ISO/RTO Council

# North American Wholesale Electricity Demand Response Program Comparison

**This document contains summary information for wholesale electricity demand response programs, products and services administered by the ISOs and RTOs in North America, and provides a high-level overview of more in-depth rules and procedures. In no case should this information be used in place of the official documentation. Additionally, Demand Response markets – as well as market rules, tariffs, manuals and protocols – are continually evolving and subject to change. Therefore readers should be aware that the information contained in this document may be out of date.**

| *ISO/RTO Product / Service* | | | | *Product / Service Features* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Minimum Size** | **Aggregation Allowed** | **Participa-tion** | **Response Required** | **Primary Driver** | **Trigger Logic** | **Deployment "Overuse" Restriction** | **"Peak" Hours Only** | **Deployment Instruction Source** | **Deployment Instruction Destination** | **Demand Resource Availability Measurement** | **Transparency of Requirements (Demonstrated through ISO/RTO Web Link)** |
| **AESO** | | | | | | | | | | | | | | | |
| **AESO** | **DOS** | **Demand Opportunity Service** | **Energy** | None | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.aeso.ca/downloads/OPP_Contents.pdf* |
| **AESO** | **FLSS** | **Frequency Load Shed Service** | **Regulation** | None | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Distribution company rotates the load and frequency blocks after each use | No | None | None | Telemetry | *http://www.aeso.ca/downloads/OPP_Contents.pdf* |
| **AESO** | **SUP** | **Supplemental Operating Reserves** | **Reserve** | 5 MW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.aeso.ca/downloads/OPP_Contents.pdf* |
| **AESO** | **VLCP** | **Voluntary Load Curtailment Program** | **Energy** | None | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.aeso.ca/downloads/OPP_Contents.pdf* |
| **CAISO** | | | | | | | | | | | | | | | |
| **CAISO** | **PLP** | **Participating Load Program** | **Energy** | 100 kW | Yes | Voluntary | Mandatory | Economic | Energy Price > Offer Price | Biddable Participation + Max Number of Startups | No | System Operator | Scheduling Coordinator | Not Monitored | *http://www.caiso.com/docs/2005/10/05/2005100520280423155.html* |
| **CAISO** | **PLP** | **Participating Load Program** | **Reserve** | 100 kW | Yes | Voluntary | Mandatory | Economic | Capacity Bid and separate Energy Bid > Offer Price | Biddable Participation + Max Number of Startups | No | System Operator | Scheduling Coordinator | Telemetry | *http://www.caiso.com/docs/2005/10/05/2005100520280423155.html* |
| **ERCOT** | | | | | | | | | | | | | | | |
| **ERCOT** | **EILS** | **Emergency Interruptible Load Service** | **Capacity** | 1 MW [Bid Size] | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | 2x Deployments or 8 Hours per Contract Period (4-Months) | No | System Operator | Qualified Scheduling Entity (QSE) | Calculated after the Commitment Period | *http://www.ercot.com/services/programs/load/eils/* |
| **ERCOT** | **LaaR / RRS / UFR** | **Loads Acting as a Resource providing Responsive Reserve Service -- Under Frequency Relay Type** | **Reserve** | 1 MW [Bid Size] | Portfolio-Based Bidding | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Qualified Scheduling Entity (QSE) | Telemetry | *http://www.ercot.com/services/programs/load/* |
| **ERCOT** | **LaaR / RRS / CLR** | **Loads Acting as a Resource providing Responsive Reserve Service -- Controllable Load Resource Type** | **Reserve** | 1 MW [Bid Size] | Portfolio-Based Bidding | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Qualified Scheduling Entity (QSE) | Telemetry | *http://www.ercot.com/services/programs/load/* |
| **ERCOT** | **LaaR / NSRS /** | **Loads Acting as a Resource providing Non-Spinning Reserve Service** | **Reserve** | 1 MW [Bid Size] | Portfolio-Based Bidding | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Qualified Scheduling Entity (QSE) | Telemetry | *http://www.ercot.com/services/programs/load/* |
| **ERCOT** | **CLR** | **Controllable Load Resources providing Regulation Service** | **Regulation** | 1 MW [Bid Size] | Portfolio-Based Bidding | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Qualified Scheduling Entity (QSE) | Telemetry | *http://www.ercot.com/services/programs/load/* |

| *ISO/RTO Product / Service* | | | | *Product / Service Features* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Minimum Size** | **Aggregation Allowed** | **Participa-tion** | **Response Required** | **Primary Driver** | **Trigger Logic** | **Deployment "Overuse" Restriction** | **"Peak" Hours Only** | **Deployment Instruction Source** | **Deployment Instruction Destination** | **Demand Resource Availability Measurement** | **Transparency of Requirements (Demonstrated through ISO/RTO Web Link)** |
| **IESO** | | | | | | | | | | | | | | | |
| **IESO** | **ELRP** | **Emergency Load Reduction Program** | **Energy** | 1 MW | Yes | Voluntary | Voluntary | Reliability | Operational Procedure | None | No | System Operator | Market Participant | Calculated after the Commitment Period | *http://www.ieso.ca/imoweb/marketsAndPrograms/markets_programs.asp* |
| **IESO** | **EDRP** | **Emergency Demand Response Program** | **Energy** | 1 MW | No | Voluntary | Voluntary | Reliability | Operational Procedure | None | No | System Operator | Market Participant | Telemetry | *http://www.ieso.ca/imoweb/marketsAndPrograms/markets_programs.asp* |
| **IESO** | **DL** | **Dispatchable Load** | **Energy** | 1 MW | No | Voluntary | Mandatory | Economic | Energy Price > Bid Price | None | No | System Operator | Market Participant | Telemetry | *http://www.ieso.ca/imoweb/marketsAndPrograms/markets_programs.asp* |
| **IESO** | **DL** | **Dispatchable Load (30 minute reserve)** | **Reserve** | 1 MW | No | Voluntary | Mandatory | Reliability | Energy Price > Offer Price | None | No | System Operator | Market Participant | Telemetry | *http://www.ieso.ca/imoweb/marketsAndPrograms/markets_programs.asp* |
| **IESO** | **DL** | **Dispatchable Load (10 Spinning / 10 Non-Spinning Component)** | **Reserve** | 1 MW | No | Voluntary | Mandatory | Reliability | Energy Price > Offer Price | None | No | System Operator | Market Participant | Telemetry | *http://www.ieso.ca/imoweb/marketsAndPrograms/markets_programs.asp* |
| **ISO-NE** | | | | | | | | | | | | | | | |
| **ISO-NE** | **RTDRP** | **Real Time Demand Response Program [Capacity Component]** | **Capacity** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | None | No | System Operator | Demand Designated Entities | Telemetry | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **RTDRP** | **Real Time Demand Response Program [Energy Component]** | **Energy** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | None | No | System Operator | Demand Designated Entities | Not Monitored | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **DALRP-RTDR** | **Day-Ahead Load Response Program for RTDRP** | **Energy** | 100 kW | Yes | Voluntary | Mandatory | Economic | Day-Ahead LMP = or > Offer Price | None | Yes | System Operator | Demand Designated Entities | Not Monitored | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **DALRP- RTPR** | **Day-Ahead Load Response Program for RTPR** | **Energy** | 100 kW | Yes | Voluntary | Mandatory | Economic | Day-Ahead LMP = or > Offer Price | None | Yes | System Operator | Demand Designated Entities | Not Monitored | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **DRR** | **Demand Response Reserves Pilot** | **Reserve** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Resources in the DRR Pilot are activated to simulate Reserve Activation Events at a frequency similar to the activation of traditional generation resources providing 30-minute Operating Reserves and 10-minute non-synchronized reserves. | None | No | System Operator | Demand Designated Entities | Telemetry | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **RTPR** | **Real Time Price Response Program** | **Energy** | 100 kW | Yes | Voluntary | Voluntary | Economic | Day-Ahead or Forecast Real-Time LMP = or > $100/MWh | None | Yes | System Operator | Demand Designated Entities | Not Monitored | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **RTDR** | **Real Time Demand Response Resource** | **Capacity** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Critical Peak Hours: OP4 Action 6 or higher and Forecast Peak Hours whenever Day-Ahead Forecast = or > 95% of 50/50 Seasonal Peak forecast for the applicable season | None | No | System Operator | Demand Designated Entities | Telemetry | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **OP and SP** | **FCM: On-Peak, Seasonal Peak Resources** | **Capacity** | 100 kW | Yes | Voluntary | Mandatory | Reliability | On-Peak (hours ending 1800-1900 winter season, 1400-1700 summer season) Seasonal Peak (real time hourly load is =/> 90% of 50/50 system peak load forecast for the applicable season, Critical Peak Hours: OP4 Action 6 or higher and Forecast Peak Hours when | None | Yes | None | None | Not Monitored | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |
| **ISO-NE** | **RTEG** | **Real Time Emergency Generation Resource** | **Capacity** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | None | No | System Operator | Demand Designated Entities | Telemetry | *http://www.iso-ne.com/rules_proceds/isone_mnls/index.html* |

