SECTION III

MARKET RULE 1

APPENDIX E1

DEMAND RESPONSE

Appendix E1 applies to Capacity Commitment Periods commencing prior to June 1, 2017.
APPENDIX E1
DEMAND RESPONSE

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1. Demand Response Registration

Appendix E1 applies to Capacity Commitment Periods commencing prior to June 1, 2017.

A Market Participant may register a Real-Time Demand Response Asset associated with a Real-Time Demand Response Resource for purposes of submitting Demand Reduction Offers on a Day-Ahead and Real-Time basis to provide demand reductions during hours ending 0800 through 1800 on non-Demand Response Holiday weekdays subject to the following conditions:

(a) the asset is able to produce at least 100 kW of demand reduction, and;
(b) the metering and communication equipment associated with the asset meets the requirements specified in Section III.E1.2.

A Real-Time Demand Response Asset may consist of an aggregation of multiple end-use metered customers.

1.1 Registration Parameters

During the registration process, Market Participants must submit the following information for each Real-Time Demand Response Asset:

(a) Maximum Interruptible Capacity;
(b) Maximum Load, and;
(c) Maximum Generation, for Real-Time Demand Response Assets that are comprised of Distributed Generation.

1.2 Restrictions on Real-Time Demand Response Asset Registration
A Market Participant may not register and must retire if previously registered a Real-Time Demand Response Asset that is comprised of:

(a) the customers of Host Utilities that distributed more than 4 million MWh in the previous fiscal year, if the relevant electric retail regulatory authority prohibits such customers’ demand response to be bid into the ISO-administered markets or programs, or;

(b) the customers of Host Utilities that distributed 4 million MWh or less in the previous fiscal year, unless the relevant electric retail regulatory authority permits such customers’ demand response to be bid into the ISO-administered markets or programs.

A Market Participant may not register an existing Generator Asset as a Real-Time Demand Response Asset for the purpose of submitting Demand Reduction Offers.

2. Metering and Communication

2.1 Interval Metering and Telemetry Requirements

The actual metered demand of each individual end-use customer facility that comprises a Real-Time Demand Response Asset must be measured using interval meters located at the individual end-use customer’s retail delivery point and shall be reported to the ISO at an interval of five minutes. Actual metered demand submitted to the ISO shall not include average avoided peak distribution losses.

Interval meters required pursuant to Section III.E1.2.1 must meet the following requirements:

(a) the interval meter must record and report meter data to the ISO in Real-Time at an interval of five-minutes;

(b) if the interval meter is the same meter used by the distribution company for billing purposes, the meter is a revenue-quality meter that is accurate within ± 0.5%, and;

(c) if the interval meter is not the same meter used by the distribution company for billing purposes, the interval meter is either a revenue-quality meter that is accurate within ± 0.5% or a non-revenue-quality meter with an overall accuracy of ± 2.0%. For each non-revenue-quality meter used, the Market Participant must, during the registration process, submit certification from the meter
manufacturer that the interval meter being used meets the ± 2.0% accuracy threshold, and shall specify accuracy for the following parameters:

i. current measurement;

ii. voltage measurement;

iii. A/D conversion, and;

iv. calibration.

2.2 Meter Testing

All interval meters must be periodically tested and calibrated.

Market Participants must conduct periodic meter data validation checks.

Market Participants must repair or replace meters that are found to be inaccurate pursuant to periodic testing and data validation checks.

Market Participants must perform an annual independent certification of the accuracy and precision of the meters and meter data communication systems.

2.3 Auditing

The ISO may, for a Real-Time Demand Response Asset, review and audit testing and calibration records, audit facility performance (including review of facility equipment), order and witness the testing of metering and measurement equipment, and witness the demand reduction activities of any facility associated with the asset.

Market Participants must make retail billing meter data from the Host Participant for the facilities associated with a Real-Time Demand Response Asset available to the ISO upon request.

Market Participants are responsible for all expenses associated with installing, maintaining, calibrating, testing, and certifying the metering, data recording and measurement equipment of Real-Time Demand Response Assets.
2.4 Communication/Telemetry

Market Participants must submit a single set of interval meter data representing the metered demand of the end-use facilities comprising the Real-Time Demand Response Asset on the electricity network in the New England Control Area. If one or more generators whose output can be controlled is located behind the retail delivery point of the Real-Time Demand Response Asset, other than emergency generators that cannot operate synchronized to the electrical grid, then the Market Participant must also submit to the ISO in Real-Time a single set of interval meter data, at an interval of five minutes, representing the combined output of all generators whose output can be controlled.

3. Demand Reduction Offers

3.1 Required Demand Reduction Offer Parameters

Market Participants must submit a Demand Reduction Offer for each Real-Time Demand Response Asset that meets the requirements of this section in order to be eligible for a demand reduction payment.

A Demand Reduction Offer must be equal to or greater than the Demand Reduction Threshold Price in effect on the day the Demand Reduction Offer is made.

Demand Reduction Offers reflect the amount of demand reduction offered at the retail delivery point excluding transmission and distribution losses.

