

WESTCONNECT RTO, LLC

**APPENDIX K:
TRANSMISSION AND
DISTRIBUTION LOSSES**

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APPENDIX K: Transmission and Distribution Losses

K.1 TRANSMISSION LOSSES

- a) Transmission Losses are the actual or estimated amounts of Energy consumed during the process of transmission of Energy from Generating Unit Resources or imports, at their points of injection into the WestConnect Grid, to Demands or exports at their points of withdrawal from the WestConnect Grid.
- b) Transmission Losses shall be calculated and allocated for each Settlement Period. To the extent that WestConnect LLC ("WestConnect") develops a more focused allocation of Unaccounted for Energy ("UFE") in accordance with the provisions of Appendix G, Settlements and Billings, Transmission Losses may also be calculated and allocated among each area bounded by Revenue Quality Meters and/or Congestion Zone(s) for each Settlement Period.
- c) Each Scheduling Coordinator ("SC") shall include Energy to account for its calculated share of Transmission Losses in its Balanced Schedule for each Congestion Zone and Settlement Period.
- d) Such Energy losses on the WestConnect Grid shall be taken into account by accounting for those losses in the net Generation scheduled by SCs at the points of injection into the WestConnect Grid and the net Demand scheduled by SCs at the points of withdrawal from the WestConnect Grid. That is, the scheduled Energy from Generation Resources or imports and the scheduled Energy to Demand and exports shall be increased, or decreased, to account for Transmission Losses between the points of injection into the WestConnect Grid and the points of withdrawal from the WestConnect Grid.
- e) Each SC's calculated share of Transmission Losses for a Congestion Zone and Settlement Period shall be equal to:
 - i) the SC's total Demand in the Congestion Zone plus its exports from the Congestion Zone, multiplied by,
 - ii) the WestConnect-specified Transmission Loss Factors ("TLFs") for the Demand in that Congestion Zone and Settlement Period; plus
 - iii) the SC's total Generation in the Congestion Zone plus its imports into the Congestion Zone, multiplied by,
 - iv) the WestConnect-specified TLFs for the Generation in that Congestion Zone and Settlement Period.

Note that TLFs can be both positive and negative, so that Demand and Generation that tend to decrease WestConnect Grid losses will have negative Transmission Losses.
- f) There is no explicit settlement process for Transmission Losses. The difference between:
 - i) an SC's actual delivery of Energy from Generating Unit Resources and Energy imports; and
 - ii) the SC's actual consumption of Energy by Demands (including Dispatchable Demands) and Energy exports plus the SC's allocated share of calculated Transmission Losses,

shall be treated as a Balancing Energy obligation to be settled through the SC's purchase or sale of Balancing Energy, as specified in Appendix D, Ancillary Services, and Appendix G.

K.2 TRANSMISSION LOSS FACTORS

- a) WestConnect shall be responsible for calculation of the TLFs using the methodology specified in Section K.3. WestConnect may choose to delegate the performance of such calculations to Participating Transmission Owners ("TOs") or hire consultants to perform such calculations.
- b) TLFs shall be calculated for each Congestion Zone, for each season, for On-Peak Hours and Off-Peak Hours periods, as defined in Section K.5 below. The appropriate TLF shall be used for all Settlement Periods that fall within the On-Peak Hours or Off-Peak Hours of the particular season.
- c) The TLFs for each season shall be calculated and published on the WestConnect Website at least ninety (90) Calendar Days prior to the start of the Settlement Periods to which they are applicable.
- d) WestConnect shall exercise its judgment to determine whether or not the seasonal TLFs for the current year should be used for the same season of a future year, or whether the seasonal TLFs for the future year should be recalculated using the methodology described in Section K.3.
- e) Inaccuracies in the estimation of Transmission Losses may result in under-estimates or over-estimates of the Energy consumed as Transmission Losses. Such inaccuracies will result in positive or negative contributions to UFE on the WestConnect Grid.
- f) WestConnect shall not undertake after-the-fact "true-ups" of the SCs' Transmission Losses obligations, except to the extent that a more focused allocation of UFE is developed in accordance with the provisions of Appendix G. Until or unless such a more focused UFE allocation is developed, each SC shall be allocated a share of each Congestion Zone's UFE pro rata with the SC's actual Demand. Such allocation shall be part of each SC's Balancing Energy calculation and settled in accordance with the provisions of Appendix G. In any event, there shall not be any after-the-fact adjustment to the TLFs.

K.3 METHODOLOGY FOR CALCULATION OF TRANSMISSION LOSS FACTORS

- a) WestConnect will establish a base case power flow study for the entire WestConnect Grid for each of two (2) load levels (On-Peak Hours and Off-Peak Hours) and for each of three (3) seasons (summer, winter, and spring/fall).
- b) For each point of injection into and withdrawal from the WestConnect Grid, WestConnect will calculate a marginal loss sensitivity. The marginal loss sensitivity is the incremental change in the total WestConnect-wide Transmission Losses that result from an incremental change in the injection or withdrawal at the node.
- c) WestConnect will separate the nodes of the WestConnect Grid into two classes: those nodes at which there are Generating Units and all other nodes.
- d) WestConnect will group the Generating Unit nodes that have reasonably-similar marginal loss sensitivities. For example, Generating Units that are located in the same proximity and

that have marginal loss sensitivities that are reasonably-similar to one another (note that this requirement needs to hold for all of the six (6) loss periods defined in Section K.5), WestConnect will group these Generating Unit nodes together as a "Generation loss region" and create a marginal loss sensitivity factor for that region (one for each of the six (6) loss periods) equal to the Generating Unit output-weighted average of the marginal loss sensitivities in that region. Generating loss regions may constitute all or a portion of a Congestion Zone.

