Overview of Reliability Demand Response Resource

Radha Madrigal
Customer Service Department

May 8, 2014
Agenda

• Product overview and purpose
• Define Reliability Demand Response Resource
• Agreements & registration
• Participating in the day-ahead and real-time markets
• Accessing the Demand Response System (DRS)
• Meter data submission
• Baseline methodology for RDRR
• Settlements – Default Load Adjustment (DLA)
PRODUCT OVERVIEW AND PURPOSE
Overview
Reliability Demand Response Resource

• Wholesale demand response product allowing emergency responsive demand response resources to integrate into the ISO market

• Created as a result of a multi-party, cross-industry settlement agreement approved by the California Public Utilities Commission (CPUC)

• Resolves issues concerning quantity, use and resource adequacy treatment of retail emergency-triggered demand response programs
Overview
Reliability Demand Response Resource

• Modeled like a supply resource relying on the functionality and infrastructure designed for *proxy demand resources* (PDR)

• Enables *reliability demand response resources* (RDRR) to offer energy economically in the day-ahead market

• Enables RDRR to offer remaining uncommitted capacity as energy in the real-time market
RDRR is…

Compatible with existing retail emergency-triggered demand response programs including:

- Investor-Owned Utilities’ interruptible load programs
- Direct-load control programs
- Agriculture and interruptible pumping program

Demand response resources that are configurable to offer day-ahead energy and respond to reliability event in real-time

- Large-single resource
- Aggregated resources
Purpose
Reliability Demand Response Resource

• Reliability-only uses include:
  – System emergencies
    • transmission emergencies on ISO controlled grid
    • mitigation of imminent or threatened operating reserve deficiencies
  – Resolving local transmission and distribution system emergencies
Purpose
Reliability Demand Response Resource

• Resources provide additional value to respond economically in the day-ahead timeframe yet can curtail real-time load when required under a system or local emergency

• ISO can utilize full available capacity of RDRR in the markets
## Comparison of PDR and RDRR Designs

<table>
<thead>
<tr>
<th>Design</th>
<th>Acronym</th>
<th>Services</th>
<th>Market dispatch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proxy Demand Demand Resource</td>
<td>PDR</td>
<td>Energy, non-spin, residual unit commitment (RUC)</td>
<td>Economic day-ahead and real-time</td>
<td>Bids into ISO markets as supply</td>
</tr>
<tr>
<td>Reliability Demand Response Resource</td>
<td>RDRR</td>
<td>Energy</td>
<td>Economic day-ahead, reliability real-time</td>
<td>Bids into ISO markets; used for reliability purposes</td>
</tr>
</tbody>
</table>
RDRR Real-Time Example

SC submits bids between $950 - $1000/MW

The ISO has a system or local emergency

RDRR bids are added to the bid pool

Resources are dispatched...

And settled like generation
DEFINE RELIABILITY DEMAND RESPONSE RESOURCE
Resource Characteristics

- Minimum load curtailment ≥ 500kW per RDRR
- Must be capable of delivering reliability energy in real-time, reaching full curtailment within 40 minutes
- Cannot have a minimum run time of greater than one (1) hour
- Must have sustained response period or maximum run time of at least four (4) hours
Resource Characteristics

• Must be dispatchable by the ISO’s automated dispatch system (ADS) within a geographic location sub-load aggregation point (Sub-LAP) for a specific MW quantity

• In Master File, all RDRR resources will:
  – Have a Pmin Value of 0MW
  – Have $0 minimum load cost compensation value registered
Resource Characteristics

• Must be available for up to 15 Events and/or 48 hours per term

• A term is a 6 month period (summer and winter)
  – Summer term runs from June through September
  – Winter term runs from October through May

• Economic participation in the day-ahead market will not reduce availability limits

• RDRR automatically roll-over each term unless demand response provider opts out
Resource Characteristics

- RDRR may elect to participate as a resource that receives discrete dispatches (all or nothing) modeled similar to constrained output generators
  - Resource will be limited in size up to 50MW
- RDRR that do not elect to have discrete dispatches will have no ISO specified megawatt size limitation
- Discrete dispatch election through Generator Resource Data Template and maintained in Master File
- Discrete dispatch option is for the real-time market only
AGREEMENTS & REGISTRATION
Securing Agreements for Wholesale Participation