A Demand Reduction Offer shall consist of a single offer price in $/MWh (less than or equal to $1000/MWh) and a single demand reduction amount (in MW to the nearest 0.1 MW) that shall apply to hours ending 0800 through 1800 in the Operating Day.

A Market Participant may submit a single Demand Reduction Offer for each of its Real-Time Demand Response Assets for each Operating Day that is a non-Demand Response Holiday weekday.

Demand Reduction Offers for the following Operating Day must be submitted by the offer submission deadline for the Day-Ahead Energy Market of the day before the Operating Day and may not be changed thereafter.
The minimum Demand Reduction Offer amount for each Real-Time Demand Response Asset is 100 kW.

The maximum Demand Reduction Offer amount for each Real-Time Demand Response Asset cannot exceed the asset’s Maximum Interruptible Capacity.

Market Participants are prohibited from submitting a Demand Reduction Offer for a Real-Time Demand Response Asset for an Operating Day with a scheduled curtailment, or for an Operating Day with a known forced curtailment. If an unanticipated forced curtailment has occurred, Market Participants are prohibited from submitting a Demand Reduction Offer for the affected Real-Time Demand Response Asset for any subsequent Operating Days until the forced curtailment is over and electrical service to the asset has been restored.

3.2 Optional Demand Reduction Offer Parameters

A Demand Reduction Offer may specify a minimum interruption duration of one to four hours. If a Market Participant does not specify a minimum interruption duration in its Demand Reduction Offer, the minimum interruption duration shall be one hour.

A Demand Reduction Offer may specify a curtailment initiation price (in $ per interruption). If a Market Participant does not specify a curtailment initiation price, the curtailment initiation price shall be $0.

A Demand Reduction Offer must meet the following minimum and maximum price requirements:

(a) The offer price not including the curtailment initiation price shall be greater than or equal to the Demand Reduction Threshold Price; and

(b) The offer cost of the Demand Reduction Offer, which shall include the curtailment initiation price, shall be less than or equal to $1000/MWh. The offer cost shall be computed as follows: \( \text{offer cost} = \text{offer price} + \frac{\text{curtailment initiation price}}{(\text{minimum interruption duration} \times \text{bid amount (MW)})} \).
Ahead LMPs for the Load Zone in which the Real-Time Demand Response Asset is located. A Demand Reduction Offer associated with a Real-Time Demand Response Asset will clear in one or more hours of the Operating Day if the sum of the hourly Day-Ahead LMP times the Demand Reduction Offer amount in the cleared hours of the Operating Day is greater than or equal to the sum of the curtailment initiation price for the Operating Day and the sum of the Demand Reduction Offer price times the Demand Reduction Offer amount in the cleared hours of the Operating Day.

The ISO will provide Market Participants with demand curtailment schedules for Real-Time Demand Response Assets based on cleared Demand Reduction Offers.

The demand curtailment schedule shall reflect demand reductions (MW) at the Real-Time Demand Response Asset’s retail delivery point.

5. Real-Time Scheduling of Demand Reductions

A Demand Reduction Offer shall continue to apply in Real-Time during the Operating Day even if the Demand Reduction Offer is not scheduled Day-Ahead for the next Operating Day pursuant to Section III.E1.4. If a Market Participant’s Demand Reduction Offer is not cleared Day-Ahead to reduce demand in an hourly time interval for the next Operating Day, the Market Participant may initiate a Real-Time demand reduction by reducing demand when the offer price (not including the curtailment initiation price) is less than or equal to the provisional hourly Real-Time LMP published in the Operating Day for the Load Zone in which a Real-Time Demand Response Asset is located.

A Market Participant will not receive a Dispatch Instruction in Real-Time for a Real-Time Demand Response Asset.

5.1 Requirements for Demand Reductions of 5 MW and Above

A Market Participant with a Real-Time Demand Response Asset that has submitted a Demand Reduction Offer for the Operating Day, must request permission from the ISO prior to reducing demand in an amount greater than or equal to 5 MW during a 60 minute period, unless the asset was dispatched or audited pursuant to Section III.13. Permission must be requested not less than 15 minutes and not greater than 60 minutes before the start of the demand reduction. The ISO may approve or deny the requested interruption based on the impact of the interruption on system reliability.
6. Determination of the Demand Reduction Threshold Price

The Demand Reduction Threshold Price for each month shall be determined through an analysis of a smoothed supply curve for the month. The smoothed supply curve shall be derived from real-time generator and import offer data for the same month of the previous year. The ISO may adjust the offer data to account for significant changes in generator and import availability or other significant changes to the historic supply curve. The historic supply curve shall be calculated as follows:

i. Each generator and import offer block (i.e., each price-quantity pair offered in the Real-Time Energy Market) for each day of the month shall be compiled and sorted in ascending order of price to create an unsmoothed supply curve.

ii. An unsmoothed supply curve for the month shall be formed from the price and cumulative quantity of each offer block.

iii. A non-linear regression shall be performed on a sampled portion of the unsmoothed supply curve to produce an increasing, convex, smooth approximation of the supply curve.

iv. A historic threshold price $P_{th}$ shall be determined as the point on the smoothed supply curve beyond which the benefit to load from the reduced LMP resulting from demand response exceeds the cost to load associated with compensating demand response.

v. The Demand Reduction Threshold Price for the upcoming month shall be determined by the following formula:

$$DRTP = P_{th} \times \frac{FPI_c}{FPI_h}$$

where $FPI_h$ is the historic fuel price index for the same month of the previous year, and $FPI_c$ is the fuel price index for the current month.

