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October 2, 2017

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

RE: British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Open Access Transmission Tariff (OATT)
Dynamic Scheduling Amendments Application

BC Hydro writes pursuant to sections 59 to 61 of the *Utilities Commission Act* to submit the attached application for approval of amendments to the dynamic scheduling provisions in Attachment Q-1 of the OATT. The proposed amendments will provide flexibility in how dynamic scheduling may be used, and increase the ability of BC Hydro's OATT customers to use their transmission service to participate in markets in the Western Interconnection.

For further information, please contact Anthea Jubb at 604-623-3545 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

Fred James
Chief Regulatory Officer

ch/ma

Enclosure (1)

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BC Hydro
Power smart

Open Access Transmission Tariff

Dynamic Scheduling Amendments Application

October 2017

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1 Introduction

1.1 Approvals Sought

British Columbia Hydro and Power Authority (**BC Hydro**) files this application (**Application**) pursuant to sections 59 to 61 of the *Utilities Commission Act*, R.S.B.C. 1996, c. 473 (***UCA***) to seek approval from the British Columbia Utilities Commission (**Commission**) to amend Attachment Q-1 of its Open Access Transmission Tariff[1] (**OATT** or **Tariff**). The proposed amendments will provide flexibility in how dynamic scheduling may be used, and increase the ability of BC Hydro's OATT customers to use their transmission service to participate in new and growing markets in the Western Interconnection.

BC Hydro currently offers its transmission customers the option of dynamic scheduling pursuant to Attachment Q-1 of the OATT. A dynamic schedule is an energy transfer from one Balancing Authority Area (**BAA**) into another BAA that varies within the hour and is updated in real time. Dynamic scheduling under Attachment Q-1 was designed in 2005 to facilitate dynamic scheduling to the California Independent System Operator (**CAISO**). Based on the needs and industry practice at the time, dynamic scheduling under Attachment Q-1 was designed to be limited to the export path and to require that the transmission customer have sufficient firm point-to-point transmission service (**Firm Service**) to enable the required dynamic schedule. Since Attachment Q-1 was approved, dynamic scheduling has become more prevalent in the Western Interconnection. It is now used extensively in new and growing markets such as the California Independent System Operator's (**CAISO**) Energy imbalance Market (**EIM**). BC Hydro's transmission customer and subsidiary, Powerex Inc. (**Powerex**), will be joining the EIM on April 4, 2018.

[1] OATT available at: http://www.bchydro.com/about/planning_regulatory/tariff_filings/oatt.html.

To provide its OATT customers with the option to use their transmission service to participate in markets that require increased use of dynamic scheduling, BC Hydro is proposing amendments to Attachment Q-1 that will:

(a) allow for dynamic scheduling for imports, in addition to exports; and

(b) allow dynamic scheduling on all transmission service reservations, including Firm Service, non-firm point-to-point transmission service (**Non-Firm Service**), and network integration transmission service (**NITS**), including network economy service (**Network Economy Service**).

As a housekeeping matter, BC Hydro is also proposing to update the definitions, correct typographical errors, and to simplify and clarify the language of Attachment Q-1.

Clean and blackline versions of BC Hydro's proposed amendments to Attachment Q-1 of the OATT are included in Appendix A. A draft Order is included in Appendix C.

1.2 Proposed Regulatory Process

BC Hydro believes that the Commission can review the Application with minimal process. As detailed in this application, BC Hydro is seeking expansion of an existing scheduling service under the OATT, which is consistent with industry practice and is required to enable BC Hydro's OATT transmission customers to participate in new and growing markets. BC Hydro posted a transmission bulletin[2] explaining the proposed amendments to Attachment Q-1 as well its proposed changes to its business practices.[3] BC Hydro did not receive any comments in response to the consultation notice.

[2] Any interested party can subscribe to receive BC Hydro transmission bulletins including BC Hydro's OATT transmission customers.

[3] The proposed updates to BC Hydro Business Practices were included in the Consultation Notice, as attached in Appendix B, of these, only the Submitting Energy Schedules Business Practice is relevant to the Application and clean and blacklined versions of the document, revised to reflect the contents of the Application, are included in Attachment 1 to Appendix B for information purposes.

Should the Commission determine that a regulatory process is required for it to consider the proposed amendments, BC Hydro believes that a written process, with a single round of information requests, would be appropriate given the nature of the approvals sought.

BC Hydro respectfully requests approval of its proposed amendments to Attachment Q-1 on or before January 31, 2018 in order to facilitate the participation in the CAISO EIM by Powerex. Powerex intends to begin parallel operations with the CAISO on February 1, 2018. The parallel operations are important to demonstrate that systems and operations personnel are ready to operate as anticipated for CAISO's EIM and must be completed before the April 4, 2018 go-live date for Powerex's full participation in the EIM.

2 Development of Dynamic Scheduling in the OATT

2.1 Transmission Service Originally Limited to Hourly Scheduling

BC Hydro's wholesale transmission service rates were first approved by the Commission on June 25, 1996 through Order No. G-67-96. At that time, before deregulation of energy markets, transmission scheduling within the Western Interconnection was undertaken on an hourly basis. Likewise, transmission service capacity reservations were, and continue to be, available in minimum one hour blocks so that transmission scheduling matched the minimum capacity reservation. Hourly scheduling protocols for transmission service were considered to be sufficient to accommodate changes in the amount of generation actually scheduled. This was because hydro and thermal-based generation can be determined with relative precision since these are not normally subject to significant short-term fluctuations in energy resource availability.

Hourly transmission scheduling protocols continued to be a part of BC Hydro's wholesale transmission service, as reflected in:

- BC Hydro's Application for Approval of its Wholesale Transmission Services (**WTS**) tariff, including revisions to its initial application to conform to the Federal Energy Regulatory Commission's (**FERC**) Order No. 888-A *pro forma* OATT. The WTS tariff was approved by the Commission through Order No. G-43-98 dated April 23, 1998; and
- The British Columbia Transmission Corporation (**BCTC**) Application for an Open Access Transmission Tariff, which replaced the WTS tariff. The OATT was approved through Commission Order No. G-58-05 dated June 19, 2005.

2.2 FERC Confirms Dynamic Scheduling as a Voluntary Service

In Order No. 888, issued April 24, 1996, FERC established its *pro forma* open access transmission tariff on which BC Hydro's OATT is based. In Order No. 888 FERC determined that "Dynamic Scheduling Service" was not an ancillary service that must be included in an open access transmission tariff. FERC noted in Order No. 888 that dynamic scheduling was "used only infrequently":

> "Although Dynamic Scheduling is closely related to Scheduling, System Control and Dispatch Service, it is a special service that is used only infrequently in the industry. It uses advanced technology and requires a great level of coordination. Each Dynamic Scheduling application has unique costs for special telemetry and control equipment, making it difficult to post a standard price for the service."[4]

In Order No 888-A, issued March 4, 1997, FERC confirmed that transmission providers may offer dynamic scheduling on a voluntary basis:

> "…we note that dynamic scheduling is not a required ancillary service in Order No. 888, and we do not require a transmission provider to offer this service. However, nothing in the Final Rule precludes a transmission provider from offering it as a separate service. Furthermore, offering dynamic scheduling to integrate

[4] FERC Order No. 888, at page 219, available at: https://www.ferc.gov/legal/maj-ord-reg/land-docs/order888.asp.

loads and resources in more than one control area is also not required." [5]

2.3 2005 BCTC Dynamic Scheduling Application

On April 14, 2005, BCTC filed an Application for Approval of Tariff Amendments to provide Dynamic Scheduling of exports of Energy and Ancillary Services from BCTC's Control Area (**DS Application**). The DS Application sought approval to allow for the dynamic scheduling of exports of energy and ancillary services from BCTC's control area (now referred to as a BAA) so that its customers could participate in intra-hour markets operated by the CAISO. The CAISO had introduced a dynamic scheduling framework that would enable imports into the CAISO control area to respond to CAISO's dispatch instructions within an operating hour, thereby facilitating the participation of those CAISO imports into the CAISO intra-hour markets.