| *ISO/RTO Product / Service* | | | | *Product / Service Features* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Minimum Size** | **Aggregation Allowed** | **Participa-tion** | **Response Required** | **Primary Driver** | **Trigger Logic** | **Deployment "Overuse" Restriction** | **"Peak" Hours Only** | **Deployment Instruction Source** | **Deployment Instruction Destination** | **Demand Resource Availability Measurement** | **Transparency of Requirements (Demonstrated through ISO/RTO Web Link)** |
| **MISO** | | | | | | | | | | | | | | | |
| **MISO** | **EDR** | **Emergency Demand Response** | **Energy** | 100 kW | yes | Voluntary | Voluntary | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Market Participant | Daily Update | *http://www.midwestmarket.org/publish/Folder/1e1401_118199304fa_-78d10a48324a* |
| **MISO** | **DRR-I** | **Demand Response Resource Type I** | **Energy** | 1 MW | yes | Voluntary | Voluntary | Economic | Energy Price > Offer Price | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.midwestmarket.org/publish/Document/279a04_11db4d152b9_-7efc0a48324a?rev=4* |
| **MISO** | **DRR-I** | **Demand Response Resource Type-I** | **Reserve** | 1 MW | Yes | Voluntary | Mandatory | Reliability | Energy Price > Offer Price | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.midwestmarket.org/publish/Document/279a04_11db4d152b9_-7efc0a48324a?rev=4* |
| **MISO** | **DRR-II** | **Demand Response Resource Type II** | **Energy** | 1 MW | No | Voluntary | Voluntary | Economic | Energy Price > Offer Price | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.midwestmarket.org/publish/Document/279a04_11db4d152b9_-7efc0a48324a?rev=4* |
| **MISO** | **DRR-II** | **Demand Response Resource Type-II** | **Reserve** | 1 MW | No | Voluntary | Mandatory | Reliability | Energy Price > Offer Price | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.midwestmarket.org/publish/Document/279a04_11db4d152b9_-7efc0a48324a?rev=4* |
| **MISO** | **DRR-II** | **Demand Response Resource Type-II** | **Regulation** | 1 MW | No | Voluntary | Mandatory | Reliability | Energy Price > Offer Price | Biddable Daily Participation | No | System Operator | Market Participant | Telemetry | *http://www.midwestmarket.org/publish/Document/279a04_11db4d152b9_-7efc0a48324a?rev=4* |
| **MISO** | **LMR** | **Load Modifying Resource** | **Capacity** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Minimum use 5x | No | System Operator | Local Balancing Authority (LBA) | Daily Update | *http://www.midwestmarket.org/publish/Document/2c41ee_1200f54a695_-7ff30a48324a* |
| **NYISO** | | | | | | | | | | | | | | | |
| **NYISO** | **DADRP** | **Day-Ahead Demand Response Program** | **Energy** | 1 MW | Yes | Voluntary | Mandatory | Economic | Energy Price > Offer Price (Security Constrained Unit Commitment) | None | No | System Operator | Demand Resource | Not Monitored | *http://www.nyiso.com/public/products/demand_response/day_ahead.jsp* |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Reserve** | 1 MW | No | Voluntary | Mandatory | Economic | Energy Price > Offer Price (Security Constrained Economic Dispatch) | None | No | System Operator | Demand Resource | Telemetry | *http://www.nyiso.com/public/products/demand_response/dsasp.jsp* |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Reserve** | 1 MW | No | Voluntary | Mandatory | Economic | Energy Price > Offer Price (Security Constrained Economic Dispatch) | None | No | System Operator | Demand Resource | Telemetry | *http://www.nyiso.com/public/products/demand_response/dsasp.jsp* |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Regulation** | 1 MW | No | Voluntary | Mandatory | Economic | Energy Price > Offer Price (Security Constrained Economic Dispatch) | None | No | System Operator | Demand Resource | Telemetry | *http://www.nyiso.com/public/products/demand_response/dsasp.jsp* |
| **NYISO** | **EDRP** | **Emergency Demand Response Program** | **Energy** | 100 kW (per Zone) | Yes | Voluntary | Voluntary | Reliability | Operational Procedure | None | No | System Operator | Curtailment Service Provider (CSP) | Not Monitored | *http://www.nyiso.com/public/products/demand_response/edrp.jsp* |

| *ISO/RTO Product / Service* | | | | *Product / Service Features* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Minimum Size** | **Aggregation Allowed** | **Participa-tion** | **Response Required** | **Primary Driver** | **Trigger Logic** | **Deployment "Overuse" Restriction** | **"Peak" Hours Only** | **Deployment Instruction Source** | **Deployment Instruction Destination** | **Demand Resource Availability Measurement** | **Transparency of Requirements (Demonstrated through ISO/RTO Web Link)** |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Energy Component)** | **Energy** | 100 kW (per Zone) | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | None | No | System Operator | Responsible Interface Party (RIP) | Not Monitored | *http://www.nyiso.com/public/products/demand_response/scr_icap.jsp* |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Capacity Component)** | **Capacity** | 100 kW (per Zone) | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | None | No | System Operator | Responsible Interface Party (RIP) | Not Monitored | *http://www.nyiso.com/public/products/demand_response/scr_icap.jsp* |
| **PJM** | | | | | | | | | | | | | | | |
| **PJM** | **Economic** | **Economic Load Response** | **Energy** | 100 kW | Yes | Voluntary | Voluntary | Economic | Self-Scheduled, Cleared Day-Ahead Bid, or Real-Time Dispatch | Biddable Daily Participation | No | System Operator [Unless Self Deployment] | Curtailment Service Provider (CSP) | Not Monitored | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | 1 MW [0.5 MW proposed] | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Curtailment Service Provider (CSP) | Not Monitored | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | 1 MW [0.5 MW proposed] | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Curtailment Service Provider (CSP) | Not Monitored | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **PJM** | **Economic** | **Economic Load Response** | **Regulation** | 1 MW | No | Voluntary | Mandatory | Reliability | Operational Procedure | Biddable Daily Participation | No | System Operator | Curtailment Service Provider (CSP) | Telemetry | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **PJM** | **Emergency (Energy Only)** | **Emergency Load Response - Energy Only** | **Energy** | 100 kW | Yes | Voluntary | Voluntary | Reliability | Operational Procedure | None | No | System Operator | Curtailment Service Provider (CSP) | Not Monitored | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **PJM** | **Emergency** | **Full Emergency Load Response (Capacity Component)** | **Capacity** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | 6 Hours (Maximum) | Yes | System Operator | Curtailment Service Provider (CSP) | Not Monitored | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **PJM** | **Emergency** | **Full Emergency Load Response (Energy Component)** | **Energy** | 100 kW | Yes | Voluntary | Mandatory | Reliability | Operational Procedure | 6 Hours (Maximum) | Yes | System Operator | Curtailment Service Provider (CSP) | Not Monitored | *http://www.pjm.com/markets-and-operations/demand-response/~/media/markets-ops/dsr/20090106-demand-response-reference-sheet.ashx* |
| **SPP** | | | | | | | | | | | | | | | |
| **SPP** | **VDDR** | **Variable Dispatch Demand Response** | **Energy** | 1 MW | Aggregation to a single withdrawal point from the Transmission Grid (and single Retail Provider) is permitted | Voluntary | Mandatory | Economic | Energy Price > Offer Price (Security Constrained Economic Dispatch) | Biddable Daily Participation | No | System Operator | Market Participant | ICCP | *http://www.spp.org/section.asp?group=327&pageID=27* |

| ISO/RTO Product / Service | | | | Deployment Type | | | Deployment Technology | | | | | Event Timing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Acronym | Name | Service Type | Resource-Specific | Bulk | Self | Dedicated Network | Internet | Verbal | e-mail | Automatic Relay | Advance Notification(s) | Ramp Period | Sustained Response Period | Recovery Period |
| **AESO** | | | | | | | | | | | | | | | |
| AESO | DOS | Demand Opportunity Service | Energy | ✓ | | | | | ✓ | | | None | - 7 Minutes (Term & 7 Minute Service)<br>- 1 Hour (1 Hour Service)<br>- Standard - immediate | 8 Hours (Minimum) | Based on Resource Parameters |
| AESO | FLSS | Frequency Load Shed Service | Regulation | | | ✓ | | | | | ✓ | None | Effectively Instantaneous | As Scheduled / Dispatched | N / A |
| AESO | SUP | Supplemental Operating Reserves | Reserve | | | ✓ | ✓ | | | | | None | 10 Minutes | 1 Hour (Minimum) | Based on Resource Parameters |
| AESO | VLCP | Voluntary Load Curtailment Program | Energy | ✓ | | | | | ✓ | | | None | one hour, unless customer declines dispatch | As Scheduled / Dispatched | Based on Resource Parameters |
| **CAISO** | | | | | | | | | | | | | | | |
| CAISO | PLP | Participating Load Program | Energy | ✓ | | | | ✓ | | | | Day-Ahead Market Clearing (~ 1:00 PM) | 1 Hour | 1 hour or resource's min run time | Based on Resource Parameters |
| CAISO | PLP | Participating Load Program | Reserve | ✓ | | | | ✓ | | | | Day-Ahead Market Clearing (~ 1:00 PM) | 10 Minutes | 2 Hours (Maximum) | Based on Resource Parameters |
| **ERCOT** | | | | | | | | | | | | | | | |
| ERCOT | EILS | Emergency Interruptible Load Service | Capacity | | ✓ | | ✓ | | ✓ | | | None | 10 Minutes | As Scheduled / Dispatched | 10 Hours |
| ERCOT | LaaR / RRS / UFR | Loads Acting as a Resource providing Responsive Reserve Service -- Under Frequency Relay Type | Reserve | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | Day-Ahead Market Clearing (~ 13:30) | 10 Minutes (Phone)<br>30 Cycles (Relay) | As Scheduled / Dispatched | 3 Hours |
| ERCOT | LaaR / RRS / CLR | Loads Acting as a Resource providing Responsive Reserve Service -- Controllable Load Resource Type | Reserve | ✓ | ✓ | ✓ | ✓ | | ✓ | | | Day-Ahead Market Clearing (~ 13:30) | Continuous, similar to governor action by a generator; and 10 min response for remaining obligation to electronic instruction | As Scheduled / Dispatched | 3 Hours |
| ERCOT | LaaR / NSRS / | Loads Acting as a Resource providing Non-Spinning Reserve Service | Reserve | ✓ | ✓ | | ✓ | | ✓ | | | Day-Ahead Market Clearing (~ 13:30) | 30 Minutes | As Scheduled / Dispatched | 3 Hours |
| ERCOT | CLR | Controllable Load Resources providing Regulation Service | Regulation | | | ✓ | ✓ | | | | | Day-Ahead Market Clearing (~ 13:30) | Effectively Instantaneous | As Scheduled / Dispatched | N / A |

