | 2 to 8 per Summer | 30 to 60 per Summer | 5 per Winter |
| **Incentive** | $35/kW-Summer | $200/kW-Summer | $25/kW-Winter |
| **Incentive Lock** | None | 5 Years | None |
| **Length of Events** | 3 Hours | 2 to 3 Hours | 3 Hours |
| **Time of Day** | Between 2pm and 7pm | Between 2pm and 7pm | TBD |
| **Weekend/Weekday** | Mon. – Friday Only | Mon. – Friday Only | Mon. – Friday Only |
| **Events on Holidays** | No | No | No |
| **Day-Ahead Notification** | Yes | Yes | Yes |
| **Months** | June – September | June – September | December – March |

* This Option is not available to Unitil customers currently.

**Eversource Only:**

| | ***Summer*** | ***Winter*** |
|---|---|---|
| **Option** | **Targeted Dispatch for Batteries** | **Winter Dispatch for Batteries** |
| **Number of Events per Season** | 2 to 8 per Summer | 4 to 6 per Winter |
| **Incentive** | $100/kW-Summer | $50/kW-Winter |
| **Incentive Lock** | None | None |
| **Length of Events** | 3 Hours | 3 Hours |
| **Time of Day** | Between 2pm and 7pm | TBD |
| **Weekend/Weekday** | Mon. – Friday Only | Mon. – Friday Only |
| **Events on Holidays** | No | No |
| **Day-Ahead Notification** | Yes | Yes |
| **Months** | June – September | December – March |

## Enrollment through a CSP and Direct Participation

Typically, customers enroll through an approved Curtailment Service Provider (CSP). The approved CSPs are CPower, Enel-X, IPKeys, and Voltus. 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.

## Shared Savings

Typically, CSPs share the incentive with customers. This is common practice in other demand response programs, such as the ISO-NE's programs. How or if the incentive is split between the CSP and the customer is up to the CSP and the customer. The program administrator 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, will be made in October or November each year. Incentive payments for Winter Dispatch will be made in April or May each year.

For National Grid and Unitil Customers:

If a customer enrolls through a CSP, the customer's annual performance incentive will be sent straight to that CSP at the end of the season. 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.

If a customer does not enroll through a CSP, the full incentive will be paid directly to the customer. Please mark NONE (DIRECT PARTICIPANT) on the customer application and provide the customer tax ID number, company type, and who the check should be made out to.

For Eversource Customers:

Customers will be able to elect their payment options 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. Typically, between 2 to 6 events are called per summer. We will never call more than 8 events in a summer.

Daily Dispatch

The goal of Daily Dispatch 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 between December 1 each year 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 a National Grid, Eversource, or Unitil electric service account in Massachusetts where the demand response savings will be achieved. 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 National Grid, Eversource, or Unitil electric service monthly bill has a line for "Energy Efficiency Prgms", are eligible for this program. Customers in Cape Light Compact service territory (Cape Cod and Martha's Vineyard) are not able to participate at this time.[1]

## Enrollment Deadlines

To participate in that summer's program, a customer must enroll in Targeted Dispatch or Daily Dispatch by 11:59 p.m. on May 31 of that year.

To participate in that winter's program, a customer must enroll in Winter Dispatch by 11:59 p.m. on November 30 of that year.

The program administrators or individual program administrator may choose to extend these deadlines if there are extenuating circumstances.

## Unsubscribing 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 program administrator 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 program administrators or individual program administrators (National Grid, Eversource, and/or Unitil) may cancel their Connected Solutions Program or subsets of their program at the end of any season (summer or winter).

## Notification of Demand Response Events

Notification of demand response events will be given at 1pm the before the day of the event. For customers who sign up through a pre-approved CSP, these notifications will be sent to the customer's

[1] Cape Light Compact customers can contact 1-800-797-6699 to learn more.

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 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, Winter Dispatch, and Daily Dispatch events are called on weekdays – Monday through Friday. 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.

## Incentive Rates and Average Performance

The incentive rate for each option is shown in the table below.

**All Program Administrators:**

| | ***Summer*** | | ***Winter*** |
|---|---|---|---|
| **Option** | **Targeted Dispatch** | **Daily Dispatch** | **Winter Dispatch** |
| **Incentive** | $35/kW-Summer | $200/kW-Summer | $25/kW-Winter |

**Eversource Only:**

| | ***Summer*** | ***Winter*** |
|---|---|---|
| **Option** | **Targeted Dispatch for Batteries** | **Winter Dispatch for Batteries** |
| **Number of Events per Season** | 2 to 8 per Summer | 4 to 6 per Winter |
| **Incentive** | $100/kW-Summer | $50/kW-Winter |

The incentive rates refer to the average curtailment amount for 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 would like result in a low calculated performance for the event, which would lower the customers average performance for the season, and lower the incentive for the season.

