

# Generation Imbalance Service

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## BPA Transmission Business Practice

**Version 13**

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This Business Practice describes Generation Imbalance Service and the associated accounting for the difference between energy scheduled and energy delivered from that generation.

### BPA Policy Reference

- [Transmission Rate Schedules/Provisions: Ancillary and Control Area Service Rates, Generation Imbalance Service](#)

For more information, visit the [BPA Transmission Business Practices page](#) or submit questions to [techforum@bpa.gov](mailto:techforum@bpa.gov).

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## A. Generation Imbalance Service

1. The purpose of Generation Imbalance Service is to ensure that the BPA Transmission Services Control Area can maintain load-resource balance. Northwest interconnected loads and generators must be in a Western Electric Coordinating Council (WECC) certified Control Area. Generation Imbalance Service applies to generation resources in the BPA Transmission Services Control Area, except as specified in Section B below in Generation Imbalance Behind the Meter. The Generation Imbalance Service addressed in this Business Practice is described in the Transmission and Ancillary Services Rate Schedules, Ancillary and Control Area Services Rate (ACS Rate Schedule).
2. Generation in the Control Area should produce energy in each scheduling period equal to the sum of the generator's delivery schedules. Generation levels different from amounts scheduled will generally result in generators on Automatic Generation Control (AGC) deviating from Basepoint settings to maintain Control Area generation-load balance.
3. Generation Imbalance
  - a. Generation Imbalance is a Control Area Service taken by generation in the BPA Transmission Services Control Area when there is a difference between the energy scheduled and the actual energy delivered from that generation during a scheduling period. The treatment of deviations between scheduled and actual

generation depends upon which deviation band is applicable, and whether the deviation qualifies as a Persistent Deviation as defined in the ACS Rate Schedule. Generation Imbalance service is not applied to generators that are dynamically transferred out of the BPA Transmission Services Control Area.

- b. Exclusion: For any hour in which a contingency is declared and Operating Reserves are delivered, the Generation Imbalance Service is not taken and, therefore, the rate is not applied. If the generator recovers from the contingency such that no energy is taken during the Scheduling Hour, the Generation Imbalance Service will be applied.
  - c. During times when a curtailment is in effect Generation Imbalance service is provided in accordance with this business practice. The use of Generation Imbalance service during a curtailment does not negate the requirement to modify output as instructed by a Dispatch Order. Failure to modify generator output in response to a Dispatch Order will result in a Failure to Comply penalty charge as detailed in the Failure to Comply business practice.
4. Generation Imbalance Deviation Bands
- a. The Generation Imbalance Deviation Bands and the associated settlements are described in the ACS Rate Schedule. The Customers are responsible for keeping track of their imbalances and scheduling Generation Imbalance deviation returns with BPA Transmission Services.
5. Generation Imbalance Deviation Accounting
- a. The Generation Imbalance amount is the difference between the scheduled generation energy (Scheduled Generation) and the actual generation energy in each scheduling period. If all schedules for a generator are hourly, the imbalance accounting will be the same time period as the hourly schedule period. If there is an intra-hour schedule for the generator, imbalance accounting will be on the shortest schedule period submitted during the hour. For example, if one 15-minute schedule is submitted within an hour then all of the scheduling increments for the hour will be broken into 15-minute schedule periods. Likewise, if a 30-minute schedule is submitted within the hour then the hour will be broken into two 30-minute scheduling periods.
  - b. Actual generation energy means kilowatt-hours of metered energy. The measurement interval is a clock hour for all hourly schedules and the scheduling period when an intra-hour schedule is used. For example, the 60-minute period ending at HH:00:00, the 30-minute periods ending at HH:00:00 or HH:30:00, or 15-minute periods ending at HH:00:00, HH:15:00, HH:30:00, or HH:45:00.
  - c. Scheduled Generation means the sum of energy delivery schedule arrangements or transmission schedules. This is the generator's sum of transmission schedules plus Payback Schedules, which should be equal to the Generator Estimate. See Section A.6 below for Payback Schedule use. The Generation Estimate must be separately identified and entered into BPA Transmission Services' Customer Data Entry (CDE) or successor in accordance with BPA Transmission Services' Business Practice on Scheduling Transmission Service. Customers will continue to submit hourly Generation Estimates and BPA systems will convert these to an intra-hour period when the customer submits an intra-hour transmission schedule.