| ISO/RTO Product / Service | | | | Deployment Type | | | Deployment Technology | | | | | Event Timing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Acronym | Name | Service Type | Resource-Specific | Bulk | Self | Dedicated Network | Internet | Verbal | e-mail | Automatic Relay | Advance Notification(s) | Ramp Period | Sustained Response Period | Recovery Period |
| **IESO** | | | | | | | | | | | | | | | |
| IESO | ELRP | Emergency Load Reduction Program | Energy | ✓ | | | | | ✓ | ✓ | | Day-Ahead Advisory (15:00) or Day-at-hand (09:00) + 1 Hour (Minimum) | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| IESO | EDRP | Emergency Demand Response Program | Energy | ✓ | | | | | ✓ | ✓ | | None | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| IESO | DL | Dispatchable Load | Energy | ✓ | | | ✓ | | | | | 5 Minutes (Minimum) | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| IESO | DL | Dispatchable Load (30 minute reserve) | Reserve | ✓ | | | ✓ | | | | | 5 Minutes (Minimum) | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| IESO | DL | Dispatchable Load (10 Spinning / 10 Non-Spinning Component) | Reserve | ✓ | | | ✓ | | | | | 5 Minutes (Minimum) | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| **ISO-NE** | | | | | | | | | | | | | | | |
| ISO-NE | RTDRP | Real Time Demand Response Program [Capacity Component] | Capacity | | ✓ | | | ✓ | | | | None | 10 Minutes/ 30 Minutes | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | RTDRP | Real Time Demand Response Program [Energy Component] | Energy | | ✓ | | | ✓ | | | | None | 10 Minutes/ 30 Minutes | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | DALRP-RTDR | Day-Ahead Load Response Program for RTDRP | Energy | ✓ | | | | ✓ | | | | Day-Ahead Market Clearing (~4:00 PM) | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | DALRP- RTPR | Day-Ahead Load Response Program for RTPR | Energy | ✓ | | | | ✓ | | | | Day-Ahead Market Clearing (~4:00 PM) | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | DRR | Demand Response Reserves Pilot | Reserve | | ✓ | | | ✓ | | | | None | 30 Minutes | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | RTPR | Real Time Price Response Program | Energy | | ✓ | | | ✓ | | | | None | Effectively Instantaneous | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | RTDR | Real Time Demand Response Resource | Capacity | | ✓ | | ✓ | | | | | 10 PM on the day prior to the call for DR Forecast Peak Hours, in each hour for RT DR Dispatch Hours | 30 Minutes | As Scheduled / Dispatched | Not Monitored |
| ISO-NE | OP and SP | FCM: On-Peak, Seasonal Peak Resources | Capacity | | | ✓ | | | | | | None | Effectively Instantaneous | On-Peak - June, July, August hours ending 1300 to 1700, December and January hours ending 1700 to 1900. Seasonal Peak - As Scheduled | Not Monitored |
| ISO-NE | RTEG | Real Time Emergency Generation Resource | Capacity | | ✓ | | ✓ | | | | | None | 30 Minutes | As Scheduled / Dispatched | Not Monitored |

| ISO/RTO Product / Service | | | | Deployment Type | | | Deployment Technology | | | | | Event Timing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Acronym | Name | Service Type | Resource-Specific | Bulk | Self | Dedicated Network | Internet | Verbal | e-mail | Automatic Relay | Advance Notification(s) | Ramp Period | Sustained Response Period | Recovery Period |
| **MISO** | | | | | | | | | | | | | | | |
| MISO | EDR | Emergency Demand Response | Energy | ✓ | | | ✓ | | | | | None | Resource-Specific (Biddable Parameter) | As Scheduled / Dispatched | Not Monitored |
| MISO | DRR-I | Demand Response Resource Type I | Energy | ✓ | | ✓ | ✓ | | | | | Day-Ahead Clearing (~5:00) | 5 Minutes | As Scheduled / Dispatched with 1 Hour (Minimum) | Not Monitored |
| MISO | DRR-I | Demand Response Resource Type-I | Reserve | ✓ | | ✓ | ✓ | | | | | Day-Ahead Clearing (~5:00) | 10 Minutes | As Scheduled / Dispatched with 1 Hour (Minimum) | Not Monitored |
| MISO | DRR-II | Demand Response Resource Type II | Energy | ✓ | | ✓ | ✓ | | | | | Day-Ahead Clearing (~5:00) | 5 Minutes | As Scheduled / Dispatched with 1 Hour (Minimum) | Not Monitored |
| MISO | DRR-II | Demand Response Resource Type-II | Reserve | ✓ | | ✓ | ✓ | | | | | Day-Ahead Clearing (~5:00) | 10 Minutes | As Scheduled / Dispatched with 1 Hour (Minimum) | Not Monitored |
| MISO | DRR-II | Demand Response Resource Type-II | Regulation | ✓ | | ✓ | ✓ | | | | | Day-Ahead Clearing (~5:00) | Effectively Instantaneous | As Scheduled / Dispatched with 1 Hour (Minimum) | N / A |
| MISO | LMR | Load Modifying Resource | Capacity | ✓ | | | | | ✓ | | | None | - | As Scheduled / Dispatched with 4 Hours (Minimum) | Not Monitored |
| **NYISO** | | | | | | | | | | | | | | | |
| NYISO | DADRP | Day-Ahead Demand Response Program | Energy | ✓ | | | | ✓ | | | | Day-Ahead by 11 am | - | As Scheduled / Dispatched | Not Monitored |
| NYISO | DSASP | Demand Side Ancillary Services Program | Reserve | ✓ | | | ✓ | | | | | Day-Ahead by 11 am<br>Real-time: 75 minutes | 10 Minutes | As Scheduled / Dispatched | Not Monitored |
| NYISO | DSASP | Demand Side Ancillary Services Program | Reserve | ✓ | | | ✓ | | | | | Day-Ahead by 11 am<br>Real-time: 75 minutes | 10 minutes/ 30 minutes | As Scheduled / Dispatched | Not Monitored |
| NYISO | DSASP | Demand Side Ancillary Services Program | Regulation | ✓ | | | ✓ | | | | | Day-Ahead by 11 am<br>Real-time: 5 minutes | Effectively Instantaneous | As Scheduled / Dispatched | N / A |
| NYISO | EDRP | Emergency Demand Response Program | Energy | | ✓ | | | | ✓ | ✓ | | Day-ahead advisory<br>Day- of: 120 minutes | 2 Hours | 4 Hours (Minimum) | Not Monitored |

| *ISO/RTO Product / Service* | | | | *Deployment Type* | | | *Deployment Technology* | | | | | *Event Timing* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Resource-Specific** | **Bulk** | **Self** | **Dedicated Network** | **Internet** | **Verbal** | **e-mail** | **Automatic Relay** | **Advance Notification(s)** | **Ramp Period** | **Sustained Response Period** | **Recovery Period** |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Energy Component)** | **Energy** | | ✓ | | | | ✓ | ✓ | | Day-ahead advisory<br>Day- of: 120 minutes | 2 Hours | 4 Hours (Minimum) | Not Monitored |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Capacity Component)** | **Capacity** | | ✓ | | | | ✓ | ✓ | | Day-ahead advisory<br>Day- of: 120 minutes | 2 Hours | 4 Hours (Minimum)<br>[or 1 Hour for Test] | Not Monitored |
| **PJM** | | | | | | | | | | | | | | | |
| **PJM** | **Economic** | **Economic Load Response** | **Energy** | ✓ | | ✓ | | ✓ | | ✓ | | Day-Ahead Clearing (~4:00) | Resource Specific | As Scheduled / Dispatched | Not Monitored |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | | ✓ | | | ✓ | ✓ | | | 1 Hour | 10 Minutes | As Scheduled / Dispatched | Not Monitored |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | ✓ | | | | ✓ | | ✓ | | Day-Ahead Clearing (~4:00) | 30 Minutes | As Scheduled / Dispatched | Not Monitored |
| **PJM** | **Economic** | **Economic Load Response** | **Regulation** | ✓ | | | ✓ | | | | | None | Effectively Instantaneous | As Scheduled / Dispatched | N / A |
| **PJM** | **Emergency (Energy Only)** | **Emergency Load Response - Energy Only** | **Energy** | | ✓ | | | ✓ | ✓ | | | 2 Hours (Maximum) | 1 Hour or 2 Hours (Participant Selected) | As Scheduled / Dispatched | Not Monitored |
| **PJM** | **Emergency** | **Full Emergency Load Response (Capacity Component)** | **Capacity** | | ✓ | | | ✓ | ✓ | | | 2 Hours (Maximum) | 1 Hour or 2 Hours (Participant Selected) | As Scheduled / Dispatched | Not Monitored |
| **PJM** | **Emergency** | **Full Emergency Load Response (Energy Component)** | **Energy** | | ✓ | | | ✓ | ✓ | | | 2 Hours (Maximum) | 1 Hour or 2 Hours (Participant Selected) | As Scheduled / Dispatched | Not Monitored |
| **SPP** | | | | | | | | | | | | | | | |
| **SPP** | **VDDR** | **Variable Dispatch Demand Response** | **Energy** | ✓ | | | ✓ | ✓ | ✓ | | | 5 Minutes (Maximum) | 5 Minutes | 5 Minutes | 5 Minutes |