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 customers average performance over the summer would be:

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

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

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

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

## 5-Year Incentive Lock for Daily Dispatch and Eversource's Targeted Dispatch for Batteries

The customers' incentive for the Daily Dispatch and for Eversource customers only Target Dispatch for Batteries options are locked in for the first 5 consecutive years the customer is in the program. Even if the incentive rate for new customers changes during the first 5 years of the customer's participation, the incentive rate for that customer will remain the same. After the 5$^{th}$ year of participation, the program administrators still plan to offer an incentive for customers to discharge their battery system at the right dates and times. However, those future incentive rates are not set yet.

If the all program administrators or individual program administrators cancel the Daily Dispatch option due to regulatory or other reasons, the customers incentive lock will still be valid.

For Unitil Customers:

Unitil does not offer an incentive lock currently.

## 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 also 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 the ISO-NE calls an OP4 event 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 of 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.

For energy storage system enrolled in SMART, in Daily Dispatch, and Winter Dispatch, the program administrators will call at least 52 discharge events per year. Approximately 40 of these events will be in the summer, at least 5 will be in the winter. The remaining events will either be more winter events, or shoulder season events so that the customers 52 discharge requirement will be satisfied. The customer's program administrator will report the completion of this requirement every year on the customer's behalf. If the customer energy storage system fails to perform in the required number of Daily Dispatch and Winter Dispatch events the customer energy storage system can still maintain eligibility for SMART by documenting at least 52 complete cycle discharge equivalents in a calendar 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 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 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. Additionally, customers may only export the power from energy storage system to the electrical grid if the storage systems are charged by applicable renewable energy systems. This allows customers to discharge their batteries during Connected Solutions events even if it means exporting to the grid.

If the energy storage system is not charged exclusively by a renewable energy system, it may not export to the grid. The energy storage system could still be used to participate in Connected Solutions, but the discharge rate of the energy storage system is limited to the site load of the customer's facility.

Storage Only Systems

Customers who don't have a renewable energy system but do have an energy storage system may participate in Connected Solutions. However, the discharge rate of the energy storage system is limited to site load of the customer's facility. The customer may not export power to the electrical grid. This may limit the amount the customer can discharge their battery if the battery discharge rate is higher than the facility load.

## 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. Exporting power to the electrical grid is only permitted for battery systems that are charged electricity from interconnected renewable energy systems. Charging energy storage system exclusively with the customers renewable energy system can limit a customer performance in Connected Solutions if the battery storage system is not fully recharged (reloaded) between demand response events.

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

Targeted Dispatch and Winter Dispatch

Performance in Target Dispatch and Winter Dispatch is calculated using a "last 10-of-10 baseline model" with a same-day adjustment.

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 seasonal average.

## 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 |

## 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 in the 2 hours before the event start and the load during the event day.

However, the customers 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.

## Curtailment 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.

Daily Dispatch

In the case of energy storage devices such as batteries, generators, and co-generation, the average performance during a demand response event is the average discharge from the device during the event. No same day adjustment is applied.

In the case of thermal storage or other curtailment methods enrolled in Daily Dispatch, a custom baseline method must be applied. The customer's program administrator will work to develop a baseline method 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.

## Customer Interval Data

The interval data to be used to measure a customer performance in Targeted Dispatch and Winter dispatch must be measured at the utility meter.

For National Grid Customers:

In most cases, the customer already has a utility interval meter that records and transmits the information needed to complete the performance calculations. If this is the case, no other metering is required to participate in the program. All G-3 customers have this interval meter. Customers who do not have an interval utility meter may also participate in the program. The customer or the CSP must install a meter to measure the customer electrical load in at least 15-minute intervals for the entire demand response season. This data must be shared with the customer's program administrator at the end of the season. The cost for this added metering is the responsibility of the customer or its CSP.

For Eversource Customers:

All customers are required to install metering capable of sending real time interval data to Eversource or Unitil. Customers may apply for an added incentive of up to $1,500 per meter to pay for metering costs.

For Unitil Customers:
All customers are required to install metering capable of collecting interval data. Generally, Unitil will supply these types of meters. In the event these types of meters cannot be installed in a timely fashion, the CSP can supply such meters. Contact the CSP for the cost and a potential incentive from Unitil.

## On-Site Generation

The customer may use onsite generation for demand response. This includes backup generators, standby generators, co-generation, etc. However, the generation asset must comply with all federal, state, and local laws and permitting required for operation and participation in demand response.

For Unitil Customers:
Unitil may have some additional restrictions for On-Site Generation. Contact the approved CSP or Unitil for more information.

## Enrollment Process

To enroll in the program, the customer or their vendor must complete an application form. This form is available on the MassSave website.


Application for MA Demand Response.pdf

## Testing

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