# FERC Order 745: DR Compensation in Organized Wholesale Electricity Markets

## Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
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<tr>
<td>04/25/2012</td>
<td>1.0</td>
<td>Created the external business requirement document based on internal business requirement document</td>
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Figure 1: Showing the changes to the Settlements system as a result of the FERC Order 745. Please pay special attention to the application of Default Load Adjustment in the Uninstructed Imbalance Energy (UIE) calculation in Column W when the RT LMP at the Pnode associated with the PDR (Column G) is lower than the DR Net Benefits Threshold Price .................................................................................................................. 8
Disclaimer
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1. Introduction

1.1 Purpose

The purpose of this document is to capture and record a description of what the Users and Business Stakeholders of the project wish to obtain by providing high-level business requirements. This document establishes the basis for the agreement between the initiators and implementers of the project. The information in this document serves as input to determining the scope of Information Systems projects and to all Business Process Modeling and System Requirements Specifications efforts.

These requirements are intended for submission to the Information Technology Services (ITS) department and will serve as the initial set of business unit requirements for the appropriate software application/systems development effort. It is understood that ITS will perform additional requirements and systems analysis and may produce “To Be” Business Process Models, System Requirements Specifications, and Use Cases to serve as the set of requirements documents used by the ITS development teams to buy, modify, or build the necessary software and hardware systems. The Business Unit(s) involved in the project will have an opportunity to review and approve all ITS requirements documentation produced.

The purpose of this project is to comply with the Dec 15, 2011 order by Federal Electric Regulatory Commission (FERC) on the ISO’s compliance filing in response to Order 745, titled “Demand Response (DR) Compensation in wholesale Electricity Market” (Order 745). In that order, 2011, FERC partially accepted and partially rejected the ISO’s proposal:

- Accepted the ISO’s proposal on Methodology for calculating the Demand Response (DR) Net Benefits Test (NBT) Threshold Price
- Rejected the ISO’s Proposal on Rejection of bids from Proxy Demand Response (PDR) below the NBT Threshold Price
- Additionally, FERC Ordered Not to apply the Default Load Adjustment (DLA) if Locational Marginal Price (LMP)>NBT Threshold Price, and for the ISO to apply its existing Tariff when the LMP<NBT Threshold price. The ISO’s existing tariff practice applies the DLA.
- Settlement of DR compensation effective trade date Dec 15, 2011

It is also worth mentioning here that in Feb 2012 FERC rejected the ISO’s filling on Reliability Demand Response Resources (RDRR). The impact of FERC’s rejection of ISO’s RDRP filling is beyond the scope of this project, other than to remove such requirements from implementation in compliance with Order 745. At no time has RDRRP been in production and will be further discussed with the stakeholder before it would be ready for changes associated with its implementation.
1.1.1 High-Level Scope and Identification of Cross-functional Requirements

- **Demand Response System (DRS)**
  - Enhance the Demand Response System to only calculate the performance of each PDR at a DLAP Level and pass this information to the settlement system.\(^1\)

- **Settlements system**
  - Reads the DR NBT threshold price and reads the DR Performance at each Default Load Aggregation Point (DLAP) from DRS and either
    - applies the Default Load Adjustment (DLA) to the Real-Time (RT) Metered load of the LSE whose DLAP, the PDR is associated, when the RT LMP at the Pnode associated with the Proxy < DR NBT threshold price
    - does not apply the DLA, when RT LMP at the Pnode associated with the PDR >= DR NBT threshold price
  - Changes needed to the following charge codes (CC)
    - RT Energy Pre-Calc
    - 6806\(^2\)
    - CC6475
    - CC6477

1.2 References

All references represent external requirements documents or stakeholder requests developed and submitted by the Business Units.


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\(^1\) Currently, the DRS system aggregates the performance of all the PDRs in a DLAP and sends the aggregated performance number to the Settlements system.

\(^2\) CC 6806 is used for bid cost recovery (BCR). In this charge code, Net negative measured demand is offset using DLA. There is a potential that there might not be any changes to this one but a determination would be made during the design phase of the project.
2. Details of Business Need/Problem

2.1 Description

2.1.1 Changes to existing Settlement Rules

2.1.1.1 Updated relevant Tariff sections

The ISO’s compliance filings in response to Order 745 (see reference section 1.2 for a link to the tariff filing) changed section 11.5.2.4 of the tariff.

