



## Dynamic Transfer Limits: Operating Procedures for Use of Upper and Lower Transfer Limits on BPA's Transmission System

Effective: 10/21/2014

This Business Practice governs the use of Upper and Lower Transfer Limits on BPA Managed Paths. The user of such limits would use a **Security**<sup>1</sup> Constrained Economic Dispatch Model (SCED) to dispatch generation over five minute intervals using BPA transmission in support of an **Energy Imbalance**<sup>2</sup> Market (EIM) or similar purpose. This Business Practice does not seek to foster the development of a SCED, but rather to provide a reliable operational framework if customers wish to use a SCED that uses BPA's transmission system. This Business Practice does not apply to use of a SCED that affects BPA transmission system but does not actually use BPA transmission, a matter BPA will discuss with the appropriate SCED operator should that issue arise.

The heart of a SCED that uses BPA's transmission system is the ability to:

1. Accurately model BPA's transmission system in real time and on a forecasted basis over the next few operating hours;
2. Forecast the impact on BPA's system of power flows resulting from dispatching multiple generators in response to short term price signals, such as five minute intervals (referred to as "market flow");
3. Control market flow in real time within applicable constraints on BPA's system taking into account current power flows on each affected flow gate, Historic uses of DTC by EIM participants, current DTC Awards granted to EIM participants, dispatch orders, and operating limits that affect system reliability; and
4. Respond to requests to provide congestion relief as may have been agreed between BPA and the SCED operator.

The successful implementation of a SCED that uses BPA transmission requires communication equipment and systems that allow for timely exchange of data between BPA and the SCED operator. This Business Practices describes the data exchange needed for successful operation of a SCED.

---

<sup>1</sup>Letter of Credit, deposit into an Escrow Account or cash deposit with BPA that the customer will establish in accordance with the Network Open Season business practice.

<sup>2</sup>Difference occurring between hourly scheduled amount and hourly metered (actually-delivered) amount associated with transmission to a load located in BPA's Balancing Authority Area or from a generation resource located within BPA's Balancing Authority Area.

To protect the BPA transmission system from adverse impacts, the SCED must incorporate constraints on BPA's system including system operating limits, RAS arming constraints, voltage limitations, stability and other operating limits and other constraints that affect system reliability. BPA will provide these constraints by developing upper and lower transfer limits for each applicable BPA managed path that will limit movement of SCED market flow across each managed path over each five minute interval. Initially, these limits will be based on historic use of BPA's system by generating facilities subject to the SCED. BPA expects to develop nomograms based on the characteristics of BPA's system to set these limits.

Use of **Dynamic Transfer Capability**<sup>1</sup> on the California-Oregon Intertie (COI) is governed by a different business practice found at [**Dynamic Transfer**<sup>2</sup> Operating and Scheduling Requirements]. Dynamic Transfers are not currently allowed on the DC Intertie. Thus, a SCED Operator may not allow dynamic movement of market flow on the DC Intertie.

BPA plans to monitor the performance of the Upper and Lower Transfer Limits and of initial SCED Participants prior to developing any penalty or incentive structure to comply with this Business Practice.

## A. Definitions

Unless otherwise defined herein, capitalized terms are defined in Federal Energy Regulatory Commission (FERC) **OASIS**<sup>3</sup> Status Code Definitions, North America Reliability Council (NERC), Western Electric Coordinating Council (WECC), or their successor(s).

1. Lower Transfer Limit: The maximum MW amount by which Market Flow may decrease over the next five minutes relative to the Market Flow resulting from the aggregate 15 minute schedules for the multiple generators dispatched by a SCED for the current scheduling interval. For example, if (A) the current 15 minute Market Flow resulting from the aggregate generation schedules were 100 MW, (B) the current Market Flow were 125 MW, and (C) the Lower Transfer Limit were 40 MW, Market Flow may be decreased over the next five minutes by 65 MW to 60 MW (the current 15 minute Market Flow Schedule (100 MW) less the current Lower Transfer Limit (40 MW)).