BCTC limited the scope of the DS Application to the facilitation of dynamic scheduling of energy and ancillary services on the export path, which met the immediate requirements to enable participation in the CAISO intra-hour markets. At the time of the DS Application, the use of dynamic scheduling technology was still relatively new. BCTC did not yet have contractual or technical arrangements with other control areas that would necessitate consideration of broader dynamic scheduling service.

The DS Application also limited the use of dynamic scheduling to customers holding Firm Service reservations. Since its intra-hour markets included the provision of operating reserve and regulating energy, the CAISO required participating transmission customers to hold reservations of firm (or non-interruptible within the hour) transmission capacity.

[5] FERC Order No. 888-A, at part I page 180 available at: https://www.ferc.gov/legal/maj-ord-reg/land-docs/order888.asp.

BCTC was aware of customer interest in expanded dynamic scheduling functionality and committed in the DS Application to work with its customers and other control areas to increase its dynamic scheduling capability.

The Commission approved the DS Application on an interim basis through Order No. G-37-05 dated April 20, 2005 with dynamic scheduling service to be included in the OATT as Attachment O. Permanent approval of the tariff was to be based on a subsequent application to be filed by BCTC to include a report evaluating the interim dynamic scheduling provisions. On December 7, 2005, BCTC filed an application, including the requested evaluation report, requesting permanent approval of the dynamic scheduling tariff, with minor modifications. The dynamic scheduling provisions of the OATT were approved on a permanent basis through Order No. G-12-06 dated February 2, 2006.

2.4 2008 Housekeeping Amendments to Dynamic Scheduling

On November 21, 2008, BCTC filed an Application to Amend the OATT (**2008 OATT Application**). As part of its "housekeeping" amendments, BCTC proposed amendments to what was then Attachment O - Dynamic Scheduling, including amendments:

- To enable BCTC to serve as an Intermediary BAA, to facilitate the dynamic scheduling of energy between Alberta and the United States at the request of the Alberta Electric System Operator;
- To rename Attachment O as Attachment Q-1;
- To replace the terms Host Control Area and Receiving Control Area with Host BAA and Receiving BAA, respectively, to reflect industry practice; and
- To delete the "Revert Back" provision that was contained in section 5(a) of Attachment O since transmission customers were now required to reserve dynamic scheduling by submitting electronic documentation of the energy transaction through the electronic tagging system (**eTag**), with the result that

there was no longer a need for specific provisions that would provide the ability to revert back to normal transmission service.

The housekeeping aspects of the 2008 OATT Application (among others) were approved on September 10, 2009 through Commission Order No. G-102-09.

3 Growth of Intra-Hour and Dynamic Scheduling in the Industry

Since the introduction of dynamic scheduling into the OATT, several U.S. States, such as California, have introduced Renewable Portfolio Standards (**RPS**) that require power utilities and electric service providers to increase procurement from eligible renewable energy resources to meet state renewable targets. The introduction of RPS, which was accompanied by a substantial investment in clean energy and technology, has led to an increased penetration of intermittent energy resources such as wind and solar generation (also known as variable energy resources, or **VERs**).

For several years the industry has continued to address the challenges associated with the integration of VERs. One of the ways the industry has worked to facilitate the integration of VERs has been the development of increasingly complex sub-hourly transaction options in energy and capacity markets. The BAAs in the Western interconnection and market operators such as the CAISO have adjusted their tariffs and scheduling practices, including expanding the use of dynamic scheduling, to receive and balance intermittent energy on an intra-hour basis.

3.1 Increased use of Intra-Hour Scheduling and Dynamic Scheduling To Accommodate Variable Energy Resources

The use of intra-hour scheduling in the Western Interconnection has increased to accommodate the accelerating penetration of VERs into the supply side of the markets, for which hourly scheduling protocols were inefficient. VERs are

characterised by their natural fluctuation due to fuel supply, which can be accommodated by the capability to schedule their energy on a shorter interval period than one hour. To promote the efficient integration of VERs into the electric grid, FERC issued Order No. 764 in 2012 which required U.S. jurisdictional transmission providers to permit the adjustment of transmission schedules within the hour. Intra-hour scheduling allows for greater flexibility for generation resource owners and other users of the transmission system to more efficiently participate in the markets.

In recognition of these industry requirements, BC Hydro adjusted its tariff and operating practices in 2013 to facilitate the implementation of FERC Order No. 764. BC Hydro's Open Access Transmission Tariff Amendments Application included intra-hour (15 minute) scheduling amendments to sections 13.8 and 14.6 of the OATT, and was approved by Commission Order No. G-180-13 on October 31, 2013. These amendments gave BC Hydro's transmission customer greater flexibility to import and export energy on a sub-hourly basis while ensuring that transmission reservations were still procured on an hourly basis. At that time, BC Hydro made no changes to the dynamic scheduling features of its OATT that had been put in place in 2005.

In addition to the use of intra-hour scheduling, and in response to the increasing challenge to maintain balancing requirements within the hour, while managing the fluctuations of a growing fleet of intermittent resources, BAAs in the Western Interconnection have also expanded their use of dynamic scheduling in recent years. Dynamic schedules can be managed by the receiving BAA by permitting the BAA to adjust internal generation in order to accommodate dynamic transfers with granularity. By using dynamic scheduling, BAAs can integrate VERs more efficiently and optimize their systems reliably.

In 2011, CAISO expanded its use of dynamic scheduling to permit it to more effectively integrate both imports and exports from intermittent resources. CAISO's expanded use of dynamic transfer capability recognized the inefficiencies of VERs

scheduling on an hourly basis, and was intended to provide greater scheduling flexibility and benefits to markets in California and the rest of the Western Interconnection.

In recent years, Bonneville Power Administration (**BPA**) has also recognized that enhanced use of dynamic transfer capability is needed to effectively deal with increased VERs penetration on its transmission system. BPA has recently initiated a project that will result in an increase in voltage control to allow for an increase of dynamic transfers.[6] BPA's movement toward increasing dynamic scheduling capability will allow the region to more effectively manage VERs in a larger balancing footprint.

3.2 CAISO Market Development

In 2014, the CAISO initiated the EIM. The EIM is a voluntary organized market platform in the Western Interconnection for the real-time wholesale purchase and sale of imbalance energy. The EIM currently facilitates the efficient dispatch of generation resources within each participating BAA, as well as 15-minute and five-minute transfers between participating BAAs.[7]

Participation in CAISO's EIM five-minute market is conducted through dynamic schedules on import and export paths to or from a BAA using a variety of transmission reservation priorities including Firm Service, Non-Firm Service and NITS.

On May 30, 2017, CAISO issued a news release announcing that Powerex would participate in the EIM beginning in April 2018.[8] Powerex's participation in the EIM,

[6] BPA Technology Innovation Project 370 available at: https://www.bpa.gov/Doing Business/TechnologyInnovation/TIPProjectBriefs/2017-TS-TIP-370.pdf.

[7] Current active participants in the EIM include PacifiCorp (entered 2014), NV Energy (entered 2015), Puget Sound Energy (entered 2016), and the Arizona Public Service (entered 2016). The EIM continues to grow with a number of BAAs planned to participate, including Portland General Electric in 2017, Idaho Power Company in 2018, and Seattle City Light in 2019.

[8] News Release available at: https://www.caiso.com/Documents/PowerexWillJoinWesternEnergyImbalanceMarket.pdf.

subject to regulatory approvals from FERC, will be facilitated by the use of dynamic scheduling on both the import and the export path between BC and US.