| *ISO/RTO Product / Service* | | | | *Telemetry* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Telemetry Requirement** | **Telemetry Accuracy** | **Telemetry Reporting Interval** | **Other Telemetry Measurements** | **Communication Protocol** | **Governor Control Equivalent [Regulation Only]** | **On-Site Generation Telemetry Requirement** |
| **AESO** | | | | | | | | | | |
| **AESO** | **DOS** | **Demand Opportunity Service** | **Energy** | Yes | ± 5% | 4 Seconds (or on threshold crossing) | Quality check on all points from site | ICCP | N / A | Yes |
| **AESO** | **FLSS** | **Frequency Load Shed Service** | **Regulation** | Yes | ± 5% | 4 Seconds (or on threshold crossing) | Quality check on all points from site | ICCP | No | No |
| **AESO** | **SUP** | **Supplemental Operating Reserves** | **Reserve** | Yes | ± 5% | 4 Seconds (or on threshold crossing) | Quality check on all points from site | ICCP | N / A | Yes |
| **AESO** | **VLCP** | **Voluntary Load Curtailment Program** | **Energy** | Limited | ± 5% | 4 Seconds (or on threshold crossing) | Quality check on all points from site | ICCP | N / A | Yes (Selected Sites) |
| **CAISO** | | | | | | | | | | |
| **CAISO** | **PLP** | **Participating Load Program** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **CAISO** | **PLP** | **Participating Load Program** | **Reserve** | Yes | ± 2 % | 1 Minute (resource to eDAC 4-Second eDAC to CAISO) | None | DNP3 or ICCP | N / A | No |
| **ERCOT** | | | | | | | | | | |
| **ERCOT** | **EILS** | **Emergency Interruptible Load Service** | **Capacity** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **ERCOT** | **LaaR / RRS / UFR** | **Loads Acting as a Resource providing Responsive Reserve Service -- Under Frequency Relay Type** | **Reserve** | Yes | ± 3 % | 2 Seconds | UFR Status<br>Breaker Status<br>Data Quality Status | DNP3 | N / A | No |
| **ERCOT** | **LaaR / RRS / CLR** | **Loads Acting as a Resource providing Responsive Reserve Service -- Controllable Load Resource Type** | **Reserve** | Yes | ± 3 % | 2 Seconds | Breaker Status<br>Data Quality Status | DNP3 | N / A | No |
| **ERCOT** | **LaaR / NSRS /** | **Loads Acting as a Resource providing Non-Spinning Reserve Service** | **Reserve** | Yes | ± 3 % | 2 Seconds | Breaker Status<br>Data Quality Status | DNP3 | N / A | No |
| **ERCOT** | **CLR** | **Controllable Load Resources providing Regulation Service** | **Regulation** | Yes | ± 3 % | 2 Seconds | Breaker Status<br>Data Quality Status | DNP3 | Yes | No |

| *ISO/RTO Product / Service* | | | | *Telemetry* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Telemetry Requirement** | **Telemetry Accuracy** | **Telemetry Reporting Interval** | **Other Telemetry Measurements** | **Communication Protocol** | **Governor Control Equivalent [Regulation Only]** | **On-Site Generation Telemetry Requirement** |
| **IESO** | | | | | | | | | | |
| **IESO** | **ELRP** | **Emergency Load Reduction Program** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **IESO** | **EDRP** | **Emergency Demand Response Program** | **Energy** | Yes | ± 2 % | 2 Seconds | None | SCADA | N / A | No |
| **IESO** | **DL** | **Dispatchable Load** | **Energy** | Yes | ± 2 % | 2 Seconds | None | SCADA | N / A | No |
| **IESO** | **DL** | **Dispatchable Load (30 minute reserve)** | **Reserve** | Yes | ± 2 % | 2 Seconds | None | SCADA | N / A | No |
| **IESO** | **DL** | **Dispatchable Load (10 Spinning / 10 Non-Spinning Component)** | **Reserve** | Yes | ± 2 % | 2 Seconds | None | SCADA | N / A | No |
| **ISO-NE** | | | | | | | | | | |
| **ISO-NE** | **RTDRP** | **Real Time Demand Response Program [Capacity Component]** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | 5 Minutes | None | Internet (IBCS Protocol) | N / A | No |
| **ISO-NE** | **RTDRP** | **Real Time Demand Response Program [Energy Component]** | **Energy** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | 5 Minutes | None | Internet (IBCS Protocol) | N / A | No |
| **ISO-NE** | **DALRP-RTDR** | **Day-Ahead Load Response Program for RTDRP** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **ISO-NE** | **DALRP- RTPR** | **Day-Ahead Load Response Program for RTPR** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **ISO-NE** | **DRR** | **Demand Response Reserves Pilot** | **Reserve** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | 5 Minutes | None | Internet (IBCS Protocol) | N / A | No |
| **ISO-NE** | **RTPR** | **Real Time Price Response Program** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **ISO-NE** | **RTDR** | **Real Time Demand Response Resource** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | 5 Minutes | None | Internet (IBCS Protocol) | N / A | No |
| **ISO-NE** | **OP and SP** | **FCM: On-Peak, Seasonal Peak Resources** | **Capacity** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **ISO-NE** | **RTEG** | **Real Time Emergency Generation Resource** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | 5 Minutes | None | Internet (IBCS Protocol) | N / A | Yes |

| *ISO/RTO Product / Service* | | | | *Telemetry* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Telemetry Requirement** | **Telemetry Accuracy** | **Telemetry Reporting Interval** | **Other Telemetry Measurements** | **Communication Protocol** | **Governor Control Equivalent [Regulation Only]** | **On-Site Generation Telemetry Requirement** |
| **MISO** | | | | | | | | | | |
| **MISO** | **EDR** | **Emergency Demand Response** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **MISO** | **DRR-I** | **Demand Response Resource Type I** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **MISO** | **DRR-I** | **Demand Response Resource Type-I** | **Reserve** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **MISO** | **DRR-II** | **Demand Response Resource Type II** | **Energy** | yes | Consistent with other ICCP Data | 4 Seconds | None | ICCP | N / A | Yes |
| **MISO** | **DRR-II** | **Demand Response Resource Type-II** | **Reserve** | yes | Consistent with other ICCP Data | 4 Seconds | None | ICCP | N / A | Yes |
| **MISO** | **DRR-II** | **Demand Response Resource Type-II** | **Regulation** | Yes | Consistent with other ICCP Data | 4 Seconds | None | ICCP | No | Yes |
| **MISO** | **LMR** | **Load Modifying Resource** | **Capacity** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **NYISO** | | | | | | | | | | |
| **NYISO** | **DADRP** | **Day-Ahead Demand Response Program** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Reserve** | Yes | Digital data: Maximum error of +0.1 percent of reading<br><br>Analog data: combined error of less than 1.0 percent of full scale reading end to end for the telemetering oscillator and converter | 6 Seconds | Regulation Flag, Base Load Interval, Calc Response MW, Breaker Status | ICCP | N / A | Yes |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Reserve** | Yes | Digital data: Maximum error of +0.1 percent of reading<br><br>Analog data: combined error of less than 1.0 percent of full scale reading end to end for the telemetering oscillator and converter | 6 Seconds | Regulation Flag, Base Load Interval, Calc Response MW, Breaker Status | ICCP | N / A | Yes |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Regulation** | Yes | Digital data: Maximum error of +0.1 percent of reading<br><br>Analog data: combined error of less than 1.0 percent of full scale reading end to end for the telemetering oscillator and converter | 6 Seconds | Regulation Flag, Base Load Interval, Calc Response MW, Breaker Status | ICCP | No | Yes |
| **NYISO** | **EDRP** | **Emergency Demand Response Program** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |

| *ISO/RTO Product / Service* | | | | *Telemetry* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **Telemetry Requirement** | **Telemetry Accuracy** | **Telemetry Reporting Interval** | **Other Telemetry Measurements** | **Communication Protocol** | **Governor Control Equivalent [Regulation Only]** | **On-Site Generation Telemetry Requirement** |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Energy Component)** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Capacity Component)** | **Capacity** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM** | | | | | | | | | | |
| **PJM** | **Economic** | **Economic Load Response** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM** | **Economic** | **Economic Load Response** | **Regulation** | Yes | ± 2 % | 2-4 Seconds | None | ICCP | No | No |
| **PJM** | **Emergency (Energy Only)** | **Emergency Load Response - Energy Only** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM** | **Emergency** | **Full Emergency Load Response (Capacity Component)** | **Capacity** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM** | **Emergency** | **Full Emergency Load Response (Energy Component)** | **Energy** | No | N / A | N / A | N / A | N / A | N / A | N / A |
| **SPP** | | | | | | | | | | |
| **SPP** | **VDDR** | **Variable Dispatch Demand Response** | **Energy** | Yes | Consistent with all other ICCP Data | 4 Seconds | Breaker Status | ICCP | N / A | Yes |