The historic and current fuel price indices used to establish the Demand Reduction Threshold Price for a month shall be based on the lesser of the monthly natural gas or heating oil fuel
indices applicable to the New England Control Area, as calculated three business days before the start of the month preceding the Demand Reduction Threshold Price’s effective date.

The ISO will post the resulting Demand Reduction Threshold Price, along with the index-based fuel price values used in establishing the Demand Reduction Threshold Price, on its website by the 15th day of the preceding month in advance of the Demand Reduction Threshold Price’s effective date.

The Demand Reduction Threshold Price shall apply to all Demand Reduction Offers associated with Real-Time Demand Response Assets located anywhere within the New England Control Area.

7. **Demand Response Baselines**

A Market Participant must establish a Demand Response Baseline pursuant to Section III.8A prior to submitting a Demand Reduction Offer for a Real-Time Demand Response Asset.

A Market Participant shall take no actions to establish a Demand Response Baseline or affect a Demand Response Baseline adjustment that results in a Demand Response Baseline that exceeds the expected electricity consumption levels of its end-use metered customers absent demand reduction payments.

For Real-Time Demand Response Assets comprised of Distributed Generation, a Market Participant shall take no actions to establish a Demand Response Baseline that results in a Demand Response Baseline that reduces the expected output levels of its generation absent demand reduction payments.

8. **Real-Time Demand Reduction Obligations**

8.1 **Real-Time Demand Reduction of Assets Without Generation**

The Real-Time demand reduction amount of a Real-Time Demand Response Asset is equal to the difference between its Demand Response Baseline adjusted pursuant to Section III.8A.4 and the asset’s Real-Time metered demand, during the intervals that the Real-Time Demand Response Asset was scheduled Day-Ahead by the ISO to reduce demand or was otherwise eligible to receive payment for a demand reduction in Real-Time. A Real-Time Demand Response Asset’s Real-Time demand reduction amount is negative if the asset’s Real-Time metered demand is greater than its adjusted Demand Response Baseline.
8.2 Real-Time Demand Reduction of Assets With Generation

To the extent a generator is located behind the retail delivery point of an individual end-use customer facility that comprises a Real-Time Demand Response Asset, the metered output of the generator in each five-minute interval shall be added to the metered demand measured at the retail delivery point in the same intervals to determine the Real-Time Demand Response Asset’s Demand Response Baseline. The Real-Time demand reduction amount achieved by the individual end-use customer facility that comprises a Real-Time Demand Response Asset shall be equal to the asset’s adjusted Demand Response Baseline in each five-minute interval minus the sum of the metered demand measured at the retail delivery point and the output of all of the generators located behind the Real-Time Demand Response Asset’s retail delivery point in the same time intervals. A Real-Time Demand Response Asset’s Real-Time demand reduction amount is negative if the sum of the asset’s Real-Time metered demand and the output of all of the generators is greater than its adjusted Demand Response Baseline.

If a Real-Time Demand Response Asset is comprised of a Distributed Generation asset located behind the retail delivery point of an individual end-use customer facility, the interval metered output of the Real-Time Demand Response Asset comprised of the Distributed Generation asset shall be used to determine its Demand Response Baseline. The Real-Time demand reduction amount achieved by the Real-Time Demand Response Asset comprised of the Distributed Generation asset shall be equal to the asset’s incremental output in each five-minute interval relative to its Demand Response Baseline in the same intervals. A Real-Time Demand Response Asset’s Real-Time demand reduction amount is negative if the asset’s Real-Time metered output is less than its Demand Response Baseline.

8.2.1 Real-Time Demand Reduction of Assets With Generation But With No Other Real-Time Demand Response Asset at that Location

For a Real-Time Demand Response Asset located at a retail delivery point with no other Real-Time Demand Response Assets at or behind the same retail delivery point, the metered output of any Real-Time Emergency Generation Assets in each five-minute interval shall be added to the metered demand measured at the retail delivery point in the same intervals to determine the Real-Time Demand Response Asset’s Demand Response Baseline.
The Real-Time demand reduction amount achieved by the Real-Time Demand Response Asset shall be equal to the asset’s adjusted Demand Response Baseline in each five-minute interval, calculated pursuant to Section III.8A.4.4, minus the sum of the metered demand measured at the retail delivery point and the output of any Real-Time Emergency Generation Assets located behind the Real-Time Demand Response Asset’s retail delivery point in the same time intervals. A Real-Time Demand Response Asset’s Real-Time demand reduction amount is negative if the sum of the asset’s Real-Time metered demand and the output of any Real-Time Emergency Generation Assets is greater than its adjusted Demand Response Baseline.