3.3 Use of Dynamic Scheduling in British Columbia

As discussed in section 2, BC Hydro's OATT currently limits dynamic scheduling to exports and requires Firm Service. To facilitate Powerex's participation in the EIM, Powerex has requested that BC Hydro evaluate the expanded use of dynamic scheduling on imports and on all transmission reservations, including Firm Service, Non-Firm Service and Network Economy Service. BC Hydro has considered Powerex's request, and concluded that there is no valid reason to restrict dynamic scheduling to exports on Firm Service. The current restrictions in the OATT reflect outdated market requirements which are no longer applicable. The EIM, for example, does not restrict the use of dynamic scheduling to Firm Service and relies on dynamic schedules in both the import and export direction between BAAs. The expanded availability of dynamic scheduling on the BC Hydro transmission system as proposed in this application is in alignment with evolving markets and practices in the Western Interconnection, and will give BC Hydro's OATT customers the option to use their transmission service to participate in those markets that rely on dynamic scheduling.

4 Proposed OATT Amendments in Response to Need for Dynamic Scheduling

BC Hydro's OATT has generally kept pace with market developments as described in sections 2 and 3 of this application, and has been amended in the past to accommodate intra-hour scheduling and a limited use of dynamic scheduling.
BC Hydro is now proposing amendments to give its OATT customers the option to use their transmission service to participate in markets that require an expanded use of dynamic scheduling. As a transmission provider, BC Hydro has considered the industry developments and concluded that it is reasonable and desirable to propose changes to its OATT to expand the use of dynamic scheduling. It is important that

BC Hydro keep up with industry developments where reasonable to support its customers, to reduce seam issues with interconnected BAAs[9], and to encourage the efficient use of its transmission system.

Although Powerex is the only BC Hydro OATT customer that has formally expressed to BC Hydro an interest in expanded use of dynamic scheduling at this time, the amendments being proposed would be available to all eligible customers wishing to schedule dynamically. The amendments would be beneficial for all transmission customers who may want to dynamically import and export into or out of other regions and markets.

BC Hydro's proposed amendments are shown in the blackline and clean versions of Attachment Q-1, attached as Appendix A, and are described below.

4.1 Expansion of Dynamic Scheduling to Imports and All Transmission Reservations

The key purpose of the proposed amendments is to allow dynamic scheduling for imports, and to allow OATT customers the ability to use any transmission reservation priority, including Non-Firm Service and Network Economy Service. The key changes to Attachment Q-1 required to allow this expanded use of dynamic scheduling are found in section 2(a) (describing availability of dynamic scheduling), section 3 (eligibility requirements amended to account for BC Hydro acting as a host BAA), and section 10 (charges for dynamic scheduling to reflect reservations on Non-Firm Service or NITS).

As discussed in section 2 of the Application, the existing terms of Attachment Q-1 were designed to meet the needs at that time, which were limited to exports on Firm Service. Since that time, the industry has developed such that dynamic scheduling is now commonly used on imports and exports, using transmission reservations of

[9] "Seams issues" refers to inefficiencies that prevent the economic transfer of capacity and energy between neighboring markets or control areas, due to differences in market rules and designs, operating and scheduling protocols or other control area practices.

different priorities. Other entities in the Western Interconnection, such as Arizona, Avista, El Paso, PacifiCorp, and Tucson, are allowing dynamic scheduling on non-firm transmission, including network service.

Technology has now developed to the point that the complex coordination between BAAs required for dynamic scheduling is not as challenging as it was at the time of the DS Application in 2005. Because it causes an automatic interchange to occur between BAAs, dynamic scheduling requires coordination between the host BAA, any intermediary BAA(s) and the receiving BAA. Advanced computerized interchange mechanisms are now available to accommodate this coordination. With the benefit of this technology, BC Hydro can safely and reliably offer expanded dynamic scheduling service to its OATT customers on imports and exports using any transmission reservation priority. For these reasons, BC Hydro believes its proposed changes are reasonable.

4.2 Summary of Housekeeping Amendments

The current language in Attachment Q-1 was drafted when dynamic scheduling was still relatively new. Since that time dynamic scheduling has become more prevalent, industry terms have developed, the technology to facilitate dynamic scheduling has improved, and BC Hydro has more experience with offering dynamic scheduling to its customers. BC Hydro is therefore proposing various amendments to Attachment Q-1 of a housekeeping nature to alphabetize and update defined terms used in Attachment Q-1, to make corrections to Attachment Q-1 of a typographical nature, and to clarify and simplify the tariff language of Attachment Q-1.

The key housekeeping amendments are summarized below:

- BC Hydro has updated the definitions in Attachment Q-1, including aligning some definitions with industry standards (i.e., North American Electric Reliability Corporation's (**NERC**) glossary of terms), as appropriate;

- Throughout Attachment Q-1, BC Hydro has sought to remove technical information that is not necessary or at a level of detail that is not customarily included in the OATT. For example, reference to the "EMS" was removed because it is not necessary to specify the technical system by which BC Hydro sends dispatch signals. As another example, the technical description of dispatching in the existing 7(a) was removed as it is not a term or condition of service;
- Throughout Attachment Q-1, BC Hydro has also sought to clarify and simplify the language. For example, BC Hydro has consolidated the content in the current section 2 (Availability); section 8 (Limitations) and section 12 (Suspension or Reduction in Dynamic Schedules). With the proposed amendments, the limitations on the availability of dynamic scheduling are all found in section 2. As another example, BC Hydro removed the concept of "Dynamic Scheduling Transmission" as this is not an industry term, and is the concept is no longer required for the purposes of describing dynamic scheduling as it is currently used; and
- Due the limitations on the availability of dynamic scheduling, dynamic scheduling was always subject to technical limitations and feasibility. BC Hydro's proposed amendments to section 4 of Attachment Q-1 clarify the process required for customers to use dynamic scheduling given these limitations. Proposed section 4 clarifies that BC Hydro may limit the volume of dynamic scheduling requests that can be accepted based on its reasonable assessment of the availability and limitations of dynamic scheduling between and through specific BAAs. For instance, BC Hydro must have arrangements in place with other BAAs in order to accommodate dynamic scheduling, and dynamic scheduling may be limited by reliability constraints.

4.3 Detailed Description of Amendments

Table 4-1 below provides a more detailed description of BC Hydro's proposed amendments to Attachment Q-1, and explains the rationale for substantive amendments.