• Before participating in the ISO’s wholesale markets, Demand Response Provider (DRP) must:
  – Have an agreement with the Load Serving Entity (LSE) who serves the demand responsive load
  – Have an agreement with the Utility Distribution Company (UDC) who distributes the energy to the demand response locations
  – Execute a Demand Response Agreement with the ISO to participate in the wholesale markets
Obtaining California ISO Agreement, DRP ID and System Access

- A guide has been developed for DRP’s providing a checklist of tasks that must be completed prior to obtaining access to the Demand Response System (DRS)
  - [http://www.caiso.com/participate/Pages/Load/Default.aspx](http://www.caiso.com/participate/Pages/Load/Default.aspx)

- Includes additional document links to initiate processes to obtain a DRP agreement and system access

- Documents are in the Proxy Demand Resource section of the page (the registration process is the same)
Key Points

- Demand response locations are site specific
- Different LSEs or sub-LAPs require different registrations
- Different contract dates require different registrations
Example 1 – DRP1 contracted with 4 locations in San Diego to provide DR in the wholesale market

DRP1 will complete a registration for LSE1 and another registration for LSE2
Example 2 – DRP2’s locations are all with the same LSE but, the contract dates are not the same.

DRP2 will complete 2 separate registrations based on the contract dates.
Establishing a Portfolio

- Once agreements are executed and accepted
- DRP requests system access (see checklist)
- Enters customer specific information into DRS to add demand response locations and create registrations
- Using an RDRR Registration, ISO assigns an RDRR Resource ID used in the ISO’s wholesale markets
- DRP completes an ISO Generator Resource Data Template (GRDT)
  - Details resource specific characteristics
Periodic Performance Testing

- One unannounced test dispatch per year to ensure availability and performance of resource
- Test events will count toward RDRR availability limit of 15 events and/or 48 hours per RDRR term
- Test events instructed through exceptional dispatch and settled as test energy
- Availability standards apply for RDRR identified as resource adequacy resources
PARTICIPATING IN THE DAY-AHEAD AND REAL-TIME MARKETS
Market Rules for RDRR

• Minimum load curtailment must be at least 500kW
• ISO will apply a generation distribution factor to all aggregated RDRR; this is not a biddable parameter
• May not submit RUC availability or ancillary service bids
• May not self-provide ancillary services
• RDRR may receive an exceptional dispatch if system conditions warrant the action
Bidding Rules for RDRR
Day-Ahead Market

- Energy may not be self-scheduled
- Multi-segment energy bid curves may be submitted in the day-ahead market
- Day-ahead energy bids will not be constrained to be in the range of the ISO bid cap and 95% of the bid cap
- Economic participation in the day-ahead market will not reduce availability limits for the RDRR term
Bidding Rules for RDRR
Real-Time Market

- RDRR resources electing to receive discrete dispatches must submit a single segment bid in real-time
- Multi-segment bids may be submitted for RDRR resources not under a discrete dispatch election
- Real-Time energy bids for all RDRR resources must be in the range of the ISO bid cap and 95% of the ISO bid cap
Real-Time Dispatches for Reliability

- Real-time dispatch of RDRR in event of imminent or actual system or transmission emergency as specified in ISO Operating Procedure 4420
- RDRR may be a marginal resource and may be dispatched as such, unless the resource has a discrete dispatch election
- RDRR identified as marginal resource may set the LMP
- RDRR dispatched in real-time settled on a 15-minute (FMM) or 5-minute time scale (RTD)
Real-Time Dispatches for Reliability

- Real-time RDRR dispatches will be received through ADS
- Dispatches of RDRR in real-time will be based solely on the energy bids of RDRR between the ISO bid cap and 95% of the ISO bid cap
- Upon system conditions returning to normal, RDRR returned to “emergency-only” status
- Event (#) and event duration (hours) will be recorded in DRS and counted against total RDRR eligible availability limits of 15 and/or 48 hours within any six (6) month RDRR term
ACCESSING THE DEMAND RESPONSE SYSTEM (DRS)
Purpose of DRS

DRP and SC must provide an external point of contact

- Registration
- Meter Data Submission
- Calculate energy measurement

Participants need a digital certificate for access to DRS
DRPs may perform the following functions in DRS:

- Create & modify locations
- Create & modify registrations
- Review and comment by LSE and UDC
- Upload & download meter data
- Calculate & download customer baseline information
- Evaluate compliance and event information
Defining the Terms – Demand Response System

- **Locations**
  - Physical location of the demand responsive entity
  - Includes customer data like UDC account number, physical service location, curtailable load amounts

- **Registration**
  - May be comprised of a single location or an aggregation of many locations
  - Aggregation of locations must be served by same LSE and located in same Sub-LAP for approval by LSE and UDC
  - Meter Data information submitted at registration level for baseline calculation prior to market participation
Defining the Terms

• Registration submitted for LSE, UDC review and ISO approval

• RDRR Resource ID assigned by ISO
  – One Registration to One RDRR Resource ID
  – Unique RDRR Resource ID used as identifier for the ISO wholesale markets
  – RDRR Resource ID is utilized for participation in the wholesale markets (scheduling/bidding and settlement)
  – Resource specific information for RDRR Resource ID resides in the ISO Master File
DRS Application Updates

Fields

• Registration Details Screen:
  – Program
  – Season (visible when Reliability program is selected)
  – Discrete Dispatch (visible when Reliability program is selected)
  – Start Date (defaults to today’s date)
  – End Date (populated based on end of season date)

• Performance Tab:
  – Method
DRS Application Updates

Fields

- Name
- Registration Id: R2561
- DRP
- Status: Pending
- Discrete Dispatch
- Program
- Season
- Start Date
- End Date
- Reliability (1/1/09-5/31/20)
- Program:
  - Select Season:
    - Winter 2013
    - Summer 2014
    - Winter 2014
    - Summer 2015
    - Winter 2015
    - Summer 2016
    - Winter 2016
    - Summer 2017
    - Winter 2017
    - Summer 2018
    - Winter 2018
    - Summer 2019
- Locations:
  - UDC
  - LSE
  - SubLAP
  - PDR_ID
  - DRP SCID
  - Reserve ID
DRS Application Updates

Fields
DRS Application Updates
Screens

• Seasonal Resource Usage (new)
  – Displays season summary data

• Event Search page
  – Season column added to this page

• Performance Search page
  – Season column added to this page
### DRS Application Updates

#### Seasonal Resource Usage

<table>
<thead>
<tr>
<th>Resource</th>
<th>Sub LAP</th>
<th>Program Performance Hours</th>
<th>Pending Cap (MW)</th>
<th>Confirmed Cap (MW)</th>
<th>Season</th>
<th>Discrete Dispatch Flag</th>
<th>DRP</th>
<th>Capacity Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The table above illustrates the seasonal resource usage and capacity thresholds. Each row represents a different resource and column specifies various parameters such as sub LAP, performance hours, pending and confirmed capacity, season, discrete dispatch flag, DRP, and capacity threshold.
### DRS Application Updates

#### Event Search Page

![Event Search Page](image)

### Table: Event Search

<table>
<thead>
<tr>
<th>ID</th>
<th>Date</th>
<th>Event Type</th>
<th>Status</th>
<th>Reg Id</th>
<th>Registration Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Season](image)  

Total: 2
DRS Application Updates
Performance Search Page
Using the Demand Response System

• Instructions for submitting/retrieving information from DRS can be found in the user guide:

• Technical interface specifications for DRS Exchange Services v20111001 are available:
METER DATA
Meter Data Submission

• A RDRR is a scheduling coordinator metered entity
  – SCs submit Settlement Quality Meter Data (SQMD) to the DRS for DRPs they represent

• Used to establish Customer Baseline Load
  – Baseline established using “10 in 10” methodology
  – Simple average of 10 similar non-event days using most recent days prior to an “event”

• A written application may be submitted to the ISO for approval of a methodology for deriving Settlement Quality Meter Data that consists of a statistical sampling of energy usage data
Meter Data Submission - Post Market

- Only the scheduling coordinator for the DRP may submit meter data.

- DRP must identify their SC during the registration process and submit User Application Authorization Request Form (AARF) on the SC’s behalf.

- Only the scheduling coordinator for the LSE can retrieve meter data for the RDRRs associated to their DLAP Resource IDs.