8.3 Treatment of Net Supply

If the metered amount measured at the retail delivery point reflects net energy supply during intervals in which Real-Time Demand Response Assets and/or Real-Time Emergency Generation Assets behind the retail delivery point had positive Real-Time demand reductions, then the amount of net energy supplied in an interval with a positive Real-Time demand reduction shall be subtracted from the Real-Time demand reduction amount in the same interval of each Real-Time Demand Response Asset and/or Real-Time Emergency Generation Asset behind that retail delivery point on a pro rata basis. The adjustment for net energy supply shall not result in a negative Real-Time demand reduction amount.

8.4 Real-Time Demand Reduction Obligations

The Real-Time Demand Reduction Obligation of a Real-Time Demand Response Asset is equal to its Real-Time demand reduction amount adjusted for net supply (limited to 200% of the associated Demand Reduction Offer amount) multiplied by one plus the percent average avoided peak distribution losses.

9. Settlement

9.1 Day-Ahead Settlement

A Market Participant with a Real-Time Demand Response Asset will be paid for its Day-Ahead Demand Reduction Obligation multiplied by the Day-Ahead LMP for the Load Zone within which the Real-Time Demand Response Asset is located.
9.2 Real-Time Settlement

9.2.1. Real-Time Demand Response Assets with Cleared Demand Reduction Offers

A Market Participant with a Real-Time Demand Response Asset will be paid or charged for the difference between its Real-Time Demand Reduction Obligation and its Day-Ahead Demand Reduction Obligation multiplied by the final hourly Real-Time LMP for the Load Zone within which the Real-Time Demand Response Asset is located. The payment for the amount by which the Real-Time Demand Reduction Obligation exceeds the Day-Ahead Demand Reduction Obligation in an hour shall be set to zero if the provisional Real-Time LMP for that hour is less than the Demand Reduction Threshold Price.

A Market Participant will not be charged for the difference between its Real-Time Demand Reduction Obligation and its Day-Ahead Demand Reduction Obligation for which a demand reduction request is denied pursuant to Section III.E1.5.1.

9.2.2. Real-Time Demand Response Assets without Cleared Demand Reduction Offers

If the Demand Reduction Offer price (not including the curtailment initiation price) is less than or equal to the provisional hourly Real-Time LMP published in the Operating Day for the Load Zone in which the Real-Time Demand Response Asset is located, the Market Participant will be paid the final hourly Real-Time LMP multiplied by its Real-Time Demand Reduction Obligation.

A Market Participant will not be charged pursuant to Section III.E1.9.2.2 if:

(a) a Demand Reduction Offer does not clear Day-Ahead pursuant to Section III.E1.4, and;
(b) the Real-Time Demand Response Asset produces a negative Real-Time demand reduction amount.

A Market Participant will not be paid for a Real-Time Demand Reduction Obligation for which a demand reduction request is denied pursuant to Section III.E1.5.1.

9.3 Cost Allocation

Payments and charges pursuant to this section will be allocated on an hourly basis proportionally to Market Participants with Real-Time Load Obligation, excluding Real-Time Load Obligation incurred at
all External Nodes or incurred by Dispatchable Asset Related Demand Postured by the ISO, on a system-wide basis.

10. Average Distribution Losses

For purposes of Section III.E1, the percent average avoided peak distribution losses shall be the percent average avoided peak transmission and distribution losses used for the associated Capacity Commitment Period in the Forward Capacity Market less the percent average avoided peak transmission system losses.
SECTION III

MARKET RULE 1

APPENDIX E2

DEMAND RESPONSE

Appendix E2 applies to Capacity Commitment Periods commencing on or after June 1, 2017.
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DEMAND RESPONSE

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APPENDIX E2
DEMAND RESPONSE

Appendix E2 applies to Capacity Commitment Periods commencing on or after June 1, 2017.

1. Demand Response Registration

1.1 Demand Response Resource Registration

A Market Participant may register a Demand Response Resource for purposes of submitting Demand Reduction Offers on a Day-Ahead and Real-Time basis and providing Operating Reserve subject to the following conditions:

(a) each Demand Response Resource must be a single Demand Response Asset or an aggregation of Demand Response Assets located within the same Dispatch Zone and Reserve Zone;
(b) each Demand Response Resource must be able to produce at least 100 kW of demand reduction;
(c) the Market Participant must comply with ISO required auditing and testing requirements; and
(d) the MarketParticipant must indicate whether it intends to maintain CLAIM10 or CLAIM30 capability for the Demand Response Resource.

A Market Participant may not register a Real-Time Emergency Generation Resource, an On-Peak Demand Resource, a Seasonal Peak Demand Resource or a Dispatchable Asset Related Demand to participate as a Demand Response Resource in the Day-Ahead Energy Market or Real-Time Energy Market. A Market Participant may not register a Generator Asset as a Demand Response Asset for the purpose of submitting Demand Reduction Offers. A Market Participant may not register a Demand Response Asset at the same Retail Delivery Point as an existing Generator Asset, and may not register a Generator Asset at the same Retail Delivery Point as an existing Demand Response Asset; provided that this provision shall not apply if the Generator Asset is separately metered and its output is added to the metered load as measured at the Retail Delivery Point.