Table 4-1 Attachment Q-1 Concordance Table

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 1	**Section 1**		
1.(a) Automatic Generation Control		Definition deleted	The definition is not required as Tariff language using this term was only used in the definition of "Dynamic Schedule". The proposed definition of "Dynamic Schedule" no longer refers to Automatic Generation Control.
1.(b) Dynamic Scheduling Business Practice		Definition deleted	BC Hydro no longer has a single business practice for dynamic scheduling. This became redundant when Attachment Q-1 was incorporated into the OATT. Business practices related to dynamic scheduling are now addressed in various BC Hydro business practices as appropriate.
1.(c) Dynamic Schedule	1.(a) Dynamic Schedule	Definition replaced	The definition has been amended to align with the definition included in the NERC Glossary of Terms.
	1.(b) Dynamic Transfer	New Definition of term used.	The new definition aligns with the definition included in the NERC Glossary of Terms.
	1.(c) Interchange Schedule	New Definition of term used.	The new definition aligns with the definition included in the NERC Glossary of Terms.
	1.(d) Interchange Transaction	New Definition of term used.	The new definition aligns with the definition included in the NERC Glossary of Terms.
1.(d) Dynamic Scheduling Energy		Definition deleted	The definition is not required as Tariff language is proposed to be simplified.
1.(e) Dynamic Scheduling Transmission		Definition deleted	The definition is not required as Tariff language is proposed to be simplified.
1.(f) "EMS" or Energy Management System		Definition deleted	The definition is no longer required. The term "EMS" only occurred in section 3(e). To simplify the Tariff language, the reference to EMS in 3(e) was removed as it was not necessary to specify in the Tariff the technical system by which the Transmission Provider issues control signals.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 1	**Section 1**		
1.(g) Intermediary Balancing Authority Area	1.(e) Intermediate Balancing Authority Area	Term and definition updated	The term and its definition have been updated to align with the definitions included in the NERC Glossary of Terms.
1.(i) Receiving Balancing Authority Area	1.(f) Receiving Balancing Authority Area	Definition replaced	The definition has been amended to align with the definition included in the NERC Glossary of Terms.
1.(j) Host Balancing Authority Area	1.(g) Sending Balancing Authority Area	Term and definition updated	The term and its definition have been amended to align with the definitions included in the NERC Glossary of Terms.
1.(k) SCADA		Definition deleted	The term is not used in Attachment Q-1 and is therefore not needed.
1.(l) WECC	1.(h) WECC	Renumbering only	No amendment
Section 2	**Section 2**		
2. Availability of Dynamic Scheduling Transmission; **8. Limitations; and** **12. Suspension or Reduction in Dynamic Schedules**	**2. Availability and Limitations**	Housekeeping amendments to simplify and combine related aspects of the availability and limitations of dynamic scheduling.	This section combines and simplifies the provisions of section 2 (Availability); section 8 (Limitations) and section 12 (Suspension or Reduction in Dynamic Schedules).
2.(a)	2.(a)(i)	Provides when dynamic scheduling will be made available	No substantive amendment
	2.(a)(ii)	Amended to reflect that dynamic scheduling of imports will also be possible.	This subsection provides that dynamic scheduling will only be available if all arrangements necessary to facilitate dynamic schedules are in place with other BAAs.
2.(b)		Requirements for dynamic scheduling when BC Hydro is Host BAA is incorporated into generic description in proposed 2.(a)(ii).	The specific requirements of this section have been incorporated into section 2.(a)(ii), which is applicable whether BC Hydro is the sending, receiving or intermediate balancing authority.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 2	**Section 2**		
2.(c)		Requirements for dynamic scheduling when BC Hydro is Intermediary BAA is incorporated into generic description in proposed 2.(a)(ii).	The specific requirements of this section have been incorporated into section 2.(a)(ii), which is applicable whether BC Hydro is the sending, receiving or intermediate balancing authority.
	2.(a)(iii)	New subsection	This section clarifies that BAAs need to have the required systems in place to dynamically schedule.
7(a) and (b)	2.(b)(i)	Technical detail of dispatching removed. Description of limitations moved.	Technical description of dispatch in original section 7(a) is removed, as this level of detail is more appropriate in a business practice or operating order. Proposed section 2(b)(i) incorporates description of conditions that may limit Transmission Provider's ability to accommodate dynamic scheduling on transmission capacity reservations. No substantive amendment.
8. Limitations	2.(b)(ii) and (iii)	Section moved.	No substantive amendment.
12. Suspension or Reduction in Dynamic Schedules	2.(d)	Section moved	No substantive amendment.
Section 3	**Section 3**		
3. Eligibility Requirements	**3. Eligibility Requirements**	General update to reflect Tariff requirements of a comprehensive dynamic scheduling framework.	Amendments to reflect that BC Hydro may now by the receiving BAA. Other amendments to this section are largely of a non-substantive housekeeping nature.
3.(c)	3.(a)	Section moved	No substantive amendment
3.(a)	3.(b)	Section moved and amended	No substantive amendment.
	3.(c)	New section	Sets out the eligibility requirements where BC Hydro is the Receiving BAA.
3.(b)	3.(d)	Section moved and amended	No substantive amendment.
3.(d) , (d) and (g)	3.(e), (f) and (h)	Sections renumbered and amended	No substantive amendment
3(f)		Section deleted	This section has been removed since dynamic scheduling will be allowed on any transmission reservation priority.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 3	**Section 3**		
	3(g)	Section added to add Service Agreement requirement.	Proposed 3(g) requires a Transmission Customer to have a signed Transmission Service Agreement with BC Hydro.
3.(h)	Concluding paragraph	No amendment proposed	No substantive amendment
Section 4	**Section 4**		
4. Relationship Between Dynamic Scheduling Transmission and Dynamic Scheduling Energy	**4. Dynamic Scheduling**	Content of section deleted or revised	Current sentence on reserving dynamic schedules has been incorporated into BC Hydro's Business Practices. Current sentence on procedures for dynamic scheduling has been reworded in new section 4, Dynamic Scheduling. This section clarifies that dynamic scheduling is subject to approval of the Transmission Provider's review of availability. Once approved, transmission customers may dynamically schedule using eTags in accordance with BC Hydro's business practices.
Section 5	**-**		
5. Resale and Reassignment of Unused Dynamic Scheduling Transmission	Not Applicable	Section Deleted	This section has been removed, as there is no need to specify restrictions on resale or reassignment. Resale and reassignment rights are tied to the type of transmission rights that are held as specified in the OATT, regardless of whether a customer schedules dynamically or statically.
Section 6	**Section 5**		
6. Official Dispatch Signal	**5. Official Dispatch Signal**	General update to reflect BC Hydro may be either the Sending or Receiving BAA.	Expands the approved Attachment Q-1 provision to set the requirement that both Sending and Receiving BAA's have a responsibility to coordinate and respond to dispatches of resources.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 7	**Section 6**		
7. Dispatch Instruction Data	**6. Dispatch Instruction Data**		
7.(a) and (b)	2.(b)(i)	Section deleted or moved	Dispatch instruction data requirements when BC Hydro is Sending BAA deleted as more appropriate in business practice or operating order. Constraints on dynamic scheduling moved to section 2.(b)(i).
7.(c)	6.	Minor amendments to section of a housekeeping nature.	No substantive amendments.
Section 8	**-**		
8. Limitations	2.(b)(ii) and (iii) and 2.(c)	Section moved to section 2.	No substantive amendments.
Section 9	**Section 7**		
9. Losses	**7. Losses**	Minor amendments to section of a housekeeping nature.	No substantive amendments.
Section 10	**Section 8**		
10. Settlement Data Discrepancy	**8. Settlement Data Discrepancy**	Minor amendments to section of a housekeeping nature.	No substantive amendments.
Section 11	**-**		
11. Failure of Dynamic Transfer Signal or Official Dispatch Signal	**Not Applicable**	Section deleted.	Section deleted as it was technical information and not necessary to include in the OATT.
Section 12	**-**		
12. Suspension or Reduction in Dynamic Schedules	2(d)	Section moved to section 2.	No substantive amendments.
Section 13	**Section 9**		
13. Sharing of Information	**9. Sharing of Information**	Minor amendments to section of a housekeeping nature.	No substantive amendments.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 14	**Section 10**		
14. Charges for Dynamic Scheduling (DS) Service	**10. Charges for Dynamic Scheduling (DS) Service**	General update to reflect dynamic scheduling of imports and exports on any available transmission service.	In the approved Attachment Q-1, only exports may be dynamically scheduled and only Firm Point-To-Point Transmission Service reservations can be utilized for these schedules. This section has been updated to reflect that dynamic scheduling will be possible for both imports and exports on any transmission reservation, including Firm Point-To-Point, Non-Firm Point-To-Point and Network Economy.
Not Applicable	10.(a)	Section added.	This section provides the applicable Tariff references when imports are dynamically scheduled using Network Economy Service.
14.(a) and 14.(b)	10.(b)	This section combines Short Term Firm and Long Term Firm provisions from the approved Attachment Q-1 and adds Non-Firm.	This section provides the applicable Tariff Rate Schedule when imports are dynamically scheduled using Point-To-Point Transmission Service.
14.(c)	10.(c)	This section has been expanded to consider all Ancillary Services instead of just Scheduling, System Control and Dispatch per approved Attachment Q-1	This section provides the applicable Tariff Rate Schedules for ancillary services, all of which are applicable to transmission reservations that can be used for dynamic scheduling.