- Scheduling coordinator for LSE will need to obtain DRS access (AARF) to see active RDRR resources that impact DLAP Resource IDs.
Meter Data Submission - Post Market

- Actual SQMD must be submitted into DRS for the RDRR Resource ID following the ISO meter data submittal timelines
  - T+8B
  - T+48B
  - T+168B - 172B resubmittal window
    - Data submitted during this time period will be subject to the Rules of Conduct, which include a penalty of $1000 per Trade Date affiliated with an SCID

- RDRR resources participating in the day-ahead market may submit data in 60-minute (hourly) interval format for each of the 24 hours in a day

- RDRR resources must submit sufficient SQMD after an event has occurred (historical/event day data)

- All meter data submitted in GMT
Meter Data Submission

• Data needs to be provided for 24 hours for each day
  – hourly intervals for day ahead only, 5-minute intervals for real-time

• Meter data submittal file will accommodate multiple resources and multiple trade days

• For multiple locations in a registration, meter data must be aggregated from underlying loads and submitted

• Meter data is used for different calculations in DRS

• Meter data may be uploaded to DRS in XML format or submitted via API

• XSD Technical specifications for meter data submission can be found in the technical interface specifications
How Meter Data is Used

- Raw Customer Baseline
- Load Point Adjustment (Morning Adjustment)
- RDRR Energy Measurement
Validating Performance

- Performance calculation based on a 10-in-10 baseline methodology with a bi-directional morning adjustment capped at 20%

- If approved by the ISO, a DRP may use a different methodology for deriving performance measurement
  - Conform to North American Energy Standards Board (NAESB) standards
  - Will require FERC approval of tariff amendment
    - “Hourly Gen” choice in DRS to accommodate this option
Baseline Methodology for RDRR
Standard Baseline Types

- RDRR will rely on 2 North American Energy Standards Board measurement and verification standard baseline types
  - Baseline Type – I
    - Performance evaluation based on historical interval meter data
  - Baseline Type – II
    - Performance evaluation based on statistical sampling to estimate energy consumption of aggregated demand resource where interval metering is not available
Baseline methodology for RDRR Resources using Baseline Type – I
Using Interval Meter Data to Settle for RDRR Resources

Baseline Type – I

• Raw baseline will be calculated

• After the event, the Load Point Adjustment will be calculated for the resource

• Meter data will be used to measure performance

• Resource will be paid based on performance
Defining a Customer Baseline

• A customer baseline is an average performance measurement of RDRR when the resource is in a “non-event” state

• Events are defined as anything that would change the performance output of a resource.
  – SLIC outage
  – Day-ahead schedule
  – Real-time dispatch
  – Capacity award

• Calculated using Settlement Quality Meter Data

• Requires 45 days of historic meter data
Defining a Customer Baseline

• When an event occurs, DRS selects the most recent, similar non-event days

• Customer baseline established using “10-in-10” methodology

• Simple average of 10 similar non-event days using most recent days prior to an “event”

• The raw customer baseline can be adjusted up or down by no more than 20% - called a Load Point Adjustment (Morning Adjustment) for the day

• Revised customer baseline is used for the RDRR energy measurement
## Example of How to Calculate the Baseline

### Meter Data Submission HE 16 for 45-Day Historical Customer Baseline Calculation

#### Trade Date: 6/15 - HE 16

<table>
<thead>
<tr>
<th>May 2010</th>
<th>June 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUN</strong></td>
<td><strong>SUN</strong></td>
</tr>
<tr>
<td><strong>MON</strong></td>
<td><strong>MON</strong></td>
</tr>
<tr>
<td><strong>TUES</strong></td>
<td><strong>TUES</strong></td>
</tr>
<tr>
<td><strong>WED</strong></td>
<td><strong>WED</strong></td>
</tr>
<tr>
<td><strong>THUR</strong></td>
<td><strong>THUR</strong></td>
</tr>
<tr>
<td><strong>FRI</strong></td>
<td><strong>FRI</strong></td>
</tr>
<tr>
<td><strong>SAT</strong></td>
<td><strong>SAT</strong></td>
</tr>
</tbody>
</table>

- **NE** = Non-Event Day
- **E** = Event Day
- **WE** = Weekend
- **H** = Holiday