1.2 Demand Response Capacity Resource Registration

A Market Participant may register a Demand Response Capacity Resource subject to the following conditions:
(a) each Demand Response Capacity Resource must have mapped to it at least one Demand Response Resource within the same Dispatch Zone in order to comply with the energy market offer requirements in Section III.13.6.1.5; and

(b) a Demand Response Resource cannot be mapped to a Demand Response Capacity Resource, or maintain the mapping to a Demand Response Capacity Resource, if the Demand Response Resource violates the mapping provisions in Section III.E2.1.4(c).

1.3 Demand Response Asset Registration

A Market Participant may register a Demand Response Asset subject to the following conditions:

(a) Unless it meets the conditions for aggregation in sub-section (b) below, a Demand Response Asset must have a defined, single Retail Delivery Point and be registered at a single Node.

(b) A Demand Response Asset may be the aggregate demand reduction capability of multiple end-use customers from multiple delivery points within a single Dispatch Zone and Reserve Zone if (i) the demand reduction from each Retail Delivery Point in the aggregation is less than 10 kW, and (ii) the demand at the multiple Retail Delivery Points satisfy the criteria for a homogenous population. A Demand Response Asset that meets these conditions for aggregation must be registered at a single Dispatch Zone and Reserve Zone rather than at a single Node.

(c) No more than one Demand Response Asset may be located at a single Retail Delivery Point.

(d) Each Demand Response Asset must be mapped to a Demand Response Resource.

(e) Each Demand Response Asset must be able to produce at least 10 kW of demand reduction.

(f) A Demand Response Asset with a registered Maximum Interruptible Capacity equal to or greater than 5 MW from the same Retail Delivery Point must be registered as a single Demand Response Resource at a Node. The evaluation of whether a Demand Response Asset’s Maximum Interruptible Capacity is equal to or greater than 5 MW shall account for the most recent seasonal audit results for the assets.

(g) The metering and communication equipment associated with each Demand Response Asset must meet the requirements in Section III.E2.2.
During the registration process, Market Participants must submit the following for each Demand Response Asset:

(a) Maximum Interruptible Capacity;
(b) Maximum Load;
(c) Maximum Generation, for Demand Response Assets that are comprised of Distributed Generation;
(d) For a Demand Response Asset capable of producing Net Supply, the Maximum Net Supply permitted under the asset’s interconnection agreement; and
(e) Retail account number and meter number for the end-use customer.

1.4 Restrictions on Demand Response Resource Registration

A Market Participant may not register and must retire if previously registered a Demand Response Resource that is comprised of:

(a) the customers of Host Utilities that distributed more than 4 million MWh in the previous fiscal year, if the relevant electric retail regulatory authority prohibits such customers’ demand response to be bid into the ISO-administered markets or programs, or;
(b) the customers of Host Utilities that distributed 4 million MWh or less in the previous fiscal year, unless the relevant electric retail regulatory authority permits such customers’ demand response to be bid into the ISO-administered markets or programs.
(c) The Maximum Interruptible Capacity adjusted for the Audited Demand Reduction of each Demand Response Resource registered by a Market Participant within a single Dispatch Zone and Reserve Zone must be at least 1 MW before the Market Participant registers a new Demand Response Resource within that same Dispatch Zone and Reserve Zone. This restriction shall not apply if either:
   (i) all Demand Response Assets registered by the Market Participant in the Dispatch Zone and Reserve Zone are mapped to a Demand Response Resource mapped to a Demand Response Capacity Resource and the Market Participant wants to register a Demand Response Resource that is not mapped to a Demand Response Capacity Resource; or
   (ii) all Demand Response Assets registered by the Market Participant in the Dispatch Zone and Reserve Zone are mapped to a Demand Response Resource not mapped to a Demand Response Capacity Resource and the Market Participant wants to register a Demand Response Resource that is mapped to a Demand Response Capacity Resource.
(d) In the event the Audited Demand Reductions of two or more Demand Response Resources registered by a Market Participant within a single Dispatch Zone and Reserve Zone are less than 1 MW following an audit, Demand Response Asset mapping for that Market Participant shall be adjusted if doing so decreases the number of Demand Response Resources within that Dispatch Zone and Reserve Zone.

1.5 Restrictions on Demand Response Asset Mapping

Demand Response Assets may be un-mapped from a Demand Response Resource for re-mapping to another Demand Response Resource, or un-mapped without re-mapping, subject to the following conditions:

(a) A Demand Response Asset cannot be unmapped from a Demand Response Resource that is mapped to a Demand Response Capacity Resource if, following the un-mapping, the sum of the demand reductions of the remaining Demand Response Assets that are associated with the Demand Response Capacity Resource, as reflected in the most recent seasonal audit for that resource, would be lower than the resource’s highest Capacity Supply Obligation acquired for the current Capacity Commitment Period or any future Capacity Commitment Period.