---

<sup>1</sup>The capability of the transmission system to accommodate continuous ramping of a resource (s) over a pre-determined range, such that the control of the electrical output of such resources(s) can be varied from moment to moment by an entity other than the host utility/host Balancing Authority Area operator.

<sup>2</sup>A term that refers to methods by which the control response to load or generation is assigned, on a real-time basis from the Balancing Authority to which such load or generation is electrically interconnected (native Balancing Authority) to another Balancing Authority (attaining Balancing Authority) or other controlling entity on a real-time basis. This includes Pseudo-Ties, Dynamic Schedules, and dynamic arrangements within the BPA Balancing Authority Area.

<sup>3</sup>Open Access Same-Time Information System

2. Market Flow: The forecasted aggregate power flow across a managed path resulting from the dispatch of multiple generators under the control of a SCED.
3. SCED: A security constrained economic dispatch model.
4. SCED Operating Procedures: Operating protocols between BPA and the SCED Operator relating to a SCED using BPA's system.
5. SCED Operator: The entity that will operate a SCED using BPA's system.
6. SCED Participant<sup>1</sup>: An entity that has agreed to allow a SCED Operator to use its SCED to control the entity's generators where doing so may have more than a de minimus impact on a BPA managed path through the use of BPA's system.
7. Upper Transfer Limit: The maximum MW amount by which Market Flow may increase over the next five minutes relative to the Market Flow resulting from the aggregate 15 minute schedules for the multiple generators dispatched by a SCED for the current scheduling interval. For example, if (A) the current 15 minute Market Flow resulting from the aggregate generation schedules were 100 MW, (B) the current Market Flow were 125 MW, and (C) the Upper Transfer Limit were 50 MW, Market Flow may be increased over the next five minutes by 25 MW to 150 MW (the current 15 minute schedule Market Flow (100 MW) plus the current Upper Transfer Limit (50 MW)).

## B. Becoming a SCED Participant

1. A customer is only eligible to become a SCED Participant if they are utilizing a SCED as defined in this Business Practice.
2. An entity seeking to become a SCED Participant must notify BPA of its intent to become a SCED Participant through the SCED Participant's Account Executive.
3. Any new SCED Participant must execute appropriate agreements necessary for it to participate in the SCED and SCED Operating Procedures, cost reimbursement agreement and other agreements as may be requested by BPA.
4. The new SCED Participant must meet the requirements for adding a new generating facility to a SCED described in Section D of this business practice.

## C. Limitations for an On Demand Resource

1. To support the needs of a SCED Participant or to meet other dynamic uses that cannot

---

<sup>1</sup>An entity that operates a Wind Facility or other Variable Energy Resource within BPA's Balancing Authority Area and that has signed a Supplemental Service Agreement agreeing to supply or purchase Supplemental Services for that Wind Facility.

- be met with a Dynamic Transfer Capability award, BPA will establish Upper Transfer Limits and Lower Transfer Limits for each applicable BPA flowgate.
2. Each Upper Transfer Limit and each Lower Transfer Limit constitutes a dispatch directive.
  3. Upper Transfer Limits and Lower Transfer Limits may be based on:
    - a. Historic use of BPA managed paths by generating facilities under the control of the SCED Operator
    - b. Static nomograms BPA may establish for each managed path by season or other time period or
    - c. Real-time nomograms that may change with system conditions.
  4. BPA may change an Upper Transfer Limit or Lower Transfer Limit at any time to:
    - a. Protect reliability, to respond to a loss of communication or data transfers between the SCED Operator and BPA to account for changing system conditions
    - b. To address a failure to perform according to the requirements of this business practice or applicable SCED Operating Conditions
    - c. As may be needed to further the purpose of BPA's SCED policies.
  5. BPA will make these limits available electronically in real-time to each SCED Operator.
  6. The costs to BPA of installing communications or other equipment necessary to make use of such limits, and the costs of maintaining such limits, shall be paid by the SCED Participants making use of these limits.
  7. Each SCED Participant must identify the generating facilities that will be dispatched by the SCED.