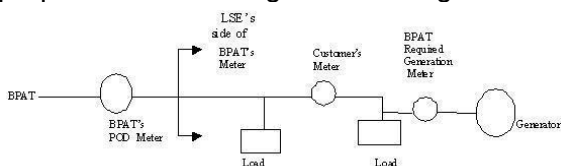
- d. Within Deviation Band 1, account imbalances will be tracked separately for Heavy Load Hour (HLH) and Light Load Hour (LLH). Deviations must be returned in like hours (either HLH or LLH).
  - e. Generation Imbalance accounting for new generators will begin on the first period that the generator submits a transmission schedule. Before this time, no credit will be given for power produced.
  - f. As defined in the ACS Rate schedule, when the Energy Index is negative BPA Transmission Services will give Customers no credit for positive deviations (actual generation less than scheduled).
  - g. For the hours when Oversupply Management (OM) is in effect, the Generation Imbalance accounting, including Persistent Deviation, is disabled for all Generating Customers that are issued an order to modify generation for OM.
6. Generation Imbalance Deviation Schedules Within Deviation Band
- a. For generators in the BPA Transmission Services Control Area the following scheduling procedures for reducing Generation Imbalance deviation account balances shall apply:
    - i. Generators submit hourly Generation Estimates to the BPA Transmission Services Control Area. These estimates include energy serving the Transmission Customers' transmission schedules each hour. For the purpose of reducing the Deviation Band 1 accounts balances, a part of that estimate of total generation energy may also be a return schedule (Payback Schedule). Such Payback Schedules must be separately identified and entered into BPA Transmission Services' CDE as hourly schedules. Payback Schedules are not included in the interchange check out procedures. Customers will not receive credit for Payback Schedules during a Spill Condition.
    - ii. When the Customer has a positive Deviation Band 1 account balance, the Customer may return energy to BPA Transmission Services to reduce the Customer's balance from a positive number toward zero. In CDE this is entered in the account payback for prior undergeneration (U/G), where actual generation has been less than the Generation Estimate. This Payback Schedule is always negative.
    - iii. When the Customer has a negative Deviation Band 1 account balance, the Customer may schedule energy from BPA Transmission Services to the Customer to reduce the Customer's balance from a negative number toward zero. In CDE this is entered in the account payback for prior overgeneration (O/G), where actual generation has been greater than the Generation Estimate. This Payback Schedule is positive.
    - iv. Subject to approval by BPA Transmission Services, the Customer may schedule energy as many times as necessary during the month to bring the Deviation Band 1 accounts to zero. The Payback Schedules to reduce the deviation accounts toward zero may not exceed one and one-half percent (1.5%) of the hourly Generation Estimate or 2 MW, whichever is larger. The Deviation Band 1 account imbalances will be tracked separately for HLH and LLH. Deviations must be returned in like hours (either HLH or LLH).

7. Generation Imbalance Deviations Outside Deviation Band 1
  - a. Generation Imbalance deviations outside the Deviation Band 1 will be settled pursuant to the ACS Rate Schedule for Generation Imbalance Service.
8. Exemptions from Deviation Band 3 During the Generator Test Period
  - a. New generating resources will usually go through a period of testing where the output of the plant may be erratic and forecasting output is more difficult than after commercial acceptance. During the generator test period the generator will not be subject to Deviation Band 3. This policy applies to all types of electric generators.
    - i. The generator owner or operator must provide a test plan to BPA Transmission Services that reflects the expected commercial operation date of the generator. The test plan must be revised as needed to inform BPA Transmission Services of changes in test conditions or the expected commercial operation date.
    - ii. The test period will begin on the day the generator produces its first power as determined by meters at the connection to the grid. The period of the exemption will end when commercial operation begins but not longer than 90 consecutive days from the beginning of the test period. In the case of a newly-constructed generator the test period shall automatically terminate upon the date the project owner takes legal title to the facility, or has a right to take legal title, or assumes, or has the right to assume, operational control. The generator owner or operator must notify its BPA Transmission Services Account Executive in writing of the beginning of commercial operation within one week of the event. Failure to do so will result in BPA Transmission Services, at its discretion, applying the Band 3 charge to the resource after its actual date of commercial operation.
9. Station Service
  - a. Station service is power a generating plant uses for basic operation, or when a plant requires additional power on startup. When a generator is not operating, all or part of the station service power may be supplied from the BPA Transmission Services Control Area. This occurs when the net flow is into the plant. Energy Imbalance Service will apply when station service load is served by transmission schedules.
10. Spill Conditions
  - a. The settlement for days when the Federal System is in Spill Condition is described in the ACS Rate Schedule.

