# Public Service Company of Colorado
## Control Area and Transmission Provider

## PSCo ATC Calculation Methodology/Algorithms

## March 1, 2009

### PSCo System ATC Methodology:

### General Overview:

Public Service Company of Colorado (PSCo) is a registered Transmission Provider (TP) and Balancing Authority (BA) within the Western Interconnection and the Western Electricity Coordination Council (WECC). As PSCo is a vertically integrated electric utility, it is also a Generation Owner (GO) and Load Serving Entity (LSE). The PSCo transmission network is located primarily along the Front Range of Colorado with extensions west to Grand Junction, Colorado and south to Alamosa, Colorado. The main transmission voltages are 230 kV and 115 kV. The BAs adjacent to PSCo are Western Area Power Administration - Loveland (WACM), Area Power Administration - Phoenix (WALC), and Public Service Company of New Mexico (PNM). PSCo coordinates its ATC calculations with these neighboring transmission providers as described later in this document. PSCo is also connected asynchronously to the Southwest Public Service (SPS) BA in the Southwest Power Pool (SPP) region through an AC/DC/AC converter station at Lamar, Colorado. SPS and PSCo are both operating company subsidiaries of Xcel Energy Inc. and coordinate ATC postings for tie line capacity. PSCo has ownership in the jointly owned western slope transmission facilities extending from the Craig/Hayden area in Northwestern Colorado south to the Four Corners area. PSCo also has ownership in four jointly owned transmission cut-planes or TOT paths within Colorado – TOTs 2A, 3, 5, and 7. TOT path total TTC levels are developed seasonally and coordinated and agreed to by the owners of the TOT facilities, presented to the Colorado Coordinated Planning Group (CCPG), and approved through the WECC Operating Transfer Capability (OTC) Policy Committee process. The jointly owned TOT paths have contractually defined ownership and transmission utilization percentages. TTC development is in accordance with established WECC and NERC standards. PSCo reserves Transmission Reliability Margin (TRM) for transmission associated with reserve group activations under the Rocky Mountain Reserve Sharing Group (RMRG). PSCo uses the NERC approved contract path methodology.

### a. Definition of Horizons:

The three horizons used by Public Service Company of Colorado (PSCo) are:

**i.** **Scheduling Horizon**: At PSCo this period is defined to be the period of time beginning with the current hour and extending a total of eight hours.

**ii.** **Operating Horizon**: At PSCo this period begins at end of the Scheduling Horizon and extends through the end of the last day that has been or is being prescheduled.

**iii.** **Planning Horizon**: This period begins at the end of the Operating Horizon and extends approximately ten years into the future.

## b. Definitions for ATC Calculations:

**i. Capacity Benefit Margin (CBM):** is "that amount of transmission transfer capability reserved by load serving entities to ensure access to generation from interconnected systems to meet generation reliability requirements. Reservation of CBM by a load serving entity allows that entity to reduce its installed generation capacity below that which may otherwise have been necessary without interconnections to meet its generation reliability requirements."

**ii. Transmission Reliability Margin (TRM):** is "the amount of transmission transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions."

**iii. Existing Transmission Commitment (ETC):** can include (1) Reservations for Native Load Growth; (2) Existing Commitments; (3) Firm Transmission Reservations; and (4) Good Faith Requests for Transmission Service.

**iv. Total Transfer Capability (TTC):** "represents the reliability limit of a transmission path at any specified point in time and is a variable quantity dependent on operating conditions in the near time and forecasted conditions in the long term. TTC cannot exceed the path rating. Specific operating conditions (system topology, load/generation patterns, simultaneous path loadings, and facility outages) may require that TTC or TRM be adjusted to maintain system reliability."

**v. Committed Uses (CU):** Committed Uses, as described in the WECC document is the sum of ETC, TRM and CBM.

**vi. Operating Transfer Capability (OTC):** Seasonal path operating transfer capability (OTC) limits are under the purview of the western Interconnection Regional Reliability Organization (WECC). The Western Electricity Coordination Council (WECC) has established a review committee called the Operating Transfer Committee Policy Committee (OTCPC) with oversight and approval responsibility for seasonal OTCs on key paths across the WECC Interconnection. The OTC PC decides which paths merit WECC review. The seasonal OTC may never exceed the path's established TTC but may be adjusted downward, based on the system studies presented to the OTCPC, for each season to recognize load, generation, and transmission conditions anticipated for the upcoming operating period.

## c. PSCo specific ATC Calculation information

**i.** CBM is not included in the formulas to calculate ATC because PSCo does not currently reserve CBM on any of its posted paths.

**ii**. The formulas used by PSCo to calculate ATC are shown below for the Scheduling, Operating, and Planning Horizons and are also posted on the PSCo

OASIS site.

## d. Mathematical Algorithms Used to Calculate ATC

### i. Scheduling Horizon

The unscheduled portion of the Firm transmission reservations are released as non-firm ATC at 10:00 AM MPT during the scheduling day for the days being scheduled.

Firm ATC = TTC - ETC - TRM - Confirmed Firm Transmission Service Reservations (TSRs)

Non-Firm ATC = TTC - ETC - TRM – the untagged firm TSR's that have been released as non-firm and are not scheduled

### ii. Operating Horizon

The unscheduled portion of the Firm transmission reservations are released as non-firm ATC at 1000 MPT during the scheduling day for the days being scheduled.

Firm ATC = TTC - ETC - TRM - Confirmed Firm TSRs

Non-Firm ATC = TTC - ETC -TRM - Confirmed Firm TSRs - Confirmed Non Firm TSRs

After the unused portion of the Firm TSRs are released as Non-Firm, then the calculations change to the following:

Firm ATC = TTC - ETC - TRM - Implemented Firm Tags – the unscheduled portions of the Firm TSRs

Non-Firm ATC = TTC- ETC -TRM -Implemented Firm Tags – Implemented Non-Firm Tags

### iii. Planning Horizon

Firm ATC = TTC - ETC - TRM - Confirmed Firm TSRs

Non-Firm ATC = TTC - ETC -TRM - Confirmed Firm TSRs - Confirmed Non-Firm TSRs