#### **D. Adding a Generating Facility to a SCED**

1. A SCED Participant may add its generating facility or facilities that will be dispatched by a SCED by:
  - a. Notifying BPA of its desire to add a generating facility through the SCED Participant's Transmission Account Executive;
  - b. Identifying the generating facility and describing its operating characteristics;
  - c. Agreeing to pay BPA's cost of installing any communication equipment or systems needed to add the generating facility to its SCED;
  - d. Providing historic data BPA may request concerning past operations;
  - e. Providing such other information as BPA may request.

2. BPA will provide an estimate of the costs of adding the generating facility to the SCED and provide a reimbursable agreement for such costs, if such costs are necessary.
3. BPA anticipates that it will take up to 90 days to install and test communication equipment and to make system changes necessary to add a generating facility.
4. Such generating facility may also require dynamic scheduling capability on BPA's Network that can be obtained via BPA's Dynamic Scheduling Capability: Requesting and Awarding Business Practice.
5. Once the necessary communication and systems changes are installed and tested, BPA will notify the SCED Participant that the generating facility may be dispatched by the SCED.

## E. SCED Operator Eligibility Requirements

1. BPA will approve the use of Upper and Lower Transfer Limits by a SCED Operator whose SCED uses BPA's system if that SCED Operator meets the following requirements:
  - a. Maintains an accurate, up-to-date model acceptable to BPA comprised of a set of practices that will be used to satisfy the requirements of B.3 below
  - b. Modifies its SCED to include data to be provided by BPA or PEAK from time to time that accurately describes BPA's system topology for purposes of the SCED
  - c. Demonstrates that the SCED is capable of:
    - i. Accurately modeling BPA's system including system operating limits by managed path, voltage limitations, stability and other operating limits and other constraints that affect system reliability
    - ii. Accurately Forecasting the impact on BPA's system of Market Flow
    - iii. Controlling Market Flow in real-time within applicable constraints on BPA's system, including Upper Transfer Limits, Lower Transfer Limits, System Operating Limits or other constraint as these limitations may change from time to time
    - iv. Responding to requests to provide congestion relief as may have been agreed between BPA and the SCED Operator
2. Continuously updates its SCED to maintain the functions described in this section as BPA's system topology changes
3. Agrees to SCED Operating Procedures
4. Installs communication equipment and systems necessary to meet the requirements of this business practice and SCED Operating Procedures at the SCED Operator's or SCED Participant's expense
5. Agrees to allow BPA to validate the effectiveness and accuracy of the model as requested

6. Provides other information that BPA may request, such as:
  - a. Real-time data at least every five minutes concerning each SCED Participant's current system status in a form and electronic format acceptable to BPA
  - b. Real-time data at least every five minutes concerning each SCED Participant's forecasted system status in five minute intervals over the next hour (or other appropriate time interval acceptable to BPA) in an electronic format acceptable to BPA
  - c. Real-time data concerning each SCED Participant's forecasted system status in fifteen minute intervals over the next two hours (or other appropriate time interval acceptable to BPA) in an electronic format acceptable to BPA.

## F. Congestion Relief

1. If the SCED Participant's schedules are curtailed, BPA may request a SCED Operator to provide congestion relief on a designated managed path by notifying the SCED Operator of the amount and duration of relief needed under procedures set forth in the applicable SCED Operating Procedures.
2. If the SCED Operator does not respond to a request for congestion relief, or if the SCED Operator is unable to provide all of the requested relief, BPA may take appropriate action to obtain relief from SCED participant.

## G. Additional Information

### Related Business Practices

- [Dynamic Transfer Capability: Requesting and Awarding Access - Pilot](#)
- [Dynamic Transfer Operating and Scheduling Requirements](#)

## Version History

---

|           |                                   |
|-----------|-----------------------------------|
| Version 1 | 10/21/2014 New Business Practice. |
|-----------|-----------------------------------|

---