| *ISO/RTO Product / Service* | | | | *After-The-Fact Metering* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **After-the-Fact Metering Requirement** | **Meter Accuracy** | **Clock/Time Accuracy** | **Details of Meter/Equipment Standards** | **Meter Data Reporting Deadline** | **Meter Data Reporting Interval** | **Validating, Editing & Estimating (VEE) Method** | **On-Site Generation Meter Requirement** | **Available Performance Evaluation Methods** |
| **AESO** | | | | | | | | | | | | |
| **AESO** | **DOS** | **Demand Opportunity Service** | **Energy** | Yes | ± 0.2 % | Applicable standards | "Industry Canada" and ISO standards | Event Day + 3 Business Days | 15 Minutes | VEE described in ISO standards | N/A | **AESO-1** |
| **AESO** | **FLSS** | **Frequency Load Shed Service** | **Regulation** | Yes | ± 0.2 % | Applicable standards | "Industry Canada" and ISO standards | Event Day + 3 Business Days | 15 Minutes | VEE described in ISO standards | N/A | **AESO-1** |
| **AESO** | **SUP** | **Supplemental Operating Reserves** | **Reserve** | Yes | ± 0.2 % | Applicable standards | "Industry Canada" and ISO standards | Event Day + 3 Business Days | 15 Minutes | VEE described in ISO standards | N/A | **AESO-1** |
| **AESO** | **VLCP** | **Voluntary Load Curtailment Program** | **Energy** | Yes | ± 0.2 % | Applicable standards | "Industry Canada" and ISO standards | Event Day + 3 Business Days | 15 Minutes | VEE described in ISO standards | N/A | **AESO-1** |
| **CAISO** | | | | | | | | | | | | |
| **CAISO** | **PLP** | **Participating Load Program** | **Energy** | Yes | ± .25 % | Accuracy of the meter clock must be within 0.02% (2 minutes per week) at ambient temperature | "Local Regulatory Authority" certification or CAISO certified meter standards | Event Day + 45 Days (Scheduling Coordinator Metered Entity) OR Daily (CAISO Metered Entity) | 5 Minutes | The Scheduling Coordinator is responsible for the Validating, Editing and Estimation of meter data; If CAISO polled meters then the CAISO is responsible for VEE | N/A | **N/A** |
| **CAISO** | **PLP** | **Participating Load Program** | **Reserve** | Yes | ± .25 % | Accuracy of the meter clock must be within 0.02% (2 minutes per week) at ambient temperature | "Local Regulatory Authority" certification or CAISO certified meter standards | Event Day + 45 Days (Scheduling Coordinator Metered Entity) OR Daily (CAISO Metered Entity) | 5 Minutes | The Scheduling Coordinator is responsible for the Validating, Editing and Estimation of meter data; If CAISO polled meters then the CAISO is responsible for VEE | N/A | **N/A** |
| **ERCOT** | | | | | | | | | | | | |
| **ERCOT** | **EILS** | **Emergency Interruptible Load Service** | **Capacity** | Yes | ± 2 % | 5% relative to NIST Atomic Clock | MW Accuracy: PUCT Subst. R. 25.121 referencing ANSI C12; Guidelines for non-IDR metered Load aggregations posted as separate document at http://www.ercot.com/services/programs/load/eils/ | Contract Period End + 35 Days | 15 Minutes | Standard VEE by meter-reading entity | N/A | **ERCOT-1, ERCOT-2, ERCOT-3, ERCOT-4, ERCOT-5** |
| **ERCOT** | **LaaR / RRS / UFR** | **Loads Acting as a Resource providing Responsive Reserve Service -- Under Frequency Relay Type** | **Reserve** | Yes | ± 2 % | 5% relative to NIST Atomic Clock | MW Accuracy: PUCT Subst. R. 25.121 referencing ANSI C12; UFRs must be set no lower than 59.7 Hz and must be set to trip for a frequency drop of no more than 20 cycles | Monthly | 15 Minutes | Standard VEE by meter-reading entity | N/A | **ERCOT-6** |
| **ERCOT** | **LaaR / RRS / CLR** | **Loads Acting as a Resource providing Responsive Reserve Service -- Controllable Load Resource Type** | **Reserve** | Yes | ± 2 % | 5% relative to NIST Atomic Clock | MW Accuracy: PUCT Subst. R. 25.121 referencing ANSI C12; Governor-type response requirements described at http://www.ercot.com/services/programs/load/ | Monthly | 15 Minutes | Standard VEE by meter-reading entity | N/A | **ERCOT-6** |
| **ERCOT** | **LaaR / NSRS /** | **Loads Acting as a Resource providing Non-Spinning Reserve Service** | **Reserve** | Yes | ± 2 % | 5% relative to NIST Atomic Clock | MW Accuracy: PUCT Subst. R. 25.121 referencing ANSI C12. | Monthly | 15 Minutes | Standard VEE by meter-reading entity | N/A | **ERCOT-6** |
| **ERCOT** | **CLR** | **Controllable Load Resources providing Regulation Service** | **Regulation** | Yes | ± 2 % | 5% relative to NIST Atomic Clock | MW Accuracy: PUCT Subst. R. 25.121 referencing ANSI C12; AGC and Governor-type response requirements described at http://www.ercot.com/services/programs/load/ | Monthly | 15 Minutes | Not Applicable to Regulation Service | N/A | **ERCOT-7** |

| *ISO/RTO Product / Service* | | | | *After-The-Fact Metering* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **After-the-Fact Metering Requirement** | **Meter Accuracy** | **Clock/Time Accuracy** | **Details of Meter/Equipment Standards** | **Meter Data Reporting Deadline** | **Meter Data Reporting Interval** | **Validating, Editing & Estimating (VEE) Method** | **On-Site Generation Meter Requirement** | **Available Performance Evaluation Methods** |
| **IESO** | | | | | | | | | | | | |
| **IESO** | **ELRP** | **Emergency Load Reduction Program** | **Energy** | Yes | ± 0.2 % | None | 1. IESO Metering standards for RWM installations or<br>2. Retail electricity market revenue meter with a 0.5% accuracy class (or better) or<br>3. Interval meter owned by the LDC or<br>4. Customer-owned interval meters (sub-meters) or<br>5. SCADA/ Energy Management Sy | End-of-Month + 60 Days | 1 Hour | Standard VEE by meter-reading entity | N/A | **IESO-1, IESO-2, IESO-3** |
| **IESO** | **EDRP** | **Emergency Demand Response Program** | **Energy** | Yes | ± 0.2 % | ± 5 seconds relative to IESO Meter Data collection systems | "Measurement Canada" and IESO Metering standards | Daily | 5 Minutes | Standard VEE process by IESO meter-reading | Yes | **N/A** |
| **IESO** | **DL** | **Dispatchable Load** | **Energy** | Yes | ± 0.2 % | ± 5 seconds relative to IESO Meter Data collection systems | "Measurement Canada" and IESO Metering standards | Daily | 5 Minutes | Standard VEE process by IESO meter-reading | Yes | **N/A** |
| **IESO** | **DL** | **Dispatchable Load (30 minute reserve)** | **Reserve** | Yes | ± 0.2 % | ± 5 seconds relative to IESO Meter Data collection systems | "Measurement Canada" and IESO Metering standards | Daily | 5 Minutes | Standard VEE process by IESO meter-reading | Yes | **N/A** |
| **IESO** | **DL** | **Dispatchable Load (10 Spinning / 10 Non-Spinning Component)** | **Reserve** | Yes | ± 0.2 % | ± 5 seconds relative to IESO Meter Data collection systems | "Measurement Canada" and IESO Metering standards | Daily | 5 Minutes | Standard VEE process by IESO meter-reading | Yes | **N/A** |
| **ISO-NE** | | | | | | | | | | | | |
| **ISO-NE** | **RTDRP** | **Real Time Demand Response Program [Capacity Component]** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Event Day + 2.5 Business Days | 5 Minutes | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-1, ISO-NE-3, ISO-NE-4** |
| **ISO-NE** | **RTDRP** | **Real Time Demand Response Program [Energy Component]** | **Energy** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Event Day + 2.5 Business Days | 5 Minutes | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-1, ISO-NE-3, ISO-NE-4** |
| **ISO-NE** | **DALRP-RTDR** | **Day-Ahead Load Response Program for RTDRP** | **Energy** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Monthly | 5 Minutes OR 1 Hour | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-1, ISO-NE-3, ISO-NE-4** |
| **ISO-NE** | **DALRP- RTPR** | **Day-Ahead Load Response Program for RTPR** | **Energy** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Monthly | 5 Minutes OR 1 Hour | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-1, ISO-NE-2, ISO-NE-4** |
| **ISO-NE** | **DRR** | **Demand Response Reserves Pilot** | **Reserve** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Daily | 5 Minutes | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-1, ISO-NE-3, ISO-NE-4** |
| **ISO-NE** | **RTPR** | **Real Time Price Response Program** | **Energy** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Monthly | 1 Hour | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-1, ISO-NE-3, ISO-NE-4** |
| **ISO-NE** | **RTDR** | **Real Time Demand Response Resource** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Daily | 5 Minutes | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-5, ISO-NE-6, ISO-NE-7** |
| **ISO-NE** | **OP and SP** | **FCM: On-Peak, Seasonal Peak Resources** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Monthly | 15 Minutes | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-5, ISO-NE-6, ISO-NE-7** |
| **ISO-NE** | **RTEG** | **Real Time Emergency Generation Resource** | **Capacity** | Yes | ± 2 % (± ½ % if meter is used for Distribution billing) | accuracy of +/- 2 minutes, with the National Institute of Standards and Technology (NIST) | (ANSI) C-12 and Specific ISO-NE Standards (Operating Procedure 18 - Metering and Telemetry Criteria) | Daily | 5 Minutes | VEE described in ISO standards Manual-MVDR | Yes | **ISO-NE-5, ISO-NE-6, ISO-NE-7** |

| *ISO/RTO Product / Service* | | | | *After-The-Fact Metering* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **After-the-Fact Metering Requirement** | **Meter Accuracy** | **Clock/Time Accuracy** | **Details of Meter/Equipment Standards** | **Meter Data Reporting Deadline** | **Meter Data Reporting Interval** | **Validating, Editing & Estimating (VEE) Method** | **On-Site Generation Meter Requirement** | **Available Performance Evaluation Methods** |
| **MISO** | | | | | | | | | | | | |
| **MISO** | **EDR** | **Emergency Demand Response** | **Energy** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | Event Day + 53 Days | 1 Hour | N/A | Yes | **MISO-1, MISO-2, MISO-3, MISO-4, MISO-5** |
| **MISO** | **DRR-I** | **Demand Response Resource Type I** | **Energy** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | When Cleared Day-Ahead, During Dispatch Day -- next Hour | 1 Minute | N/A | Yes | **MISO-6** |
| **MISO** | **DRR-I** | **Demand Response Resource Type-I** | **Reserve** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | When Cleared Day-Ahead, During Dispatch Day -- next Hour | 1 Minute | N/A | Yes | **MISO-6** |
| **MISO** | **DRR-II** | **Demand Response Resource Type II** | **Energy** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | When Cleared Day-Ahead, During Dispatch Day -- next Hour | 1 Minute | N/A | Yes | **MISO-6** |
| **MISO** | **DRR-II** | **Demand Response Resource Type-II** | **Reserve** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | When Cleared Day-Ahead, During Dispatch Day -- next Hour | 1 Minute | N/A | Yes | **MISO-6** |
| **MISO** | **DRR-II** | **Demand Response Resource Type-II** | **Regulation** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | When Cleared Day-Ahead, During Dispatch Day -- next Hour | 1 Minute | N/A | Yes | **MISO-6** |
| **MISO** | **LMR** | **Load Modifying Resource** | **Capacity** | Yes | Applicable State Jurisdictional Requirements | None | applicable ANSI standards | Event Day + 53 Days | 1 Hour | N/A | Yes | **MISO-1, MISO-2, MISO-3, MISO-4, MISO-5** |
| **NYISO** | | | | | | | | | | | | |
| **NYISO** | **DADRP** | **Day-Ahead Demand Response Program** | **Energy** | Yes | ± 2 % | None | ±2% of full scale reading (for non-revenue interval metering devices; certified by a Professional Engineer as meeting ANSI C12) (1) Must use certified Meter Service Provider (MSP) and meter Data Service Provider (MDSP) (2) Hourly interval metering requir | Event Day + 55 Days | 1 Hour | N/A | N/A | **NYISO-3** |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Reserve** | Yes | ± 2 % | None | Revenue Grade: approved by NY Public Service Commission | Instantaneous, plus Scheduled Day + 55 Days | 1 Hour | Instantaneous data compared to revenue billing meter after the fact | N/A | **NYISO-2** |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Reserve** | Yes | ± 2 % | None | Revenue Grade: approved by NY Public Service Commission | Instantaneous, plus Scheduled Day + 55 Days | 1 Hour | Instantaneous data compared to revenue billing meter after the fact | Must be net metered | **NYISO-2** |
| **NYISO** | **DSASP** | **Demand Side Ancillary Services Program** | **Regulation** | Yes | ± 2 % | None | Revenue Grade: approved by NY Public Service Commission | Instantaneous, plus Scheduled Day + 55 Days | 1 Hour | Instantaneous data compared to revenue billing meter after the fact | N/A | **NYISO-2** |
| **NYISO** | **EDRP** | **Emergency Demand Response Program** | **Energy** | Yes | ± 2 % | None | ±2% of full scale reading (for non-revenue interval metering devices; certified by a Professional Engineer as meeting ANSI C12) (1) Must use certified Meter Service Provider (MSP) and meter Data Service Provider (MDSP) (2) Hourly interval metering requir | Event Day + 75 Days | 1 Hour | N/A | Optional | **NYISO-3, NYISO-4 (Small Customer Aggregations), NYISO-5** |