## B. Generation Imbalance for Generation Behind the Meter

1. Generation on the Load Serving Entity's (LSE) side of BPA Transmission Services' Point-Of-Delivery (POD) meter is referred to as "generation behind the meter" or "internal generation". Both generation and load are in the BPA Transmission Services Control Area for these examples. The LSE's net load is metered at its BPA Transmission Services PODs. When energy from the internal generation is delivered outside the LSE's system, automatic meter readings from the generation shall be sent to BPA

Transmission Services' control centers. The following diagram is provided for illustration purposes in reviewing the following subsections.



2. Generation that is dedicated to serving the LSE's load on the load side of BPA Transmission Services' POD meter will be exempt from Generation Imbalance charges, but Generation Estimates are required.
3. For generation where some or all of the energy produced is used for delivery outside of the LSE's system then all of that generation must be scheduled. Generation Estimates will be required and Generation Imbalance Service will apply.
4. LSEs receiving Energy Imbalance Service will not also be charged Generation Imbalance Service for internal generation.

### C. Intentional Deviation

1. Customers taking Variable Energy Resource Balancing Service (VERBS) are subject to the Intentional Deviation (ID) Penalty Charge is defined in BPA's ACS Rate Schedule, except as provided in D below.
2. The Rate Schedule definition provides performance measures that determine when an Intentional Deviation Penalty Charge will apply.

### D. Persistent Deviation

1. Persistent Deviation (PD) is defined in BPA's ACS Rate Schedule. The Rate Schedule definition provides performance metrics that determine when a Persistent Deviation event occurs. In addition to the specific performance metrics, the ACS rate schedule definition recognizes that "A pattern of under or over delivery or over or under use of energy occurs generally or at a specific time of day" can constitute a Persistent Deviation. An example of such a pattern would be a significant bias during peak or heavy load hours or during light load hours, or a non-random pattern of schedule error. Persistent Deviation will result in a financial penalty as described in the ACS Rate Schedule and will apply to deviations in all bands.
2. Persistent Deviation will only apply to (i) Dispatchable Energy Resources and (ii) Variable Energy Resources that have elected to participate in the Customer Supplied Generation Imbalance program.
  - a. The tables below illustrate two Persistent Deviation events defined in the 2016 Transmission GRSP Section III.42.a.1 (the deviation exceeds both 15% of schedule and 20 MW in each scheduling period for three consecutive hours or more in the same direction).
    - i. Schedule period starting at 4:00 and ending at 7:00.
    - ii. Schedule period starting at 7:30 and ending at 11:00.

- b. Although not specifically identified the tables below also illustrate Persistent Deviation events defined in the Transmission GRSP Section III.42.a.2 (the deviation exceeds both 7.5% of schedule and 10 MWh in each scheduling period for 6 consecutive hours or more in the same direction).
  - i. Schedule period starting at 3:00 and ending at 12:00.
  - ii. Any 6 hours of consecutive schedule periods within the example.
- c. For purposes of determining PD, a 5 MWh imbalance over a 15-minute scheduling period is equivalent to a 10 MWh imbalance over a 30-minute scheduling period; both of which are equivalent to 20MWh imbalance over a 60-minute scheduling period.

Table 1: Examples of Schedule, Generation and Deviation Values for the Evaluation of Persistent Deviation Events

Deviation Examples							
	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7
Schedule	200	145	150	130	110	100	105
Actual	170	120	100	108	99	82	80
Deviation	30	25	50	22	11	18	25
15% of Schedule	30	21.75	22.5	19.5	16.5	15	15.75
Count Towards 3 Hour PD	No	Yes	Yes	Yes	No	No	Yes
Count Towards 6 Hour PD	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 2: Deviations by Scheduling Interval for the Evaluation of a Persistent Deviation Event.