11.5.2.4 Adjustment to Metered Load to Settle UIE
For the purpose of settling Uninstructed Imbalance Energy of a Scheduling Coordinator representing a Load Serving Entity, the amount of PDR Energy Measurement delivered by a Proxy Demand Resource that is also served by that Load Serving Entity and that is paid a Market Clearing Price below the threshold Market Clearing Price set forth in Section 30.6.3.1 will be added to the metered load quantity of the Load Serving Entity’s Scheduling Coordinator’s Load Resource ID with which the Proxy Demand Resource is associated.
2.1.1.2 Changes to the settlement charge codes and the Demand response system (DRS) to comply with the Tariff

Currently the DRS:
- Aggregates (adds) the performance of all the Proxy Demand Response (PDR) resources belonging to the same Demand Response provider (DRP) Scheduling coordinator (SC) and associated with a common default load aggregation point (DLAP) and
- Sends the aggregated number to the Settlements system.

Upon receiving the information from the DRS, the Settlements system then:
- Applies the Default Load Adjustment (DLA) (equivalent to the performance of all the PDR resources associated with the DLAP) to the RT metered load of the host Load serving entity (LSE) associated to the DLAP.
  - In order to apply the DLA, the Settlements system adds the amount equal to the performance of all the PDR resources (in the DLAP) to the RT metered load of the LSE, while calculating Uninstructed Imbalance Energy (UIE) under charge code CC 6475. This is shown in Column Y in Figure 1.
  - Uninstructed Imbalance Energy (UIE) = (RT Metered Load + DR Performance) – DA Schedule
  - This treatment assumes that the dispatch of the PDR resource only benefite the host LSE.

In response to Order 745, the ISO has proposed to only apply DLA only when the RT Locational Marginal Price (LMP) at the Pricing Node associated with the PDR (Column G) is lower than the DR Net Benefits Threshold Price.
(Pnode) associated with the PDR \(^3\) is greater than or equal to the DR NBT threshold price, the DLA shall not be applied to the UIE calculation of the host LSE under CC 6475.

In order to make sure that the ISO settlement rules stated above can be implemented, the DRS system shall only calculate the performance of a PDR at a DLAP level and send this information to Settlement. Also since the settlement rules must be retroactively applied starting on Dec 15, 2011, the DRS system shall:

- Recalculate the performance of each PDR that has been dispatched since Dec 15, 2011. This recalculation may not be needed if the DRS internally stores the performance of individual PDR resources at a DLAP level.
- Send the performance of the PDRs at DLAP level to the Settlements system for all the PDRs that have been dispatched since Dec 15, 2011.

Let us use the example in Figure 1, and understand it further. The following discussion assumes:

- That the examples belong to an interval in an on-peak hour
- The on-peak DR NBT threshold price for the month is $51.09.
- There are three DLAPs and
  - the RT LMP for each DLAP was the same ($60.00) and each DLAP has only one PDR.

- In row 5, the RT LMP at the Pnode PGEB_1 is $69.00. This price is higher than the on-peak DR NBT threshold price ($51.09). Hence the DLA shall not be applied in this case. The UIE (in column W, cell W5) for SC PGEB_1_SC is \(-103 - (-67) = 37\) mw. If the DLA would have been applied, this amount would have been \(-103 + 2 - (-67) = 34\) mw, as shown in Column Y (cell Y5). The application of DLA would have resulted in lower payment to SC PGEB_1_SC by an amount \((36 - 34) \times 60 = 120.00\). This is evident in the difference between the amount shown in cell X5 ($2160.00) and cell Z5 ($2040.00).
  - o Row 5 displays similar behavior where non-application of the DLA results in reduced UIE (62 instead of 68) for SC SDG_2_SC because the RT LMP at SDG_2 (Pnode associated with the PDR), is $54 which is higher than the on-peak DR NBT threshold price of $51.09.

- In row 6, the RT LMP at the SCE_1 is $47.00. This price is lower than the on-peak DR NBT ($51.09). Hence the DLA shall continue to be applied while calculating the UIE (in column W, cell W6) for SC SCE1_SC (UIE = \(-34 + 7 - (-94) = 67\) mw. You can notice, the charge \((67 \times 60 = 1350)\) under CC 6475 is the same in cell X6 and Z6.

3. Business Process Impacts

3.1 High Level Business Process

3.1.1 Manage Billing and Settlement

The majority of the requirements in this BRS impact the execution of the manage billing and settlement business process. There are changes to this business process in the way the RT Uninstructed Imbalance Energy (UIE) is calculated by either apply or not applying DLA to the host LSE of the Sub-LAP associated to the PDR.