<p>| | | | | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.75</td>
<td>14.75</td>
<td>15.50</td>
<td>14.20</td>
<td>14.50</td>
<td>13.85</td>
<td>6.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.75</td>
<td>13.75</td>
<td>14.75</td>
<td>15.50</td>
<td>15.25</td>
<td>15.75</td>
<td>15.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.75</td>
<td>14.75</td>
<td>15.50</td>
<td>14.20</td>
<td>14.50</td>
<td>13.85</td>
<td>6.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.75</td>
<td>13.75</td>
<td>14.75</td>
<td>15.50</td>
<td>15.25</td>
<td>15.75</td>
<td>15.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.80</td>
<td>15.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Trade Date: 6/15 - HE 16
Example of How to Calculate the Raw Baseline

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Event</th>
<th>HE 16 Meter Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/25/2010</td>
<td>Weekday</td>
<td>N</td>
<td>14.75</td>
</tr>
<tr>
<td>5/26/2010</td>
<td>Weekday</td>
<td>N</td>
<td>15.50</td>
</tr>
<tr>
<td>5/27/2010</td>
<td>Weekday</td>
<td>N</td>
<td>15.25</td>
</tr>
<tr>
<td>5/28/2010</td>
<td>Weekday</td>
<td>N</td>
<td>15.75</td>
</tr>
<tr>
<td>6/1/2010</td>
<td>Weekday</td>
<td>N</td>
<td>13.75</td>
</tr>
<tr>
<td>6/2/2010</td>
<td>Weekday</td>
<td>N</td>
<td>14.00</td>
</tr>
<tr>
<td>6/3/2010</td>
<td>Weekday</td>
<td>N</td>
<td>14.75</td>
</tr>
<tr>
<td>6/7/2010</td>
<td>Weekday</td>
<td>N</td>
<td>13.75</td>
</tr>
<tr>
<td>6/8/2010</td>
<td>Weekday</td>
<td>N</td>
<td>15.50</td>
</tr>
<tr>
<td>6/10/2010</td>
<td>Weekday</td>
<td>N</td>
<td>14.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>147.5</td>
</tr>
<tr>
<td><strong>Average for Baseline</strong></td>
<td></td>
<td></td>
<td><strong>14.75</strong></td>
</tr>
</tbody>
</table>

- Baseline calculation used for performance evaluation of RDRR resource for Trade Date 6/15/10 – HE 16

- Raw Customer Baseline = 14.75
How the Baseline is Used

• Raw customer baseline is established as an average of normal (no curtailment) load use

• A Load Point Adjustment (morning adjustment) ratio is applied to the Raw Customer Baseline once per day for each hourly event

• Revised customer baseline establishes basis against which actual meter data is used to determine RDRR energy measurement
Defining the Load Point Adjustment (Morning Adjustment)

- Load Point Adjustment (morning adjustment) triggered by first event of a trade day

- Ratio applied to the raw Customer Baseline based on how the load is behaving on the event day
  - Based on a calculation using 3 prior hours (excludes hour immediately prior to event start) of average load compared with average RDRR Customer Baseline for the same hours
  - Load Point Adjustment ratio has a floor at 80% and a ceiling of 120%
  - If the Load Point Adjustment remains between 80% and 120%, then the calculated ratio is used
Calculating the Load Point Adjustment
ABC Company’s Resource

Using ABC Company’s RDRR:
Event Day/Hour: June 15, 2010 – HE 16

<table>
<thead>
<tr>
<th>Load</th>
<th>DR Meter</th>
<th>Raw Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE12</td>
<td>13.00</td>
<td>14.00</td>
</tr>
<tr>
<td>HE13</td>
<td>12.50</td>
<td>14.20</td>
</tr>
<tr>
<td>HE14</td>
<td>14.75</td>
<td>15.50</td>
</tr>
<tr>
<td>Average</td>
<td>13.42</td>
<td>14.57</td>
</tr>
</tbody>
</table>

Load Point Adjustment = $\frac{13.42}{14.57}$
= 0.9210 or 92.10%

Load Point Adjustment will use 0.9210 multiplier against raw Customer Baseline to establish adjusted Customer Baseline
Calculating the Load Point Adjustment