| *ISO/RTO Product / Service* | | | | *After-The-Fact Metering* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region** | **Acronym** | **Name** | **Service Type** | **After-the-Fact Metering Requirement** | **Meter Accuracy** | **Clock/Time Accuracy** | **Details of Meter/Equipment Standards** | **Meter Data Reporting Deadline** | **Meter Data Reporting Interval** | **Validating, Editing & Estimating (VEE) Method** | **On-Site Generation Meter Requirement** | **Available Performance Evaluation Methods** |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Energy Component)** | **Energy** | Yes | ± 2 % | None | ±2% of full scale reading (for non-revenue interval metering devices; certified by a Professional Engineer as meeting ANSI C12) (1) Must use certified Meter Service Provider (MSP) and meter Data Service Provider (MDSP) (2) Hourly interval metering requir | Event Day + 75 Days | 1 Hour | N/A | Optional | **NYISO-3, NYISO-4 (Small Customer Aggregations), NYISO-5** |
| **NYISO** | **SCR** | **Installed Capacity Special Case Resources (Capacity Component)** | **Capacity** | Yes | ± 2 % | None | ±2% of full scale reading (for non-revenue interval metering devices; certified by a Professional Engineer as meeting ANSI C12) (1) Must use certified Meter Service Provider (MSP) and meter Data Service Provider (MDSP) (2) Hourly interval metering requir | Event Day + 75 Days | 1 Hour | N/A | Optional | **NYISO-1, NYISO-3, NYISO-4 (Small Customer Aggregations), NYISO-5** |
| **PJM** | | | | | | | | | | | | |
| **PJM** | **Economic** | **Economic Load Response** | **Energy** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | Event Day + 60 Days | 1 Hour | NAESB VEE protocol | N/A | **PJM-1, PJM-2, PJM-3, PJM-8** |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | Event Day + 1 Business Day | 1 Minute | NAESB VEE protocol | N/A | **PJM-4** |
| **PJM** | **Economic** | **Economic Load Response** | **Reserve** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | Event Day + 1 Business Day | 1 Minute | NAESB VEE protocol | N/A | **PJM-4** |
| **PJM** | **Economic** | **Economic Load Response** | **Regulation** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | Event Day + 1 Business Day | 1 Minute | NAESB VEE protocol | N/A | **PJM-5** |
| **PJM** | **Emergency (Energy Only)** | **Emergency Load Response - Energy Only** | **Energy** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | Event Day + 60 Days | 1 Hour | NAESB VEE protocol | N/A | **PJM-6** |
| **PJM** | **Emergency** | **Full Emergency Load Response (Capacity Component)** | **Capacity** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | End-of-Month + 45 Days | 1 Hour | NAESB VEE protocol | N/A | **PJM-1, PJM-2, PJM-3, PJM-6, PJM-7, PJM-8** |
| **PJM** | **Emergency** | **Full Emergency Load Response (Energy Component)** | **Energy** | Yes | ± 2 % | None | Retail electric service requirements or ANSI C12.1 and c57.13 | Event Day + 60 Days | 1 Hour | NAESB VEE protocol | N/A | **PJM-6** |
| **SPP** | | | | | | | | | | | | |
| **SPP** | **VDDR** | **Variable Dispatch Demand Response** | **Energy** | Yes | ± 0.2 % | None | ANSI C12.1 & 12.2.0 | Event Day + 4 Days (2:00 AM) | 1 Hour | Comparison to Telemetry | Yes | **SPP-1, SPP-2** |

| PERFORMANCE EVALUATION METHODS | | Baseline Information | | | | | |
|---|---|---|---|---|---|---|---|
| Cross-Reference<br>- | Performance Evaluation<br>- | Baseline Window<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Calculation Type<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Sampling Precision and Accuracy<br>Baseline Type-II Only | Exclusion Rules<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Baseline Adjustments<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Adjustment Window<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only |
| **AESO** | | | | | | | |
| **AESO-1** | **Maximum Base Load** | N / A | N / A | N / A | N / A | N / A | N / A |
| **CAISO** | | | | | | | |
| **CAISO-1** | **Meter Before / Meter After** | Meter read before deployment | Single reading | N / A | None | None | None |
| **ERCOT** | | | | | | | |
| **ERCOT-1** | **Baseline Type-I** | 12+ months of historical data | Model built using historical meter data | N / A | None | Event day adjustment (scalar based on load point) | 80 |
| **ERCOT-2** | **Baseline Type-I** | 10 most recent like days (weekday vs. weekend/holiday) | Average | N / A | Exclude highest and lowest of the 10 most recent like days | Event day adjustment (scalar based on load point) | Deployment - 3 Hours (2 Hour Duration) |
| **ERCOT-3** | **Baseline Type-I** | 12 months | Model built using best matching day from prior 12 months | N / A | None | Event day adjustment (scalar based on load point) | Deployment - 3 Hours (2 Hour Duration) |
| **ERCOT-4** | **Maximum Base Load** | N / A | N / A | N / A | N / A | N / A | N / A |
| **ERCOT-5** | **Baseline Type-II** | 12+ months of historical data | Model built using historical meter data | Sample size which produces appropriate accuracy and confidence based on ISO-determined requirements | None | None | None |
| **ERCOT-6** | **Meter Before / Meter After** | 1 to 5 minutes, depending on Ancillary Service | Compare actual telemetered Load to 1-minute or 5-minute average telemetered Load prior to event | N / A | None | None | None |
| **ERCOT-7** | **Meter Before / Meter After** | 4 Seconds | Compare actual telemetered Load to dispatched set point | N / A | None | None | None |
| **IESO** | | | | | | | |
| **IESO-1** | **Baseline Type-I** | Data is based on the loss adjusted total metered energy consumption of the past eleven same trading hours on business days immediately preceding the ELRP activation event | Hourly interval load data of qualifying days | N / A | Exclude weekends, holidays and any weekdays where a curtailment event occurred within the Baseline Window | Weather-Sensitive Adjustment (Optional Election by Resource) | Customer / Resource Specific |
| **IESO-2** | **Baseline Type-I** | Baseline value being the maximum value of the loss adjusted net metered MWh load in the two hours before the activation period for an aggregation of one or more meters measuring a total net load | Hourly interval load data of qualifying days | N / A | Exclude weekends, holidays and any weekdays where a curtailment event occurred within the Baseline Window | Weather-Sensitive Adjustment (Optional Election by Resource) | Customer / Resource Specific |
| **IESO-3** | **Baseline Type-II** | 90% of the prior qualifying baseline + 10% of the previous qualifying day (five minute increment) (similar to a 10 day rolling average) | Five minute interval load data of qualifying days | Accuracy and Precision 90/10 | None | None | None |
| **ISO-NE-4** | **Behind-the-Meter Generation** | N / A | N / A | N / A | N / A | N / A | N / A |
| **ISO-NE-5** | **Baseline Type-I** | 90% of the prior qualifying baseline + 10% of the previous qualifying day (five minute increment) (similar to a 10 day rolling average) | Five minute interval load data of qualifying days | N / A | Exclude weekends, holidays and any weekdays where a curtailment event occurred within the Baseline Window | Weather-Sensitive Adjustment (Symmetric) | Reduction Deadline - 2.5 Hours (2 Hour Duration) |
| **ISO-NE-6** | **Baseline Type-II** | Equivalent of the Baseline Window defined for other resources, as approved on a case by case basis | Equivalent of the Calculation Type defined for other resources, as approved on a case by case basis | Accuracy and Precision 80/10 | Equivalent of the Exclusion Rules defined for other resources, as approved on a case by case basis | Equivalent of the Baseline Adjustment defined for other resources, as approved on a case by case basis | Equivalent of the Adjustment Window defined for other resources, as approved on a case by case basis |
| **ISO-NE-7** | **Behind-the-Meter Generation** | N / A | N / A | N / A | N / A | N / A | N / A |