(b) When a Demand Response Asset can be mapped to more than one Demand Response Resource that is mapped to a Demand Response Capacity Resource, a Demand Response Asset shall be mapped to a Demand Response Resource associated with a Demand Response Capacity Resource whose demand reduction capability is less than the lower of (i) its commercial capacity, as reflected in the resource’s highest audit value or (ii) its highest Capacity Supply Obligation acquired for the current Capacity Commitment Period or any future Capacity Commitment Period before being mapped to a Demand Response Resource associated with a non-commercial Demand Response Capacity Resource or non-commercial increment of a Demand Response Capacity Resource.

(c) A Demand Response Asset may be re-mapped to another Demand Response Resource only if the Audited Full Reduction Time of the asset’s new Demand Response Resource, adjusted for the Audited Demand Reduction of the asset’s current Demand Response Resource, is equal to or greater than the Audited Full Reduction Time of the Demand Response Resource from which the Demand Response Asset is being un-mapped.

(d) If a Demand Response Asset is re-mapped to a Demand Response Resource, and the Audited Full Reduction Time of the Demand Response Resource to which the asset is being mapped, adjusted for the Audited Demand Reduction of the Demand Response Resource from which
the asset is being mapped, is less than the Audited Full Reduction Time of the Demand Response Resource from which the asset is being mapped, the Demand Response Asset audit value will be set to zero.

2. Metering and Communication

2.1 Revenue Quality Interval Metering

The metered demand used for settlement purposes of each individual end-use customer facility that comprises a Demand Response Asset must be measured using interval meters located at the individual end-use customer’s Retail Delivery Point and shall be reported to the ISO at an interval of five minutes. Metered demand data submitted to the ISO shall not include average avoided peak distribution losses.

The interval meters required pursuant to Section III.E2.2.1 must meet the following requirements:

(a) The interval meter must record and report meter data to the ISO in Real-Time at an interval of five-minutes;

(b) The interval meter can be the same revenue-quality meter used by the distribution company for billing purposes; and

(c) If the interval meter is not the same revenue-quality meter used by the distribution company for billing purposes, the Market Participant must validate and provide documentation to the ISO that the difference between the values recorded by the Market Participant’s meter in each interval and the value recorded by the distribution company’s billing meter in the same interval is within ± 2.0%; provided that, if accurate interval data from the distribution company are not available, the Market Participant shall validate that the difference between the sum of the values recorded by the Market Participant’s meter and the sum of the values recorded by the distribution company’s billing meter over the same time period is within ± 2.0%; and further provided that the Market Participant specifies the meter manufacturer and model, and the accuracy for the following parameters:

i. current measurement;
ii. voltage measurement;
iii. A/D conversion; and
iv. calibration.
The Market Participant shall provide documentation to the ISO of any inaccuracies found in distribution company meter data and of any communications with the distribution company to address the meter data inaccuracies.

2.2 Communication/Telemetry

Market Participants must report in Real-Time to the ISO a single set of telemetry data for each individual end-use customer facility that comprises a Demand Response Asset associated with a Demand Response Resource. The telemetry values shall measure the real-time demand of the Demand Response Asset as measured at the Retail Delivery Point, and shall be reported to the ISO every five minutes. For a Demand Response Resource to provide Ten Minute Spinning Reserve or Ten Minute Non-Spinning Reserve, Market Participants must in addition report telemetry values at least every one minute. Telemetry values reported by Market Participants to the ISO shall be in MW units and shall be an instantaneous power measurement or an average power value derived from an energy measurement for the time interval from which the energy measurement was taken.

The Market Participant must utilize a remote terminal unit for communicating telemetry and receiving Dispatch Instructions.

If one or more generators whose output can be controlled is located behind the Retail Delivery Point of a Demand Response Asset, other than emergency generators that cannot operate electrically synchronized to the New England Transmission System, then the Market Participant must also report to the ISO, before the end of the Correction Limit for the Data Reconciliation Process, a single set of telemetry data, at an interval of five minutes, representing the combined output of all generators whose output can be controlled.

The telemetry measurement device used to measure the real-time demand and any Net Supply pursuant to Section III.E2.2.2 must have an overall accuracy of $\pm 2.0\%$. If the Market Participant is not using the meter used by the distribution company for billing purposes to obtain the real-time telemetry, then the Market Participant must specify the device manufacturer and model, and submit certification from the measurement device manufacturer that the device being used meets the $\pm 2.0\%$ accuracy threshold, and shall specify the accuracy for the following parameters:

i. current measurement;
ii. voltage measurement;
iii. A/D conversion; and
iv. calibration.

2.3 Testing of Meters and Telemetry Measurement Devices

All interval meters and telemetry measurement devices must be periodically tested and calibrated.

Market Participants must conduct periodic meter and telemetry data validation checks.

Market Participants must repair or replace meters or telemetry measurement devices that are found to be inaccurate pursuant to periodic testing and data validation checks.

Market Participants must perform an annual independent certification of the accuracy and precision of the meters, telemetry measurement devices, and data communication systems.

