Available Transfer Capability

Implementation Document

(ATCID)

Reference: NERC Standard MOD-001-1a

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Highlight denotes revision from version 7

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1. Purpose

The purpose of BC Hydro's Available Transfer Capability Implementation Document (ATCID) is to address the requirements of the North American Electric Reliability Corporation (NERC) Mandatory Reliability Standard MOD-001 Available Transmission System Capacity adopted for British Columbia. This ATCID identifies the methodologies used by BC Hydro for determining the Total Transfer Capability (TTC) and calculating Available Transfer Capability (ATC) for each ATC Path in the BC Hydro System for a time horizon up to 13 months including the current month.

2. Effective Date

Effective date: **2023-07-01**

3. Definitions

ATC_F is the firm Available Transfer Capability for the ATC Path for that period.

ATC_{NF} is the non-firm Available Transfer Capability for the ATC Path for that period.

CBM is the Capacity Benefit Margin for the ATC Path during that period.

CBM_s is the Capacity Benefit Margin for the ATC Path that has been scheduled during that period.

$Counterflows_F$ are adjustments to firm Available Transfer Capability as determined by the Transmission Service Provider and specified in their ATCID.

$Counterflows_{NF}$ are adjustments to non-firm Available Transfer Capability as determined by the Transmission Service Provider and specified in its ATCID.

ETC_F is the sum of existing firm commitments for the ATC Path during that period.

ETC_{NF} is the sum of existing non-firm commitments for the ATC Path during that period.

GF_F is the firm capacity set aside for grandfathered Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider's Open Access Transmission Tariff or "safe harbor tariff."

GF_{NF} is the non-firm capacity set aside for grandfathered Transmission Service and contracts for energy and/or Transmission Service, where executed prior to the effective date of a Transmission Service Provider's Open Access Transmission Tariff or "safe harbor tariff."

$NITS_F$ is the firm capacity reserved for Network Integration Transmission Service serving Load, to include losses, and Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

$NITS_{NF}$ is the non-firm capacity set aside for Network Integration Transmission Service serving Load (i.e., secondary service), to include losses, and load growth not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

NL_F is the firm capacity set aside to serve peak Native Load forecast commitments for the time period being calculated, to include losses, and Native Load growth, not otherwise included in Transmission Reliability Margin or Capacity Benefit Margin.

OS_F is the firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using Firm Transmission Service as specified in the ATCID.

OS_{NF} is the non-firm capacity reserved for any other service(s), contract(s), or agreement(s) not specified above using non-firm transmission service as specified in the ATCID.

$Postbacks_F$ are changes to firm Available Transfer Capability due to a change in the use of Transmission Service for that period, as defined in Business Practices.

$Postbacks_{NF}$ are changes to non-firm Available Transfer Capability due to a change in the use of Transmission Service for that period, as defined in Business Practices.

PTP_F is the firm capacity reserved for confirmed Point-to-Point Transmission Service.

PTP_{NF} is non-firm capacity reserved for confirmed Point-to-Point Transmission Service.

ROR_F is the firm capacity reserved for Roll-over rights for contracts granting Transmission Customers the right of first refusal to take or continue to take Transmission Service when the Transmission Customer's Transmission Service contract expires or is eligible for renewal.

System Operating Limit (SOL) is the value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria.

TRM is the Transmission Reliability Margin for the ATC Path during that period.

TRM_U is the Transmission Reliability Margin for the ATC Path that has not been released for sale (unreleased) as non-firm capacity by the Transmission Service Provider during that period.

TTC is the Total Transfer Capability of the ATC Path for that period.

4. TTC Methodology

The TTC methodology selected for each ATC Path is as shown in Table 1 below.