| PERFORMANCE EVALUATION METHODS | | Baseline Information | | | | | |
|---|---|---|---|---|---|---|---|
| Cross-Reference<br>- | Performance Evaluation<br>- | Baseline Window<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Calculation Type<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Sampling Precision and Accuracy<br>Baseline Type-II Only | Exclusion Rules<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Baseline Adjustments<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Adjustment Window<br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only |
| **MISO** | | | | | | | |
| **MISO-1** | **Baseline Type-I** | Customer / Resource Specific | Customer / Resource Specific | N / A | Customer / Resource Specific | Customer / Resource Specific | Customer / Resource Specific |
| **MISO-2** | **Baseline Type-II** | Customer / Resource Specific | Customer / Resource Specific | Customer / Resource Specific | Customer / Resource Specific | Customer / Resource Specific | Customer / Resource Specific |
| **MISO-3** | **Behind-the-Meter Generation** | N / A | N / A | N / A | N / A | N / A | N / A |
| **MISO-4** | **Maximum Base Load** | N / A | N / A | N / A | N / A | N / A | N / A |
| **MISO-5** | **Meter Before / Meter After** | Meter read before deployment | Single reading | N / A | None | None | None |
| **MISO-6** | **Meter Before / Meter After** | Meter read before deployment plus Host Load Zone Forecast | One-minute interval data | N / A | None | None | None |
| **NYISO** | | | | | | | |
| **NYISO-1** | **Maximum Base Load** | CAPACITY ONLY: Contracted Maximum Demand<br><br>Local Generation: per Capability Period | Average of maximum peak demand (APMD) between the hours of 12 pm and 8 pm for the four months of the previous like capability period determines available capacity<br>Summer: June, July, August, September ---<br>Winter: November, December, January, February<br>Lo | N / A | N / A | N / A | N / A |
| **NYISO-2** | **Meter Before / Meter After** | N / A | N / A | N / A | N / A | N / A | N / A |
| **NYISO-3** | **Baseline Type-I** | WEEKDAY Event: Previous 10 weekdays within the last 30 days, subject to exclusion rules<br>WEEKEND Event: Previous 3 weekends - same day type (e.g. Sat. or Sun.), no exclusions | WEEKDAY Event: Hourly simple average of the 5 highest total event period load days in CBL Window<br>WEEKEND Event: Hourly simple average of the 2 highest total event period load days in CBL Window | N / A | WEEKDAY Events only: Exclude day preceding event, holidays, and any weekdays where a curtailment event occurred within the Baseline Window | Weather-Sensitive Adjustment (Optional), Symmetrical Proportional Adjustment with a maximum of +/- 20% | Advance Notification - 2 Hours |
| **NYISO-4** | **Baseline Type-II** | Equivalent of the Baseline Window defined for other resources (NYISO-6), as approved on a case by case basis | Equivalent of the Calculation Type defined for other resources (NYISO-6), as approved on a case by case basis | Customer / Resource Specific | Equivalent of the Exclusion Rules defined for other resources (NYISO-6), as approved on a case by case basis | Equivalent of the Baseline Adjustment defined for other resources (NYISO-6), as approved on a case by case basis | Customer / Resource Specific |
| **NYISO-5** | **Behind-The-Meter Generation** | WEEKDAY Event: Previous 10 weekdays within the last 30 days, subject to exclusion rules<br>WEEKEND Event: Previous 3 weekends - same day type (e.g. Sat. or Sun.), no exclusions | WEEKDAY Event: Hourly simple average of the 5 lowest total event period load days in CBL Window<br>WEEKEND Event: Hourly simple average of the 2 lowest total event period load days in CBL Window | N / A | WEEKDAY Events only: Exclude day preceding event, holidays, and any weekdays where a curtailment event occurred within the Baseline Window | N / A | N / A |
| **PJM** | | | | | | | |
| **PJM-1** | **Baseline Type-I** | 45 calendar days which may be extended an additional 15 days based on specific conditions | Hourly average based on high 4 of 5 days for weekdays and high 2 of 3 for Saturday or Sun/Holiday. | N / A | Event days, different day types, event usage threshold < 25% | Weather-Sensitive Adjustment OR Symmetric Additive Adjustment | 3 Hour Window Ending 1 Hour prior to Deployment |
| **PJM-2** | **Behind-the-Meter Generation** | N / A | N / A | N / A | N / A | N / A | N / A |
| **PJM-3** | **Baseline Type-II** | Approved on case by case basis or may use published deemed savings study | Approved on case by case basis or may use published deemed savings study | Approved on case by case basis or may use published deemed savings study | Approved on case by case basis or may use published deemed savings study | Approved on case by case basis or may use published deemed savings study | Approved on case by case basis or may use published deemed savings study |
| **PJM-4** | **Meter Before / Meter After** | Deployment - 1 Minute | Single Reading (with special processing) | N / A | None | None | None |
| **PJM-5** | **Meter Before / Meter After** | 4 Seconds Before Signal | Single Reading (with special processing) | N / A | None | None | None |
| **PJM-6** | **Meter Before / Meter After** | Sustained Response Period - 1 Hour | Single Reading (with special processing) | N / A | CBL substitution if resource already on economic deployment | None | None |
| **PJM-7** | **Maximum Base Load** | N / A | N / A | N / A | N / A | N / A | N / A |

| PERFORMANCE EVALUATION METHODS | | Baseline Information | | | | | |
|---|---|---|---|---|---|---|---|
| Cross-Reference<br><br>- | Performance Evaluation<br><br>- | Baseline Window<br><br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Calculation Type<br><br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Sampling Precision and Accuracy<br><br>Baseline Type-II Only | Exclusion Rules<br><br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Baseline Adjustments<br><br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only | Adjustment Window<br><br>Meter Before / Meter After, Baseline Type-I, Baseline Type-II Only |
| **PJM-8** | **Baseline Type-I** | Alternative calculations available as appropriate based on specific load conditions as long as it will significantly improve accuracy compared to standard method & can be effectively administered in the market | Alternative calculations available as appropriate based on specific load conditions as long as it will significantly improve accuracy compared to standard method & can be effectively administered in the market | N / A | Alternative calculations available as appropriate based on specific load conditions as long as it will significantly improve accuracy compared to standard method & can be effectively administered in the market | Alternative calculations available as appropriate based on specific load conditions as long as it will significantly improve accuracy compared to standard method & can be effectively administered in the market | Alternative calculations available as appropriate based on specific load conditions as long as it will significantly improve accuracy compared to standard method & can be effectively administered in the market |
| **SPP** | | | | | | | |
| **SPP-1** | **Behind-the-Meter Generation** | N / A | N / A | N / A | N / A | N / A | N / A |
| **SPP-2** | **Baseline Type-I** | Customer / Resource Specific | Customer / Resource Specific | N / A | Customer / Resource Specific | Customer / Resource Specific | Customer / Resource Specific |

| PERFORMANCE EVALUATION METHODS | | Event Information | | | | Special Processing | |
|---|---|---|---|---|---|---|---|
| Cross-Reference<br>- | Performance Evaluation<br>- | Use of Real-Time Telemetry<br>- | Use of After-The-Fact Metering<br>- | Performance Window<br>- | Measurement Type<br>- | Highly-Variable Load Logic<br>ALL EXCEPT<br>Behind-The-Meter Generation | On-Site Generation Requirements<br>ALL EXCEPT<br>Behind-The-Meter Generation |
| **AESO** | | | | | | | |
| **AESO-1** | **Maximum Base Load** | Yes | Yes | Sustained Response Period | SCADA or Meter Data if compliance appears to be an issue | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **CAISO** | | | | | | | |
| **CAISO-1** | **Meter Before / Meter After** | No | For SC Metered Entities: Interval meter data is collected and submitted by a SC as Settlement Quality Meter Data<br>For CAISO Metered Entities: Interval meter data is directly polled by the C | Sustained Response Period | 5-Minute Interval Load | None | None |
| **ERCOT** | | | | | | | |
| **ERCOT-1** | **Baseline Type-I** | No | Yes | Sustained Response Period | 15-minute Interval Data Recorder compared to model | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ERCOT-2** | **Baseline Type-I** | No | Yes | Sustained Response Period | 15-minute Interval Data Recorder compared to model | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ERCOT-3** | **Baseline Type-I** | No | Yes | Sustained Response Period | 15-minute Interval Data Recorder compared to model | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ERCOT-4** | **Maximum Base Load** | No | Yes | Sustained Response Period | 15-minute Interval Data Recorder compared to model | This model is specifically designed for highly variable loads | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ERCOT-5** | **Baseline Type-II** | No | Yes | Sustained Response Period | Model based on statistical sample consistent with industry best practices and approved by ISO Staff is compared to the model | None | None |
| **ERCOT-6** | **Meter Before / Meter After** | Yes | Yes | Sustained Response Period | Telemetry (2-second) backed by 15-minute IDR meter data | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ERCOT-7** | **Meter Before / Meter After** | Yes | No | Sustained Response Period | Telemetry (2-second) | None | None |
| **IESO** | | | | | | | |
| **IESO-1** | **Baseline Type-I** | No | Yes | Event-dependent, as specified in Notification instructions | Hourly metered load | None | None |
| **IESO-2** | **Baseline Type-I** | No | Yes | Event-dependent, as specified in Notification instructions | Hourly metered load | None | None |
| **IESO-3** | **Baseline Type-II** | No | No | Event-dependent, as specified in Notification instructions | Statistical equivalent of 5 minute or hourly metered load | None | None |
| **ISO-NE-4** | **Behind-the-Meter Generation** | Yes | Optional | Sustained Response Period | 5-Minute Interval Load | N / A | N / A |
| **ISO-NE-5** | **Baseline Type-I** | Yes | Optional | Sustained Response Period | 5-Minute Interval Load | M&V alternative subject to ISO-NE approval | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ISO-NE-6** | **Baseline Type-II** | No | Yes | Sustained Response Period | Statistical equivalent of 5 minute metered load | M&V alternative subject to ISO-NE approval | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **ISO-NE-7** | **Behind-the-Meter Generation** | Yes | Optional | Sustained Response Period | 5-Minute Interval Load | N / A | N / A |