2.4 Auditing

The ISO may, for Demand Response Resources, review and audit testing and calibration records, audit facility performance (including review of facility equipment), order and witness the testing of metering and telemetry measurement equipment, and witness the demand reduction activities of any facility or generator associated with a Demand Response Asset.

Market Participants must make retail billing meter data and any interval meter data from the Host Participant for the facilities associated with a Demand Response Asset available to the ISO upon request.

Market Participants are responsible for all expenses associated with installing, maintaining, calibrating, testing and certifying the metering, data recording and telemetry measurement equipment of Demand Response Assets.

3. Day-Ahead Energy Market Demand Reduction Offers

Market Participants must submit a Demand Reduction Offer for each Demand Response Resource that meets the requirements of this section in order to be eligible for a payment for a demand reduction.

The Market Participant’s Demand Reduction Offer for a Demand Response Resource must satisfy the following conditions:
(a) Demand Reduction Offers must be submitted by the offer submission deadline for the Day-Ahead Energy Market of the day before the applicable Operating Day.

(b) The Market Participant can submit up to 10 monotonically increasing price/demand reduction amount pairs for each Operating Day. The demand reduction amount shall not include an adjustment for average avoided peak transmission and distribution losses.

(c) The minimum amount for each price/demand reduction amount pair of a Demand Reduction Offer is 100 kW.

(d) The sum of all price/demand reduction amount pairs for a Demand Reduction Offer cannot exceed the sum of the Maximum Interruptible Capacities of the resource’s Demand Response Assets.

(e) The minimum Demand Reduction Offer price must be equal to or greater than the Demand Reduction Threshold Price in effect for the day the Demand Reduction Offer is submitted.

(f) The maximum Demand Reduction Offer price must be less than or equal to the Energy Offer Cap.

Market Participants may not Self-Schedule interruptions in the Day-Ahead Energy Market.

3.1 Required Demand Reduction Offer Parameters

The Market Participant shall provide the following hourly values in its Demand Reduction Offer. The Market Participant shall maintain up-to-date values for each of these parameters prior to and throughout the Operating Day:

(a) Available or Unavailable;

(b) Minimum Reduction (MW), and;

(c) Maximum Reduction (MW).

3.2 Optional Demand Reduction Offer Parameters

The Market Participant may also specify the following in its Demand Reduction Offer:

(a) Interruption Cost ($)
4. Real-Time Energy Market Demand Reduction Offers

During the Re-Offer Period, Market Participants may submit revisions to the price or demand reduction amount parameters of a Demand Reduction Offer. Demand Response Resources scheduled subsequent to the closing of the Re-Offer Period shall be settled at the applicable Real-Time Prices.

Revisions to Demand Reduction Offers during the Re-Offer Period are subject to the following conditions that apply to Day-Ahead Demand Reduction Offers under Section III.E2.3: limitation to 10 monotonically increasing price/demand reduction amount pairs, minimum amount, maximum amount, minimum price and maximum price.

A Demand Reduction Offer shall continue to apply in Real-Time during the Operating Day even if the Demand Reduction Offer is not scheduled Day-Ahead for that Operating Day pursuant to Section III.E2.5 or modified during the Re-Offer Period.

No changes will be allowed to the Demand Reduction Offer after the close of the Re-Offer Period. Market Participants may not Self-Schedule interruptions in the Real-Time Energy Market.

5. Scheduling and Dispatching

The ISO shall schedule in the Day-Ahead Energy Market and schedule and dispatch in the Real-Time Energy Market the Demand Response Resource as specified in Section III.1.7.6(a).

At the conclusion of the Day-Ahead Energy Market clearing, the ISO will provide Market Participants with Day-Ahead demand reduction schedules for Demand Response Resources reflecting demand
reduction amounts that do not include average avoided peak transmission and distribution losses for each hour of the following Operating Day.

During the Operating Day, the ISO will issue Dispatch Instructions to the Market Participant specifying the expected demand reduction amount that does not include average avoided peak transmission and distribution losses from their Demand Response Resource and the Dispatch Rate.

A Market Participant must notify the ISO, as soon as practicable, of a facility or generator shutdown or equipment outage (including partial outages) that reduces the Demand Response Resource’s ability to achieve the demand reduction reflected in the Demand Reduction Offer for an Operating Day.

6. Determination of the Demand Reduction Threshold Price

The Demand Reduction Threshold Price for each month shall be determined through an analysis of a smoothed supply curve for the month. The smoothed supply curve shall be derived from real-time generator and import offer data for the same month of the previous year. The ISO may adjust the offer data to account for significant changes in generator and import availability or other significant changes to the historic supply curve. The historic supply curve shall be calculated as follows:

(a) Each generator and import offer block (i.e., each price-quantity pair offered in the Real-Time Energy Market) for each day of the month shall be compiled and sorted in ascending order of price to create an unsmoothed supply curve.

(b) An unsmoothed supply curve for the month shall be formed from the price and cumulative quantity of each offer block.

(c) A non-linear regression shall be performed on a sampled portion of the unsmoothed supply curve to produce an increasing, convex, smooth approximation of the supply curve.