5 Adjustment to Implementation of Network Utilization Test for Dynamic Scheduling

While no amendments to the OATT are required to implement, BC Hydro will be adjusting the way the utilization rate is calculated per section 5 of Attachment Q-2 – Network Economy Service. BC Hydro needs to adjust the way it is calculating the utilization rate in order to accommodate intra-hour scheduling and dynamic scheduling of imports, neither of which were available at the time BC Hydro originally implemented the network utilization test.

In 2006, certain Alberta transmission customers and BC Hydro entered into a Negotiated Settlement Agreement (**NSA**), which was approved by the Commission under Order No. G-127-06. The NSA established specific tests and reporting obligations on the use of Network Economy Service. Important elements of that settlement included an economic test (to ensure the service's high reservation priority would apply only when imports economically displace domestic generation); a utilization test (to ensure that Network Economy Service reservations were being used and were not simply being reserved to block third party access); and various reporting obligations (to ensure transparency). Network Economy Service reservations have a higher priority than Non-Firm Service reservations provided the economic test and utilization test criteria are passed.

Since neither intra-hour scheduling nor dynamic scheduling was available for use on Network Economy Service at the time the NSA was completed, BC Hydro needs to adjust how it is implementing the utilization test to accurately account for this new use of Network Economy Service.

The utilization test required by the NSA compares the volume of Network Economy Service reservations to the volume of energy scheduled on those reservations. For ease of implementation, BC Hydro has been calculating the utilization of Network Economy Service by comparing the volume of transmission reservations to the average scheduled energy in a given hour. This implementation approach to the

utilization test does not accurately measure utilization where there are intra-hour or dynamic schedules.

Since the transmission reservation is only available in minimum one hour blocks, BC Hydro will calculate utilization for all transmission reservations (including Network Economy Service reservations consistent with the NSA) to accurately measure utilization as follows:

1. For static schedules (i.e., non-dynamic schedules), BC Hydro will compare the volume of a reservation to the peak energy volume scheduled over an hour. This will accurately account for both hourly schedules where the amount scheduled will not change, and intra-hour energy schedules, where it may change within the hour; and
2. For dynamic schedules, BC Hydro will compare the volume of a transmission reservation to the transmission allocation (the portion of the transmission reservation that is allocated for the dynamic schedule) indicated on the eTag(s). This will accurately account for EIM and other dynamic interchange transfers, which require transmission capacity to be made available for the scheduling hour for use, as required.

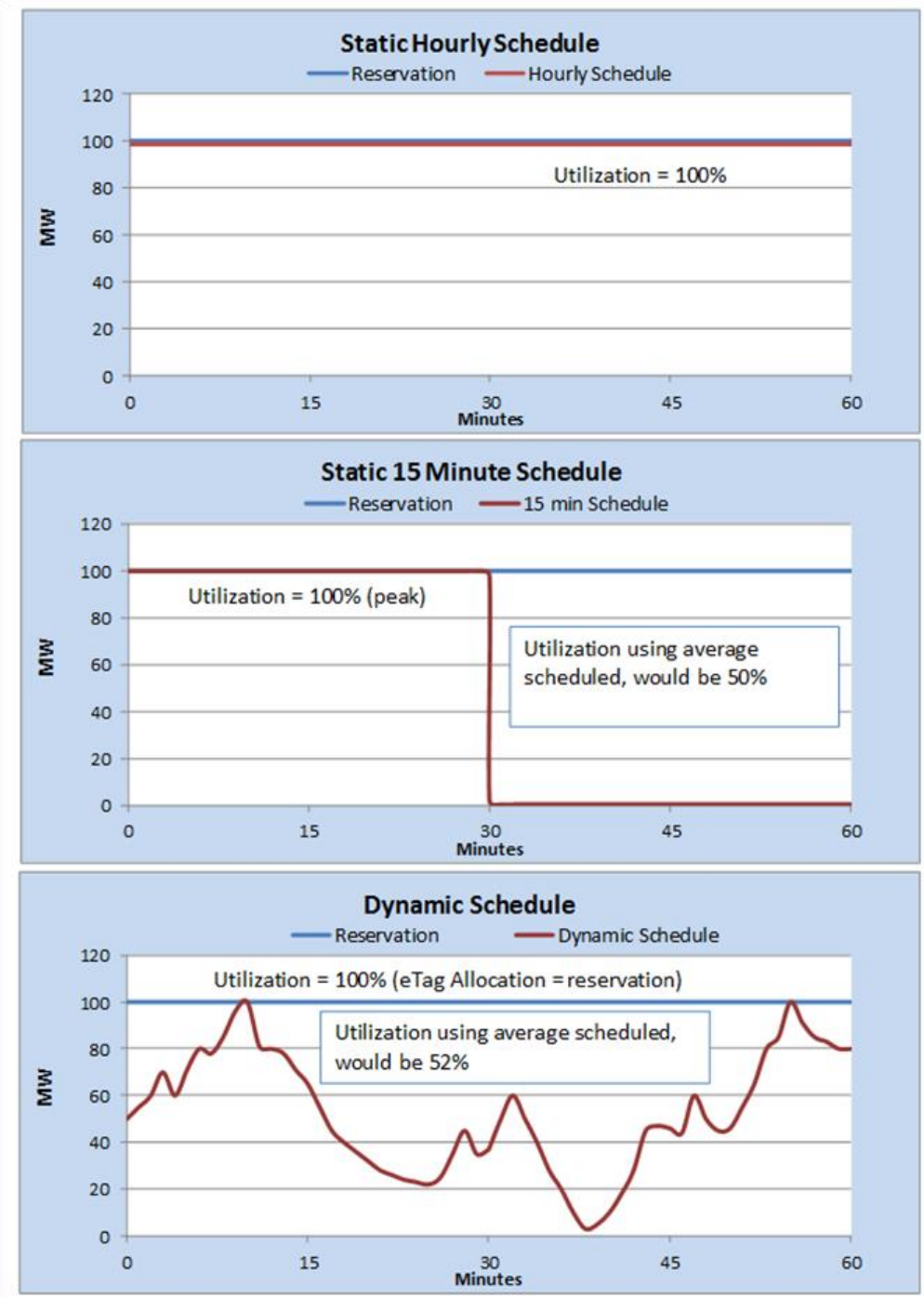
The use of the Transmission Allocation on the eTag for dynamic schedules is necessary and consistent with current operating practices. Prior to the operating hour, dynamic schedules only provide an estimate of possible energy that may be dispatched. Since energy can be dispatched and can flow up to the full Transmission Allocation on the eTag, BC Hydro relies upon the Transmission Allocation on the eTag to indicate the maximum flow that may occur for a dynamic schedule. This facilitates BC Hydro performing reliability curtailments based on the expected maximum use in the operating hour for dynamic schedules. This current practice avoids multiple curtailment or reload situations as the dynamic schedule may change on a real-time basis (i.e., every four to eight seconds).

With the above changes, BC Hydro's calculation of the utilization of Network Economy Service will remain consistent with the principles set out in the NSA, while accurately accounting for intra-hour and dynamic schedules.

Figure 5-1 shows three examples of how BC Hydro would calculate utilization of a transmission reservation:

1. The top graph depicts an hourly transmission reservation with a static hourly schedule. In this example the peak schedule matches the transmission reservation for the hour so the utilization is 100 per cent. This example shows how transmission reservations and schedules were matched historically, and still are in most instances despite more intra-hour and dynamic scheduling;
2. The middle depicts an hourly transmission reservation with static intra-hour schedules. In this example the schedule comprises two 15-minute increments equal to the transmission reservation followed by two 15-minute increments with zero scheduled. In this example the peak schedule matches the transmission reservation for the hour so the utilization is 100 per cent despite the average schedule being only 50 per cent of the peak. This example could reflect a reservation by a VER customer whose generation falls off during the hour; and
3. The third example shows a dynamic schedule. In this example, the hourly capacity reservation must be made available for the full hour and must be dynamically scheduled by T=xx:40. In this example the Transmission Allocation indicated on the eTag is equal to the transmission reservation and the utilization is therefore 100 per cent, despite the average schedule being only 52 per cent of the reservation.