| PERFORMANCE EVALUATION METHODS | | Event Information | | | | Special Processing | |
|---|---|---|---|---|---|---|---|
| Cross-Reference<br><br>- | Performance Evaluation<br><br>- | Use of Real-Time Telemetry<br><br>- | Use of After-The-Fact Metering<br><br>- | Performance Window<br><br>- | Measurement Type<br><br>- | Highly-Variable Load Logic<br><br>ALL EXCEPT<br>Behind-The-Meter Generation | On-Site Generation Requirements<br><br>ALL EXCEPT<br>Behind-The-Meter Generation |
| **MISO** | | | | | | | |
| **MISO-1** | **Baseline Type-I** | No | Yes | Sustained Response Period | Customer / Resource Specific | None | None |
| **MISO-2** | **Baseline Type-II** | No | Yes | Sustained Response Period | Customer / Resource Specific | None | None |
| **MISO-3** | **Behind-the-Meter Generation** | No | Yes | Sustained Response Period | Customer / Resource Specific | N / A | N / A |
| **MISO-4** | **Maximum Base Load** | No | Yes | Sustained Response Period | Customer / Resource Specific | None | None |
| **MISO-5** | **Meter Before / Meter After** | No | Yes | Sustained Response Period | Customer / Resource Specific | None | None |
| **MISO-6** | **Meter Before / Meter After** | Yes | Yes | Sustained Response Period | Host Load Forecast - integrated one-minute meter data | None | None |
| **NYISO** | | | | | | | |
| **NYISO-1** | **Maximum Base Load** | No | Yes | Event-dependent, as specified in Advance Notification instructions | Hourly interval meter data is collected by a NY PSC-approved Meter Data Service Provider (MDSP) | None | None |
| **NYISO-2** | **Meter Before / Meter After** | Yes (with interconnection to Transmission Owner) | Yes | Sustained Response Period | Instantaneous metered load | None | None |
| **NYISO-3** | **Baseline Type-I** | No | Yes | As scheduled (DADRP) or Event-dependent, as specified in Advance Notification instructions | Hourly interval meter data is collected by a NY PSC-approved Meter Data Service Provider (MDSP) | None | No local/backup generators permitted in DADRP |
| **NYISO-4** | **Baseline Type-II** | No | As approved on a case by case basis (for EDRP Service) or Equivalent of After-The-Fact Metering defined for other resources (NYISO-6), as approved on a case by case basis (for SCR Service) | Event-dependent, as specified in Advance Notification instructions | Statistical equivalent of hourly metered load | None | None |
| **NYISO-5** | **Behind-The-Meter Generation** | No | Yes (if unit is not net metered) | Event-dependent, as specified in Advance Notification instructions | Hourly metered output | None | No base load generators permitted in EDRP |
| **PJM** | | | | | | | |
| **PJM-1** | **Baseline Type-I** | No | Yes | Sustained Response period or optionally Deployment Period (Participant Selection) | Hourly Meter relative to CBL | Based on specific resource | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **PJM-2** | **Behind-the-Meter Generation** | No | Yes | Sustained Response Period | Settlement on Hourly Meter Read | N / A | N / A |
| **PJM-3** | **Baseline Type-II** | No | Yes | Sustained Response period or optionally Deployment Period (Participant Selection) | Hourly Meter relative to CBL | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **PJM-4** | **Meter Before / Meter After** | No | Yes | Sustained Response Period | Average over Performance Window | Specific rules for facilities with batch processing | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **PJM-5** | **Meter Before / Meter After** | Yes | Yes | Sustained Response Period | Average over Performance Window | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **PJM-6** | **Meter Before / Meter After** | No | Yes | Sustained Response Period | Average over Performance Window | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **PJM-7** | **Maximum Base Load** | No | Yes | Sustained Response Period | Average over Performance Window | None | None (On-site generation is not prohibited but performance is measured via Load reduction) |

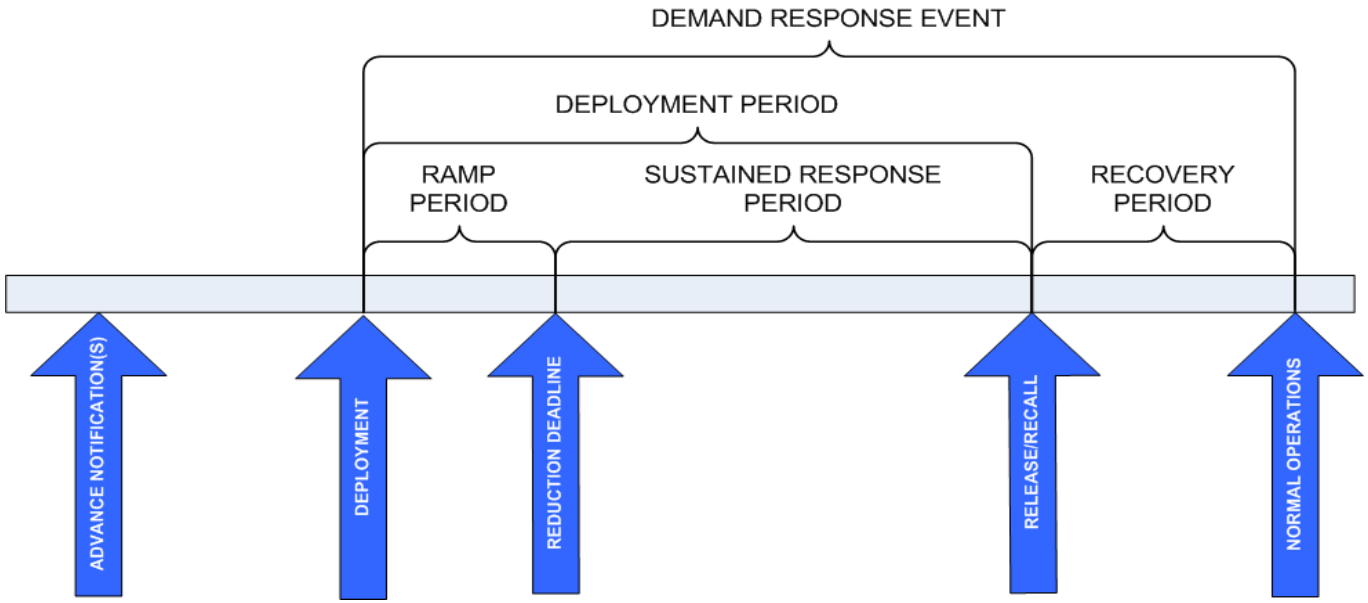
| PERFORMANCE EVALUATION METHODS | | Event Information | | | | Special Processing | |
|---|---|---|---|---|---|---|---|
| Cross-Reference<br><br>- | Performance Evaluation<br><br>- | Use of Real-Time Telemetry<br><br>- | Use of After-The-Fact Metering<br><br>- | Performance Window<br><br>- | Measurement Type<br><br>- | Highly-Variable Load Logic<br><br>ALL EXCEPT<br>Behind-The-Meter Generation | On-Site Generation Requirements<br><br>ALL EXCEPT<br>Behind-The-Meter Generation |
| **PJM-8** | **Baseline Type-I** | No | Yes | Sustained Response period or optionally Deployment Period (Participant Selection) | Hourly Meter relative to CBL | Alternative calculations available as appropriate based on specific load conditions as long as it will significantly improve accuracy compared to standard method & can be effectively administered in the market | None (On-site generation is not prohibited but performance is measured via Load reduction) |
| **SPP** | | | | | | | |
| **SPP-1** | **Behind-the-Meter Generation** | Yes | Yes | 5 Minutes & Hourly | Actual vs. Setpoint | N / A | N / A |
| **SPP-2** | **Baseline Type-I** | Yes | Yes | 5 Minutes & Hourly | Actual vs. Setpoint | None | None |

Terms used in this document are taken from the **Business Practices for Measurement and Verification of Wholesale Electricity Demand Response** available to NAESB members via the following hyperlink:

http://www.naesb.org/member_login_form.asp?doc=fa_weq_2008_api5a.doc

Clarification of other terms utilized:

| | |
|---|---|
| **Resource-Specific Deployment** | The System Operator issues dispatch instructions to one or more discrete unique resources designated to provide the demand response service. A defined communication channel is required. Real-time two-way communication is optional. |
| **Bulk Deployment** | The System Operator issues dispatch instructions to a group or block of resources designated to provide the demand response service. A defined communication channel is required. Real-time two-way communication is optional. |
| **Self Deployment** | Deployment of resources is automatic or initiated by the resource or aggregator and not initiated by the System Operator via a defined communication channel. Rather, the resource responds to signals such as real-time electrical system conditions, real-time economic conditions, or market outcomes. Real-time communication is optional. |




| | | | Advance Notification(s) | Deployment | Ramp Period | Reduction Deadline |
|---|---|---|---|---|---|---|
| 1 | **Day-Ahead Energy** | The ISO/RTO notifies a CSP at 4:00 the day before an event to begin ramping down at 2:00 with the load required to be off the system at 2:30 | 4:00 (day before) | 2:00 | 30 Minutes | 2:30 |
| 2 | **Emergency Energy or 30-Minute Reserve** | The ISO/RTO calls a CSP at 2:00 and states that load must be off the system by 2:30 | - | 2:00 | 30 Minutes | 2:30 |
| 3 | **Day-Ahead Energy** | The ISO/RTO clears a resource at 4:00 the day before for a 2:00 event. | 4:00 (day before) | 2:00 | - | 2:00 |
| 4 | **10-Minute Reserve** | The ISO/RTO calls a resource enrolled for 10-minute reserve from the control room at 2:15 to responds to a reduction request | - | 2:15 | 10 Minutes | 2:25 |
| 5 | **Balancing Energy** | The ISO/RTO uses a powerflow algorithm to calculate setpoints and sends these new targets to the demand resource every 5 minutes, beginning at 1:55. | - | 1:55, 2:00, 2:05… | 5 Minutes | 2:00, 2:05, 2:10… |
| 6 | **Day-Ahead Energy** | A 10 MW demand resource can be curtailed to 5 MW under a price-responsive bid. The resource clears for the 2:00 hour in day-ahead at 8 MW and is notified through the DA final schedule at 4:00 (day-ahead). The resource has 30 minute startup time and a ramp limitation of 0.2 MW/min. (Detailed example of #3) | 4:00 (day before) | 2:00 | - | 2:00 |
| 7 | **Balancing Energy** | Same scenarios as above, however the remaining 3 MW of potential load drop is offered as real-time imbalance energy and, in real-time, the ISO/RTO selects the imbalance bid and dispatches the resource to 5 MW. | 4:00 (day before for day schedule) & 1:30 (for imbalance) | 2:00 | 15 minutes | 2:15 |