- e) WestConnect will do the same type of groupings for reasonably-similar Demand or Load nodes. This will result in the creation of "Load loss regions," with each region having a marginal loss sensitivity factor for each of the six (6) loss periods. Load loss regions will, at least initially, constitute the same geographical area as Congestion Zones or a portion of a Congestion Zone that is part of a Self-Tracking System.
- f) WestConnect will next calculate a WestConnect-wide loss scaling factor (k) such that, when the marginal loss sensitivity factors (from Sections K.3.d and K.3.e above) are multiplied by k and then applied to all of the Generation and all of the Demand in the base case, the total amount of Transmission Losses will equal the base case's WestConnect-wide Transmission Losses.
- g) WestConnect will publish on the WestConnect Website, for each of the six (6) loss periods, the TLFs for each of the Generation loss regions and for each of the Load loss regions. The TLF for a Generation loss region (or Load loss region) will equal the marginal loss sensitivity factor for the Generation loss region (or Load loss region), multiplied by k.
- h) WestConnect will also publish on the WestConnect Website the nodes that make up each Generation loss region and Load loss region.

K.4 DISTRIBUTION LOSSES

- a) Energy losses on the Distribution System shall be taken into account by accounting for Distribution Losses for each Settlement Period and each Congestion Zone:
 - i) from the locations of the non-WestConnect Grid connected Generating Units to the points of injection into the WestConnect Grid in the net Generation scheduled by SCs at the points of injection into the WestConnect Grid; and
 - ii) from the points of withdrawal from the WestConnect Grid to the location of the End-Use Customer Loads in the Demands scheduled by SCs at the points of withdrawal from the WestConnect Grid.

That is, Energy output at Generating Units not directly connected to the WestConnect Grid shall be adjusted to account for Distribution Losses between the location of the Generating Unit on the Distribution System and the point of injection into the WestConnect Grid, and Energy consumption at the End-User Customer level shall be adjusted to account for Distribution Losses between the point of withdrawal from the WestConnect Grid and the point of consumption.

- b) The methodologies that will be used for the calculation and application of Distribution Loss Factors ("DLFs") shall be developed by Utility Distribution Companies ("UDCs").
- c) The DLFs shall be posted on the WestConnect Website.

K.5 SEASONAL AND TIME-OF-DAY DESIGNATIONS

a) Seasonal designations are:

- i) Summer - June 1 through August 31;
- ii) Winter - December 1 through February 28/29; and
- iii) Spring/Fall - March 1 through May 31 and September 1 through November 30.

b) Time-of-day designations are:

- i) On-Peak Hours – hour ending 0700 to hour ending 2200, Monday through Saturday;
and
- ii) Off-Peak Hours – hour ending 2300 to hour ending 0600, Monday through Friday, plus
all day Sunday and holidays.

All time-of-day designations shall be at Pacific Prevailing Time, or such other common time reference as is generally adopted in the western interconnection and approved by WestConnect. All seasonal and/or time-of-day designations are subject to change through the action of WestConnect.

ATTACHMENT A-1 TO APPENDIX A
DRAFT LIST OF FTR INTERFACES AND SCHEDULING POINTS

WestConnect Congestion Zones

- A. Arizona
- B. Northern New Mexico
- C. Southern New Mexico/West Texas
- D. Western Colorado
- E. Eastern Wyoming
- F. Four Corners
- G. Eastern Colorado

Import Limited Zones

- I1. Phoenix
- I2. Tucson
- I3. Yuma

External Zones

- E1. California
- E2. North Texas
- E3. Western Wyoming
- E4. Eastern Utah
- E5. Southern Utah
- E6. Nebraska
- E7. Southern Nevada
- E8. Mexico

FTR Identifier

- 1. A to I1 (Arizona to Phoenix)
- 2. A to I2 (Arizona to Tucson)
- 3. A to I3 (Arizona to Yuma)
- 4. A to C (Arizona to/from Southern New Mexico)
- 5. B to C (Northern New Mexico to/from Southern New Mexico/West Texas)
- 6. F to A (Four Corners to Arizona)
- 7. F to B (Four Corners to Northern New Mexico)
- 8. F to/from D (Four Corners to/from Western Colorado)
- 9. D to G (Western Colorado to Eastern Colorado)
- 10. E to G (Eastern Wyoming to Eastern Colorado)
- 11. A to/from E1 (Arizona to/from California)
- 12. B to/from E2 (Northern New Mexico to/from North Texas)
- 13. C to/from E2 (Southern New Mexico/West Texas to/from North Texas)
- 14. A to/from E5 (Arizona to/from Southern Utah)
- 15. E to/from E3 (Eastern Wyoming to/from Western Wyoming)
- 16. D to/from E4 (Western Colorado to/from Eastern Utah)
- 17. E to/from E6 (Eastern Wyoming to/from Nebraska)
- 18. A to/from E7 (Arizona to/from Southern Nevada)
- 19. C to/from E8 (Southern New Mexico/West Texas to/from Mexico)