Figure 5-1 Three Examples of 100 per cent Utilization of Hourly Reservation



BC Hydro will implement this change to the utilization test through its operating processes. No amendments to the OATT are required.

6 Consultation Resulted in No Comments

On August 25, 2017, BC Hydro notified its OATT customers and other interested parties of its proposed filing of the Application by way of a bulletin posted on BC Hydro's transmission website (**Consultation Notice**). The Consultation Notice established a three-week comment period and included BC Hydro's proposed amendments to the OATT and related business practices. A copy of the Consultation Notice is attached as Appendix B to this application.

The Consultation Notice also included a request for comments on the need for a face-to-face meeting (**Consultation Meeting**) to review the proposed changes to Attachment Q-1 and the possible new Attachment Q-6.

BC Hydro received no comments in response to the Consultation Notice and no requests for a Consultation Meeting.

In the Consultation Notice BC Hydro also sought comments on a possible new Attachment Q-6 that would provide a new zero priority scheduling option for customers participating in the EIM. Under Attachment Q-6, a transmission customer could use the residual capacity on its transmission reservations for EIM purposes, at the lowest transmission curtailment priority (first to be curtailed) and at no additional cost to the customer. These schedules would not decrement available transfer capability (**ATC**) that is offered for higher priority transmission services (i.e., they would have no impact to ATC). This scheduling option would be available on Point-To-Point Service Agreements and Network Integration Transmission Service Agreements.

Attachment Q-6 did not result in any comments from transmission customers and would cost approximately $250,000 to implement. As the amendments to Attachment Q-1 are sufficient to facilitate participation in the EIM and other markets requiring dynamic scheduling, BC Hydro has decided not to seek approval of Attachment Q-6 at this time. Should developments arise that would make

Attachment Q-6 necessary or desirable in the future, BC Hydro would reconsider seeking approval from the Commission at that time.

7 Implementation Requirements

Subject to Commission approval of the Application, BC Hydro will be ready to implement the dynamic scheduling amendments to support EIM parallel operations by February 1, 2018 and Powerex's full go-live EIM participation on April 4, 2018.

The key implementation requirements are:

- Posting of the Commission Order approving the amendments and updating the business practices to reflect these amendments to be posted on its Open Access Same Time Information System (**OASIS**); and
- Updating BC Hydro's Market Operations and Development System to enable dynamic scheduling on imports and exports using any transmission reservation priority in advance of the February 1, 2018 start of EIM parallel operations.

BC Hydro estimates the total cost to implement enhanced dynamic scheduling in the OATT, through BC Hydro's proposed amendments to Attachment Q-1 and adjustment to implementation of the network utilization test, to be approximately $300,000. Due to the expedited timeline required to implement dynamic scheduling to facilitate Powerex's participation in the EIM, the implementation costs will be recovered from Powerex.

8 Conclusion

It is important that BC Hydro keep up with industry developments where reasonable to support its customers, to reduce seam issues with interconnected BAAs, and to encourage the efficient use of its transmission system. BC Hydro proposed amendments to the OATT are in alignment with evolving markets and practices in the Western Interconnection, and will give all OATT customers the service they need

to participate in markets that require an expanded use of dynamic scheduling. As discussed in section 1.2, BC Hydro respectfully requests approval of its proposed amendments to Attachment Q-1 on or before January 31, 2018 to facilitate the participation in the CAISO EIM by Powerex.

9 Communications

All communications regarding this proceeding are to be addressed to:

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BC Hydro
Power smart

Open Access Transmission Tariff

Dynamic Scheduling Amendments Application

Appendix A

Tariff Amendments
Black-lined and Clean

ATTACHMENT Q-1

Dynamic Scheduling

This attachment contains the eligibility requirements and the terms and conditions for the provision of dynamic scheduling to Transmission Customers.

1. Definitions

~~(a) "AGC" means Automatic Generation Control.~~

~~(b) "Dynamic Scheduling Business Practices" means the Transmission Provider's published Dynamic Scheduling Spinning Reserve, Dynamic Scheduling Contingency Reserve and Dynamic Scheduling Regulation Reserve business practices, as amended or replaced from time to time.~~

(a) ~~(c)~~ "Dynamic Schedule" means a ~~telemetered reading or value~~time-varying energy transfer that is updated in real-time and is used ~~as a schedule~~included in the ~~Transmission Provider's AGC~~Sscheduled n~~N~~et Interchange (**~~NIS~~**) term in the same manner as an Interchange s~~S~~chedule in the affected Balancing Authorities' ~~control ACE~~area control error equations (or alternate control processes).

(b) "eTag" means an electronic documentation of an energy transaction on an electronic tagging system, as required by BC Hydro for the scheduling of energy transactions.

~~(a)~~(c) "Interchange ~~Schedule~~" means energy transfers that cross Balancing Authority boundaries ~~an agreed-upon Interchange Transaction size (megawatts), start and end time, beginning and Area Control Error equation. The integrated value is treated as a schedule~~ending ramp times and rate, and type required ~~for interchange accounting purposes.~~delivery and receipt of power and energy ~~between the Sending and Receiving Balancing Authorities involved in the transaction~~.

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~~(d) "Dynamic Scheduling Energy~~"Interchange Transaction" means ~~regulating~~an agreement to transfer energy ~~or energy delivered~~ from ~~operating reserves.~~

~~(b)~~(d) ~~(e) "Dynamic Scheduling Transmission" means firm hourly transmission used for the real-time delivery of Dynamic Scheduling Energy to the Receiving~~a seller to a buyer that crosses one or more Balancing Authority Area ~~and consists of Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes) and Dynamic Scheduling Regulation Reserve (DSRegRes).~~boundaries.

~~(f) "EMS" means Energy Management System.~~

~~(c)~~(e) ~~(g) "Intermediary~~"Intermediate Balancing Authority Area" means ~~any~~a Balancing Authority ~~Area between the Host~~on the scheduling path of an Interchange Transaction other than the ~~Source~~Sending Balancing Authority ~~Area~~ and ~~the Receiving~~~~Sink~~Receiving Balancing Authority ~~Area~~.

~~(h) Reserved~~

~~(d)~~(f) ~~(i)~~ "Receiving Balancing Authority Area" means the Balancing Authority ~~Area which is to dynamically receive Dynamic Scheduling Energy schedules~~importing the Interchange.

~~(e)~~(g) ~~(j) "Host~~"Sending Balancing Authority Area" means the Balancing Authority Area ~~which is to send Dynamic Scheduling Energy schedules from system resources within its Balancing Authority Area.~~exporting the Interchange.

~~(k) "SCADA" means Supervisory Control and Data Acquisition.~~

~~(f)~~(h) ~~(l)~~ "WECC" means the Western Electricity Coordinating Council, or any successor organization.

2. Availability ~~of Dynamic Scheduling Transmission~~and Limitations

(a) Dynamic ~~Scheduling Transmission~~scheduling is only available ~~as follows~~:

(~~a~~i) while ~~such~~ Dynamic ~~Scheduling Transmission is~~Schedules are technically feasible and consistent with all applicable reliability standards adopted by the ~~BCUC~~Commission and WECC criteria and policies;

~~(b) if the Transmission Provider's Balancing Authority Area is the Host Balancing Authority Area:~~

~~(i) while~~ (ii) while the Transmission Provider has the necessary arrangements in place with ~~applicable Intermediary~~ any Sending, Receiving, or Intermediate ~~other~~ Balancing Authority Areas, as required, for the ~~facilitation by each such Intermediary Balancing Authority Area of Dynamic Scheduling Energy, as appropriate, and~~

~~(ii) while the Transmission Provider has arrangements in place with the Receiving Balancing Authority Area for the receipt by the Receiving Balancing Authority Area of Dynamic Scheduling Energy, as appropriate; and~~

~~(c) if the Transmission Provider's Balancing Authority Area is an Intermediary Balancing Authority Area, while the Transmission Provider has arrangements in place with the Host Balancing Authority Area, Receiving Balancing Authority Area, and any other Intermediary Balancing Authority Area for the delivery~~delivery, receipt, and facilitation of Dynamic ~~Scheduling Energy~~Schedules, as ~~appropriate.~~applicable.