Table 1

ATC Path Name	Methodology	TTC (MW)	Comment
BCHA – BPAT	MOD-029 Rated System Path	3150	A WECC Rated Path (Path 3) with an Accepted Rating of 3150 MW.
BPAT – BCHA	MOD-029 Rated System Path	3000	A WECC Rated Path (Path 3) with an Accepted Rating of 3000 MW.
BCHA – AESO	MOD-029 Rated System Path	1200	A WECC Rated Path (Path 1) with an Existing Rating of 1200 MW.
AESO – BCHA	MOD-029 Rated System Path	1000	A WECC Rated Path (Path 1) with an Existing Rating of 1000 MW.
FBC – BCHA	MOD-029 Rated System Path	811	Kootenay 230 kV System Development Project.
BCHA – FBC	MOD-029 Rated System Path	811	Kootenay 230 kV System Development Project. The flow on this ATC Path is in a direction counter to the prevailing flow of the FBC – BCHA Path. Its TTC is set based on MOD-029 R2.2.
VI - BCHA	MOD-029 Rated System Path	180	1L48 line rating

BC Hydro will use the TTC value for each ATC Path shown in Table 1 to calculate ATC for that Path unless BC Hydro has determined that a System Operating Limit (SOL) for the respective ATC Path is lower than its TTC value, in which case BC Hydro will use the SOL as TTC. BC Hydro will reduce the TTC to adjust for planned outages to ensure SOL's internal to the system, or for the ATC path elements, are respected.

BC Hydro also performs on-going TTC evaluations (forecasts) and for time periods (hourly, daily, weekly and monthly) when there are changes to the transmission system

topology either due to planned or unplanned outages, and load/generation forecast including generation outages. In addition, BC Hydro coordinates with AESO and BPA to ensure TTC for the inter-ties are set at the levels that respect neighbouring systems' TTC forecasts on a day-ahead and hour-ahead basis. The lesser of the TTC values is used.

When calculating TTC, BC Hydro uses assumptions no more limiting than those used in the planning of operations for the corresponding time period studied, provided that such planning of operations has been performed for that period.

5. ATC Calculations

BC Hydro calculates ATC values for each ATC Path as described below:

- At least once per hour: hourly values for at least the next 48 hours
- At least once per day: daily values for at least the next 31 calendar days
- At least once per week: monthly values for at least the next 12 months

The ATC values are calculated using the following algorithms:

5.1. ATC Algorithms

5.1.1. Generic ATC Algorithms

$ATC_F = TTC – ETC_F – CBM – TRM + Postbacks_F + Counterflows_F$[1]

$ATC_{NF} = TTC – ETC_F – ETC_{NF} – CBMs – TRM_U + Postbacks_{NF} + Counterflows_{NF}$[2]

Where:

$ETC_F = NL_F + NITS_F + GF_F + PTP_F + ROR_F + OS_F$

$ETC_{NF} = NITS_{NF} + GF_{NF} + PTP_{NF} + OS_{NF}$

5.1.2. Capacity Benefit Margin (CBM)

BC Hydro does not set aside CBM at this time.

5.1.3. Transmission Reliability Margin (TRM)

BC Hydro sets aside TRM and TRM_U for each ATC Path as published in BC Hydro's TRMID. The TRMID can be found at:

http://www.bchydro.com/energy-in-bc/operations/transmission/transmission-system/atc-methodology.html

[1] Refer to section 5.1.4 of this document for further explanation.
[2] Refer to section 5.1.4 of this document for further explanation.

5.1.4. Postbacks and Counterflows

Counterflow adjustments are made to the Firm ATC ($Counterflows_F$) in the opposite direction when energy, that is considered an assured delivery, on Firm Point-to-Point Transmission Service is scheduled. This determination is made by BC Hydro, and is further explained in BC Hydro's Business Practice *Total Transfer Capability / Available Transfer Capability.*

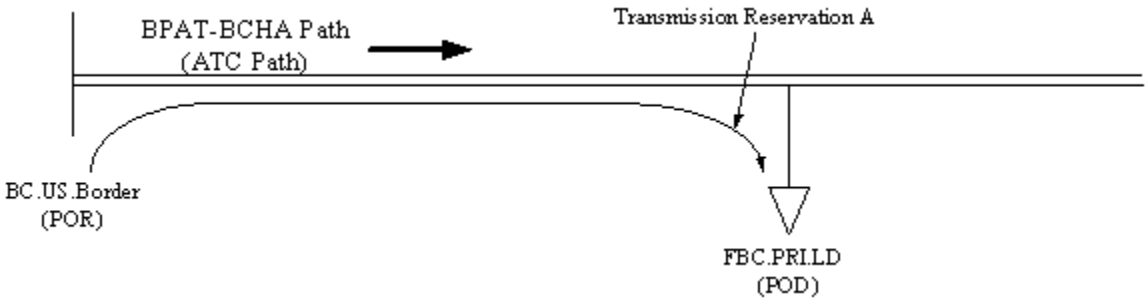
Counterflow adjustments are made to the Non-Firm ATC ($Counterflows_{NF}$) in the opposite direction when energy is scheduled on Firm (not assured delivery) or Non-Firm Point-to-Point Transmission Service. Non-Firm ATC is available at the precise time the counterflow energy is scheduled and approved by all approving entities on the energy schedule.