\(^3\) A mapping of a PDR resource and the Pnode that it is associated with, exists in the CAISO Master File (MF).
3.2 Assumptions & Constraints

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
<td>The DRS calculates the performance of a PDR at a resource level.</td>
</tr>
<tr>
<td>2.</td>
<td>There can be only one Pnode associated with a PDR resource. In case of an aggregated PDR, all resources of the aggregated PDR resource are associated with the same Pnode. It is further assumed that the DRS has a mapping of what DLAP is associated with each PDR and it can just share this mapping with the Settlements system for settlement.</td>
</tr>
<tr>
<td>3.</td>
<td>Each PDR is associated with one and only one DRP. Each DRP has an SC. This relationship of a PDR to a DRP and DRP to an SC is stored in MF. Settlements reads this information from the MF and settles the charges and payments associated with the dispatch or award of a DR in the RT or DA market respectively.</td>
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4. Business Requirements

The sections below describe the Business Processes and the associated Business Requirements involved in the project. These may represent high level functional, non-functional, reporting and/or infrastructure requirements. These business requirements directly relate to the high level scope items determined for the project.

4.1 Business Process: Manage Billing and Settlement

4.1.1 Business Requirements

<table>
<thead>
<tr>
<th>ID#</th>
<th>Business Feature</th>
<th>Requirement Type</th>
<th>Business Unit(s) Affected</th>
<th>Potenti al Application(s) Impact ed</th>
</tr>
</thead>
<tbody>
<tr>
<td>FERC745-BRQ010</td>
<td>The system shall not aggregate the performance of (one or more) PDRs at a DLAP level. Instead, the system shall calculate the performance of each resource at a DLAP level and send the following information to the Settlements system.</td>
<td>Core</td>
<td>Market Services</td>
<td>DRS</td>
</tr>
<tr>
<td>PDR Resource Name</td>
<td>DLAP name</td>
<td>DR Performance as it relates to the DLAP (in MW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID#</td>
<td>Business Feature</td>
<td>Requirement Type</td>
<td>Business Unit(s) Affected</td>
<td>Potenti al Application(s) Impacted</td>
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| FERC745-BRQ020 | The system shall  
  - *(If needed,)* Recalculate the performance of each PDR that has been dispatched since Dec 15, 2011. This recalculation may not be needed if the DRS internally stores the performance of each PDR at a DLAP level.  
  - Share the performance of each PDR at a DLAP level with the Settlements system for all the PDRs that have been dispatched since Dec 15, 2011. | Core             | Market Services            | DRS                               |
| FERC745-BRQ030 | The System shall only apply default load adjustment (DLA) when the RT LMP at the Pnode associated with the PDR is less than the DR Net Benefits test threshold price.                                                                                                                                 | Core Tariff section 11.5.2.4 | Market Services            | Settlements                                    |
| FERC745-BRQ040 | The System shall NOT apply default load adjustment (DLA) to the calculation of Uninstructed Imbalance Energy calculation when the RT LMP, at the Pnode associated with the PDR, is greater than or equal to the DR Net Benefits test threshold price                                                                 | Core Tariff section 11.5.2.4 | Market Services            | Settlements                                    |
| FERC745-BRQ050 | Every month, by the 15th Calendar day of the month, the ISO shall calculate a Demand Response (DR) Net Benefits test (NBT) threshold price for both the on-peak and off-peak hours of the upcoming (next) calendar month | Core Tariff section 30.6.3.X | Market Services            | Settlements                                    |

### 4.2 Business Process: Metrics and Performance Criteria
4.2.1 Business Requirements

<table>
<thead>
<tr>
<th>ID#</th>
<th>Business Feature</th>
<th>Requirement Type</th>
<th>Business Unit(s) Affected</th>
<th>Manual Or Auto</th>
<th>Potential Application(s) Impacted</th>
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<tr>
<td>FERC745-BRQ531</td>
<td>The calculation of the DR NBT shall not take longer than 30 minutes</td>
<td>Optional</td>
<td>Market Services</td>
<td>Auto</td>
<td>TBD</td>
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4.3 Business Process: Information Security Adherence

4.3.1 Business Requirements

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<thead>
<tr>
<th>ID#</th>
<th>Business Feature</th>
<th>Requirement Type</th>
<th>Business Unit(s) Affected</th>
<th>Manual Or Auto</th>
<th>Potential Application(s) Impacted</th>
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</thead>
<tbody>
<tr>
<td>FERC745-BRQ541</td>
<td>Adherence to all existing information security requirements must be observed</td>
<td>Core</td>
<td>MCI, Market Services</td>
<td>Auto</td>
<td>TBD, Settlements</td>
</tr>
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