(iii) while the Transmission Provider and any Sending, Receiving, or Intermediate Balancing Authority Areas, as required, have the necessary systems in place for the delivery, receipt, and facilitation of Dynamic Schedules, as applicable.

~~The availability of dynamic scheduling is limited by~~Dynamic scheduling will be limited, reduced or suspended as a result of~~:~~

(b) ~~(i) any existing~~ constraints ~~that might be in place, for the purposes of which the following are deemed constraints~~including, but not limited to~~:~~: an emergency or other condition that threatens to impair or degrade the reliability of the Transmission System ~~is threatened~~; resource constraints declared by the resource owner; insufficient Transmission Service over the Transmission System is procured for Dynamic Schedules; and any constraints imposed by the Sending Balancing Authority Area, Receiving Balancing Authority Area or any Intermediate Balancing Authority Areas on the scheduling path.

Dynamic Schedules will be limited by the Transmission Provider's cut-off times, and by the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules. ~~(ii) the Transmission Provider's cut-off times.~~

~~(iii) the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules.~~

(c) Dynamic Schedules will be processed on a first-come, first-received basis, up to the limit of the number of Dynamic Schedules that may be concurrently delivered and the total volume of energy that may be delivered through Dynamic Schedules.

~~The Transmission Provider may suspend or reduce Dynamic Schedules if:~~

~~(i) the reliability of the Transmission System is threatened; or~~

~~(ii) the Sending Balancing Authority Area, Receiving Balancing Authority Area or an Intermediate Balancing Authority Area, as applicable, requests that Dynamic Schedules be limited or suspended.~~

3. Eligibility Requirements

To be eligible to ~~designate Dynamic Scheduling Transmission~~use transmission for dynamic schedules, a Transmission Customer must satisfy the following eligibility requirements.

~~(a) The Transmission Customer must satisfy the requirements of the Receiving Balancing Authority Area with respect to the delivery of Dynamic Scheduling Energy into the Receiving Balancing Authority Area.~~

~~(b) The Transmission Customer must satisfy the requirements of Intermediary Balancing Authority Area(s) with respect to Dynamic Scheduling Energy and arrangement of appropriate transmission services through the Intermediary Balancing Authority Area.~~

(a) ~~(c)~~ The Transmission Customer must satisfy the requirements and standards of the Transmission Provider with respect to dynamic scheduling from the Transmission Provider's Balancing Authority Area, as those requirements and standards are described ~~from time to time~~ in this Attachment Q-1 and the ~~Dynamic Scheduling Business Practices~~Transmission Provider's business practices.

(b) ~~(d)~~ If the Transmission Provider's Balancing Authority Area is the Sending Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Receiving Balancing Authority Area with respect to the delivery of -energy through a Dynamic Schedule into the Receiving Balancing Authority Area.

(c) If the Transmission Provider's Balancing Authority Area is the Receiving Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Sending Balancing Authority Area with respect to the delivery of -energy through a Dynamic Schedule from the Sending Balancing Authority Area.

(d) The Transmission Customer must satisfy the requirements of Intermediate Balancing Authority Area(s) with respect to Dynamic Schedules and the arrangement of appropriate transmission services through the Intermediate Balancing Authority Area(s).

~~(b)~~(e) The Transmission Customer shall be responsible for all costs related to its own systems and equipment required to dynamically schedule, such as communications equipment, communication circuits and facility upgrades.

~~(c)~~(f) ~~(e)~~ The Transmission Customer must ~~have~~ensure sufficient resources are available that are: of the appropriate type ~~available and~~; ready to be delivered in the scheduled period ~~from a resource or resources for dynamic scheduling that are~~; electrically located within the ~~Transmission Provider's~~Sending Balancing Authority Area ~~must be~~; and responsive to control signals issued by the ~~Transmission Provider's EMS.~~Sending Balancing Authority.

~~(d)~~(g) ~~(f)~~ The Transmission Customer must have ~~a~~an executed Service Agreement with the Transmission Provider under the Tariff ~~Firm Point to Point Transmission Service reservation that is of equal or greater duration and capacity than the duration and capacity designated by the Transmission Customer as is indicated on the Dynamic Scheduling Transmission~~Schedule.

~~(e)~~(h) ~~(g)~~ The Transmission Customer must comply with applicable reliability standards adopted by the ~~BCUC~~Commission and WECC criteria and policies.

~~(h)~~ If, at any time, a Transmission Customer fails to meet any of the eligibility requirements in this section ~~3~~, the Transmission Provider may immediately suspend the Transmission Customer's eligibility for dynamic scheduling.

4. Approval and Use of ~~Relationship Between~~ Dynamic Scheduling ~~Transmission and Dynamic Scheduling Energy~~

Eligible Transmission Customers may not submit Dynamic Schedules prior to approval by the Transmission Provider. ~~The~~Eligible Transmission ~~Customer~~Customers may submit a request to the Transmission Provider for approval of dynamic scheduling. The Transmission Provider will approve such a request based on its reasonable assessment of the availability and limitations of dynamic scheduling between and through specific Balancing Authority Areas as may be required to accommodate the request. The Transmission Provider will make reasonable efforts to enter into the necessary arrangements with other Balancing Authority Areas to accommodate requests for dynamic scheduling.

Once a request for dynamic scheduling is approved by the Transmission Provider, the Eligible Customer may submit Dynamic Schedules for Point-To-Point Transmission Service or Network Integration Transmission Service by ~~reserve~~ submitting eTags ~~for Dynamic Scheduling Transmission only up~~Schedules ~~to its reasonably expected share of the total capacity of Dynamic Scheduling commitments to~~Transmission Provider following the ~~Receiving Balancing Authority Area. The~~ procedures ~~for scheduling Dynamic Scheduling Energy shall be as~~ set out ~~from time to time~~ in the ~~Dynamic Scheduling Business Practices.~~

~~**5. Resale and Reassignment of Unused Dynamic Scheduling**~~ Transmission Provider's business practices.

~~(a) Transmission Customers cannot resell or reassign any reserved transmission capacity during the time, and to the extent, that it is designated for Dynamic Scheduling Transmission.~~

~~(b) The Transmission Provider will not resell any reserved transmission capacity that has been designated for Dynamic Schedling Transmission.~~

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~~6~~5. Official Dispatch Signal

The ~~Transmission Provider, as the Host~~Sending and Receiving Balancing Authority ~~Area, is responsible for issuing~~Areas will coordinate and respond to the official dispatch signal for any dynamically scheduled resources ~~located within its Balancing Authority Area.~~.

~~7~~6. Dispatch Instruction Data

~~(a) When acting as the Host Balancing Authority Area, the Transmission Provider will automatically dispatch Dynamic Scheduling Energy upon receiving the Receiving Balancing Authority Area's dispatch instruction data, based on the value of the dispatch instruction data, up to any existing constraints that might be in place at the time of dispatch and subject to the limitations described in section 8 of this Attachment Q-1. Receiving Balancing Authority Area's dispatch instruction data will govern provided that there are no constraints.~~

~~(b) For the purpose of this section, the following are deemed to be constraints:~~

~~(i) the reliability of the Transmission System is threatened;~~

~~(ii) resource constraints declared by the resource owner;~~

~~(iii) insufficient firm transmission reservations for Dynamic Scheduling purposes; and~~

~~(iv) any constraints imposed by the Receiving Balancing Authority Area or any Intermediary Balancing Authority Areas on the scheduling path.~~

~~(a)~~ ~~(c)~~ The Transmission Customer is responsible for resolving with the Receiving Balancing Authority Area any discrepancy in data between the Receiving Balancing Authority Area's dispatch instruction data and the Transmission Customer's eTag. The Transmission Customer is responsible for ensuring the accuracy and

resolving any discrepancies in eTag information related to the ~~Intermediary~~Intermediate Balancing Authority ~~Areas~~Area.