Schedule Period	MWh Deviation	Deviation Greater than 15% of Schedule	Deviation Greater than 20 MW of Schedule	3 Hour PD Cumulative Time	Deviation Example
3:00 - 4:00	30	No	Yes	0 Hours	Ex 1
4:00 - 4:30	25	Yes	Yes	.5 Hour	Ex 2
4:30 - 5:00	25	Yes	Yes	1 Hour	Ex 2
5:00 - 6:00	50	Yes	Yes	2 Hours	Ex 3
6:00 - 6:15	22	Yes	Yes	2.25 Hours	Ex 4
6:15 - 6:30	22	Yes	Yes	2.5 Hours	Ex 4
6:30 - 6:45	22	Yes	Yes	2.75 Hours	Ex 4
6:45 - 7:00	22	Yes	Yes	3 Hours	Ex 4
7:00 - 7:15	11	No	No	0 Hours	Ex 5
7:15 - 7:30	18	Yes	No	0 Hours	Ex 6
7:30 - 8:00	25	Yes	yes	.5 Hour	Ex 7
8:00 - 9:00	25	Yes	Yes	1.5 Hours	Ex 7
9:00 - 10:00	50	Yes	Yes	2.5 Hours	Ex 3
10:00 - 11:00	50	Yes	Yes	3.5 Hours	Ex 3
11:00 - 12:00	30	No	Yes	0 Hours	Ex 1

- 3. Under the ACS Rate Schedule, new generation resources undergoing testing before commercial operation are exempt from the Persistent Deviation Penalty for up to 90 days. For the purpose of this exemption, the 90-day period will begin on the day the generator first produces power as determined by meters at the interconnection point on

the grid. Resources that are developed in phases but scheduled as a single resource will receive an exemption only for the first phase. Resources that are combined into a virtual resource will not receive an exemption.

4. A Customer may request a reduction or waiver of a Persistent Deviation Penalty by sending a written request to the Customer's BPA Transmission Services Account Executive. The request must include documentation of the quantifiable actions taken to reduce schedule errors and/or extraordinary circumstance that support the waiver request. General requests for a waiver of all Persistent Deviation Penalties without specific justification for each event will not be considered. If the waiver is approved, then the Customer will be subject to the Generation Imbalance charge without Persistent Deviation.
5. Customers must submit a waiver request for a Persistent Deviation event within 90 days of the first day of the month that follows the month in which BPA billed the Customer for the Persistent Deviation event.
  - a. Upon receipt of a waiver request, BPA Transmission Services will evaluate and decide whether to grant the waiver within 90 days. BPA Transmission Services will inform the Customer of the results of any waiver requests within this timeframe. BPA Transmission Services may in its sole discretion grant either partial or full waivers of the penalty charge. For example, BPA Transmission Services may waive two hours of a five-hour Persistent Deviation event, but apply the penalty to the remaining three hours.
6. BPA Transmission Services will consider the following factors when evaluating waiver requests:
  - a. Schedule Changes: BPA Transmission Services will consider the direction and magnitude of schedule changes taken to reduce the deviation during a Persistent Deviation event. If the Customer failed to change schedules in a way that reduced the deviations, the Customer must provide specific explanation of schedule changes or lack of change.
  - b. Forecasted Generator Output: BPA Transmission Services will take into consideration a Customer's forecasted generator output if the Customer electronically submits the forecast before the start of each operating hour.
  - c. Frequency of Persistent Deviation events: BPA Transmission Services will consider the number and pattern of Persistent Deviation events incurred by the Customer during the month for the plant.
  - d. Duration of Persistent Deviation event will be a consideration when evaluating waiver requests.
  - e. Cumulative Imbalance Energy: BPA Transmission Services will take into consideration the total accumulated energy imbalance during the event and may also consider imbalance accumulation for time periods surrounding the event.
  - f. Wind Volatility: BPA Transmission Services will take into account extreme wind volatility during the hours of the Persistent Deviation event.
  - g. Ramp events: BPA Transmission Services will consider wind ramp events during or near the Persistent Deviation event.



7. If the Persistent Deviation for a specific scheduling period is waived for billing purposes, that period will still be used to determine if a Persistent Deviation event has occurred and the charge will be pursuant to Section III.B.1 of the ACS rate schedule.

## E. Energy Indices

1. The energy index for energy settlement of Generation Imbalance is the Powerdex Mid-Columbia Hourly Index.