- Load Point Adjustment factors in actual performance conditions of the trade date (weather-related or other conditions that would affect the RDRR performance)
- Re-adjusts the raw baseline to provide a more accurate adjusted baseline for the event to measure RDRR energy measurement

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14.75</td>
<td>X</td>
<td>0.92</td>
<td>13.57</td>
<td>12.42</td>
</tr>
</tbody>
</table>
Comparison – Raw Baseline and Baseline with Load Point Adjustment

Raw Baseline

Metered Load

Adjusted Baseline Using Load Point Adjustment

06:00  Noon  18:00

Represents actual RDRR performance
SETTLEMENTS – DEFAULT LOAD ADJUSTMENT (DLA)
Unique Settlement Rules for Demand Response

- FERC Order 745 required the ISO to implement a Net Benefits Test (NBT)
- NBT establishes price threshold above which demand response resource bids are deemed cost effective
- Settlement impact is to LSE’s only
Default Load Adjustment

• Net benefits test price is used to determine whether or not a Default Load Adjustment (DLA) is applied

• DLA represents the amount of load curtailed (not meeting the net benefits test) within a Default LAP for a specific LSE

• When applicable, a resource-specific DLA will be applied to the LSE’s Default LAP Resource ID’s metered load
Default Load Adjustment

• LSE will see the DLA in the SC bill determinant file

• Detailed information on the calculation and application of the DLA to calculate the LSE Uninstructed Imbalance Energy (UIE) can be found in the BPM configuration guide for pre-calculation of the real-time energy quantity
  – Variable name is: Resource STLMT Interval PDR NBT Load Adjustment Quantity
WRAPPING IT UP
Course Summary

- Wholesale demand response product allowing emergency responsive demand response resources to integrate into the ISO market
- Enables Reliability Demand Response Resources (RDRR) to participate in the day-ahead and real-time energy markets
- May not offer RUC capacity
- May not offer ancillary services capacity
- Must complete agreements with LSE, UDC, and ISO
- Registration through the Demand Response System (DRS)
Course Summary

• RDRR design is compatible with existing retail emergency-triggered demand response programs including:
  – Investor-Owned Utilities interruptible load programs
  – Direct-load control programs
  – Agriculture and interruptible pumping program

• RDRR respond to a reliability event for the delivery of “reliability energy” in real-time
  – May be dispatched due to system emergencies
  – May be dispatched to resolve local transmission and distribution emergencies
Course Summary

• Meter data submission through DRS
• Performance evaluated against 10-in-10 baseline methodology
• RDRR is settled similar to generators
• Default Load Adjustment may be applied to Load Serving Entities’ metered load based on net benefits test
REFERENCES
References

- Reliability Demand Response (initiative page)
  - [http://www.caiso.com/participate/Pages/MeteringTelemetry/Default.aspx](http://www.caiso.com/participate/Pages/MeteringTelemetry/Default.aspx)
- Implementation Link for RDRR
- Market Simulation Structured Scenarios (updated May 1, 2014):
## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>Automated Dispatch System</td>
</tr>
<tr>
<td>DLAP</td>
<td>Default Load Aggregation Point</td>
</tr>
<tr>
<td>FMM</td>
<td>Fifteen-Minute Market</td>
</tr>
<tr>
<td>DRP</td>
<td>Demand Response Provider</td>
</tr>
<tr>
<td>DRS</td>
<td>Demand Response System</td>
</tr>
<tr>
<td>LMP</td>
<td>Locational Marginal Price</td>
</tr>
<tr>
<td>LSE</td>
<td>Load Serving Entity</td>
</tr>
<tr>
<td>PDR</td>
<td>Proxy Demand Resource</td>
</tr>
<tr>
<td>RDRR</td>
<td>Reliability Demand Response Resource</td>
</tr>
<tr>
<td>RTD</td>
<td>Real-Time Dispatch</td>
</tr>
<tr>
<td>RUC</td>
<td>Residual Unit Commitment</td>
</tr>
<tr>
<td>SC</td>
<td>Scheduling Coordinator</td>
</tr>
<tr>
<td>SQMD</td>
<td>Settlement Quality Meter Data</td>
</tr>
<tr>
<td>UDC</td>
<td>Utility Distribution Company</td>
</tr>
</tbody>
</table>