Furthermore, BC Hydro includes unused ETC_F as $Postbacks_{NF}$ when calculating real-time Non-firm ATC.

5.2. Transfer Capability Allocation Process

Currently, BC Hydro defines seven ATC Paths (see Table 1), for which on-going TTC and ATC are calculated. Within the BC Hydro System, there are PORs created to represent the bulk system, regional systems or generators, and PODs created to present system load or individual loads connected to the transmission system. These PORs and PODs have been created to facilitate the ease of scheduling and settlement for internal transactions. Transfer capability from these PORs or PODs to the system have been planned and constructed under normal planning process or Interconnection Processes to sufficiently accommodate the specific generator or load. Power transfers between these PORs and PODs are part of generation resource and load forecast assumptions used in the base cases for calculating TTC.

For example:



Transfer capability for the radial line connecting FBC.PRI.LD and the system has been planned and constructed to meet the peak load. Transmission Reservation A from BC.US.Border to FBC.PRI.LD impacts ATC on the BPAT-BCHA Path, and is counted as ETC when calculating ATC for this ATC Path. Such and similar transmission reservations are tracked, and used for calculating ATC by BC Hydro MODS, an OATI hosted system.

6. Information Sharing

BC Hydro uses WECC base cases that represent Western Interconnection's generation and transmission for calculating TTC. BC Hydro also performs on-going SOL and ATC calculations using data provided by Alberta Electric System Operator (AESO), Bonneville Power Administration (BPA) and FortisBC. In reciprocity, BC Hydro provides similar data to AESO and BPA for their use in calculating transfer or Flowgate capability.

BC Hydro will provide a copy of this ATCID and revisions before they take effect, to the following entities:

- Each Planning Coordinator associated with the BC Electric System, Alberta Electric System, and BPA System
- Reliability Coordinator associated with the BC Electric System, Alberta Electric System, and BPA System
- Transmission Operators in the BC Electric System, Alberta Electric System, and BPA System

In addition, BC Hydro will provide, within 30 calendar days of receiving a request by any Transmission Service Provider, Planning Coordinator, Reliability Coordinator, or Transmission Operator, with transmission and generation data used by BC Hydro for calculating TTC and ATC, for up to 13 months into the future, and other available data in a format maintained by BC Hydro; subject to confidentiality and security requirements, BC Hydro will make such data available on a schedule specified by the requestor but no more frequently than once per hour.

7. Document Change History

Issue	Reviewer	Reason for Issue	Date
0		Initial Implementation.	21 November 2011
1		Correcting an omission	30 November 2011
2		Change in TRM amount required for transmission system topology uncertainty	25 June 2012
3		Change in Section 4, Table 1, for BPAT-BCHA TTC. Updated for WECC Path Rating limit as the maximum (TTC).	31 January 2016
4		Table 1 – revised typo in one of the ATC path names Section 4 – revised for TTC reductions less than table values for other operating needs. Section 5.1.3 Added hyperlink to the published TRMID. Revised values in Table 2 to match the published TRMID.	23 May 2019

Issue	Reviewer	Reason for Issue	Date
		Section 6 – revised BC Control Area to BC Electric System.	
5		Reviewed and republished with no changes to the existing methodology	23 December 2020
6		Clarification of Planned outage adjustments to TTC, use of lesser values in Section 4. Remove term SOL in section 5.2	13 December 2021
7	Tania Jones	Revised Counterflow language due to BCUC Order G-73-22	2022-08-02
8	Brenda Ambrosi	New ATC path VI- BCHA	2023-05-16
9	Brenda Ambrosi	**GF_{NF}** definition added.	2023-06-16