(d) A historic threshold price $P_{th}$ shall be determined as the point on the smoothed supply curve beyond which the benefit to load from the reduced LMP resulting from demand response exceeds the cost to load associated with compensating demand response.

(e) The Demand Reduction Threshold Price for the upcoming month shall be determined by the following formula:
\[
DRTP = P_{th} \frac{FPI_c}{FPI_h}
\]

where \( FPI_h \) is the historic fuel price index for the same month of the previous year, and \( FPI_c \) is the fuel price index for the current month.

The historic and current fuel price indices used to establish the Demand Reduction Threshold Price for a month shall be based on the lesser of the monthly natural gas or heating oil fuel indices applicable to the New England Control Area, as calculated three business days before the start of the month preceding the Demand Reduction Threshold Price’s effective date.

The ISO will post the resulting Demand Reduction Threshold Price, along with the index-based fuel price values used in establishing the Demand Reduction Threshold Price, on its website by the 15th day of the preceding month in advance of the Demand Reduction Threshold Price’s effective date.

The Demand Reduction Threshold Price shall apply to all Demand Reduction Offers associated with Demand Response Resources located anywhere within the New England Control Area.

### 7. Real-Time Demand Reduction Obligation

A Demand Response Resource’s Real-Time Demand Reduction Obligation will be calculated for each dispatch interval in which the Demand Response Resource receives a Dispatch Instruction to reduce demand.

#### 7.1 Real-Time Demand Reductions

The Real-Time demand reduction in a dispatch interval is the difference between the adjusted Demand Response Baseline, further adjusted for any metered output for a Real-Time Emergency Generation Asset located at the same Retail Delivery Point, and the metered demand for each Demand Response Asset associated with the Demand Response Resource.

If a Market Participant receives a Dispatch Instruction for a Demand Response Resource to reduce demand in a dispatch interval by zero MW, then in calculating the Real-Time Demand Reduction Obligation of the Demand Response Resource the Real-Time demand reductions of the Demand Response Assets comprising the resource shall be equal to zero for that dispatch interval.
7.2 **Real-Time Demand Reduction Obligations**

The Real-Time Demand Reduction Obligation of a Demand Response Resource is the sum of the hourly integrated Real-Time demand reduction amounts of the Demand Response Assets comprising the Demand Response Resource, multiplied by one plus the percent average avoided peak distribution losses, except that any Net Supply produced by the Demand Response Assets comprising the Demand Response Resource will not be adjusted by average avoided peak distribution losses.

If a Market Participant fails to comply with the metering and communication requirements in Section III.E2.2 for a Demand Response Resource for any period of time, then the Real-Time Demand Reduction Obligation shall be zero for that period of time.

8. **Demand Response Resource Baseline**

A Market Participant must establish a Demand Response Baseline pursuant to Section III.8B prior to submitting a Demand Reduction Offer for a Demand Response Resource, and must comply with the requirements for maintaining and resetting the Demand Response Baseline as set forth in Section III.8B.

A Market Participant shall not take actions to create or maintain a Demand Response Baseline that exceeds the expected electricity consumption levels of its end-use metered customers in the absence of demand reduction payments.

9. **Energy Market Settlement**

9.1 **Day-Ahead Settlement**

A Market Participant with a Demand Response Resource will be paid for its Day-Ahead Demand Reduction Obligation multiplied by the Day-Ahead LMP for the Dispatch Zone or Node at which the resource is registered.

9.2 **Real-Time Settlement**

A Market Participant with a Demand Response Resource will be paid or charged for the difference between its Real-Time Demand Reduction Obligation and its Day-Ahead Demand Reduction Obligation multiplied by the hourly Real-Time LMP for the Dispatch Zone or Node at which the resource is registered.
9.3 Cost Allocation

Charges or payments resulting from Real-Time demand reductions produced by Demand Response Resources or Real-Time Emergency Generation Resources shall be allocated on an hourly basis proportionally to Real-Time Load Obligation, excluding the Real-Time Load Obligation incurred at all External Nodes, and excluding Real-Time Load Obligation incurred by Dispatchable Asset Related Demand Postured by the ISO, on a system-wide basis.

9.4 NCPC Credits and Charges

A Market Participant with a Demand Response Resource is eligible for NCPC credits if the resource is following Dispatch Instructions. A Market Participant with a Demand Response Resource is ineligible for NCPC credits and may be assessed NCPC charges if the resource is not operating within the acceptable dispatch tolerance. A resource is not operating within the acceptable dispatch tolerance if in any five-minute interval for an hour the resource is not operating within 10% above or below the resource’s Dispatch Instruction, except that a Market Participant with a resource that is not operating within the acceptable dispatch tolerance will not be assessed NCPC charges if during the entire hour the resource operates within 5% above or below the resource’s Dispatch Instruction.

10. Average Avoided Peak Distribution Losses

For purposes of Section III.E2, the percent average avoided peak distribution losses shall be the percent average avoided peak transmission and distribution losses used for the associated Capacity Commitment Period in the Forward Capacity Market less the percent average avoided peak transmission system losses.