~~**8. Limitations**~~

~~Dynamic Schedules will be limited by the Transmission Provider's cut-off times, and by the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules. Dynamic Schedules will be processed on a first-come, first-received basis, up to the limit of the number of Dynamic Schedules that may be concurrently delivered and the total volume of Dynamic Scheduling Energy that may be delivered.~~

~~9~~7. Losses

Any transmission losses attributed to the Dynamic Schedule on transmission systems external to the Transmission ~~Provider's Transmission~~ System will be the responsibility of the Transmission Customer.

~~10~~8. Settlement Data Discrepancy

~~(a) The Transmission Provider will use its own time-integrated energy value for inter-Control Area check-out and for settlement and billing purposes.~~

~~(a)~~ ~~(b)~~ The Transmission Customer is responsible for resolving, with the Receiving Balancing Authority Area and/or the Sending Balancing Authority Area, as applicable, any discrepancy ~~between~~with the ~~time-~~integrated energy value used by the Transmission Provider ~~and the time-integrated energy value provided by the Receiving Balancing Authority Area prior to sending the value to the Transmission Provider for settlement purposes.~~for settlement purposes.

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~~**11. Failure of Dynamic Transfer Signal or Official Dispatch Signal**~~

~~(a) If the Host Balancing Authority Area's or Receiving Balancing Authority Area's dynamic transfer signal fails, the Transmission Provider's obligation to comply with the Host Balancing Authority or Receiving Balancing Authority Area's request is automatically suspended.~~

~~(b) If the Host Balancing Authority Area's or Receiving Balancing Authority Area's dynamic transfer signal fails or the official dispatch signal from the Transmission Provider fails, the last known value will be used for the remainder of the hour. If the Transmission Provider does not recover the signal by the end of the hour, the Transmission Provider will decrease the value to zero.~~

~~(c) For the purposes of this section, a signal fails if both redundant communication paths fail.~~

~~**12. Suspension or Reduction in Dynamic Schedules**~~

~~In addition to the limitations and constraints described in sections 7 and 8, the Transmission Provider may suspend or reduce Dynamic Schedules out of its Balancing Authority Area if:~~

~~(a) the reliability of the Transmission System is threatened; or~~

~~(b) the Receiving Balancing Authority Area or an Intermediary Balancing Authority Area requests that Dynamic Schedules be limited or suspended.~~

~~13~~9. Sharing of Information

The Transmission Provider may share with the ~~Host~~Sending Balancing Authority Area, Receiving Balancing Authority Area, ~~Intermediary~~Intermediate Balancing Authority Areas, ~~and~~ reliability coordinators and relevant market operators, whatever operational information directly related to dynamic scheduling is necessary or desirable to facilitate

dynamic scheduling. The foregoing information shall include such information that may be required by applicable tariff provisions and business practices and standards of any of the ~~Host~~Sending Balancing Authority Area, Receiving Balancing Authority Area, ~~Intermediary~~Intermediate Balancing Authority Areas, and the Transmission Provider, and shall also include such information that may be required by each of the Sending Balancing Authority Area, Receiving Balancing Authority Area, ~~Intermediary~~Intermediate Balancing Authority Areas and the Transmission Provider to curtail dynamic schedules in accordance with its ~~tariff~~Tariff, business practices, standards and applicable service agreements.

~~14~~10. Charges for Dynamic Scheduling ~~(DS) Service~~

(a) ~~(a) DS~~Import Dynamic Scheduling~~es~~ using Network ~~Economy~~Integration Transmission ~~Transmission~~ Service ~~designated from Short-Term~~is ~~provided~~charged in accordance with Part III and Rate Schedule 00 of the Tariff ~~under the terms of the Tariff and in accordance with Attachment Q-2 and Tariff Supplement No. 80~~.

~~(a)~~(b) Dynamic Scheduling~~les~~ using ~~Firm service is~~or Non-Firm Point-To-Point Transmission Service ~~is provided under the terms of the Tariff and~~is charged in accordance with Part II and Rate Schedule ~~(**RS**)~~ 01 of ~~OATT~~the Tariff.

~~(b) DS Service designated from Long-Term Firm service is charged in acordance with Rate Schedule 01 of OATT.~~

~~(b)~~(c) ~~(c)~~ Charges for ~~Scheduling, System Control and Dispatch~~aAncillary ~~s~~Services will be applied in accordance with ~~Rate Schedule~~Rate Schedules 03 ~~of OATT~~through 09 of the Tariff, as applicable.

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ATTACHMENT Q-1

Dynamic Scheduling

This attachment contains the eligibility requirements and the terms and conditions for the provision of dynamic scheduling to Transmission Customers.

1. Definitions

(a) "Dynamic Schedule" means a time-varying energy transfer that is updated in real-time and is used included in the scheduled net Interchange term in the same manner as an Interchange schedule in the affected Balancing Authorities' area control error equations (or alternate control processes).

(b) "eTag" means an electronic documentation of an energy transaction on an electronic tagging system, as required by BC Hydro for the scheduling of energy transactions.

(c) "Interchange" means energy transfers that cross Balancing Authority boundaries.

(d) "Interchange Transaction" means an agreement to transfer energy from a seller to a buyer that crosses one or more Balancing Authority Area boundaries.

(e) "Intermediate Balancing Authority Area" means a Balancing Authority on the scheduling path of an Interchange Transaction other than the Sending Balancing Authority and Receiving Balancing Authority.

(f) "Receiving Balancing Authority Area" means the Balancing Authority importing the Interchange.

(g) "Sending Balancing Authority Area" means the Balancing Authority Area exporting the Interchange.

(h) "WECC" means the Western Electricity Coordinating Council, or any successor organization.

2. Availability and Limitations

(a) Dynamic scheduling is only available:

(i) while Dynamic Schedules are technically feasible and consistent with all applicable reliability standards adopted by the Commission and WECC criteria and policies;

(ii) while the Transmission Provider has the necessary arrangements in place with any Sending, Receiving, or Intermediate Balancing Authority Areas, as required, for the delivery, receipt, and facilitation of Dynamic Schedules, as applicable.

(iii) while the Transmission Provider and any Sending, Receiving, or Intermediate Balancing Authority Areas, as required, have the necessary systems in place for the delivery, receipt, and facilitation of Dynamic Schedules, as applicable.

(b) Dynamic scheduling will be limited, reduced or suspended as a result of constraints, including, but not limited to: an emergency or other condition that threatens to impair or degrade the reliability of the Transmission System; resource constraints declared by the resource owner; insufficient Transmission Service over the Transmission System is procured for Dynamic Schedules; and any constraints imposed by the Sending Balancing Authority Area, Receiving Balancing Authority Area or any Intermediate Balancing Authority Areas on the scheduling path.

(c) Dynamic Schedules will be limited by the Transmission Provider's cut-off times, and by the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules. Dynamic Schedules will be processed on a

first-come, first-received basis, up to the limit of the number of Dynamic Schedules that may be concurrently delivered and the total volume of energy that may be delivered through Dynamic Schedules.

3. Eligibility Requirements

To be eligible to use transmission for dynamic schedules, a Transmission Customer must satisfy the following eligibility requirements.

(a) The Transmission Customer must satisfy the requirements and standards of the Transmission Provider with respect to dynamic scheduling from the Transmission Provider's Balancing Authority Area, as those requirements and standards are described in this Attachment Q-1 and the Transmission Provider's business practices.

(b) If the Transmission Provider's Balancing Authority Area is the Sending Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Receiving Balancing Authority Area with respect to the delivery of energy through a Dynamic Schedule into the Receiving Balancing Authority Area.

(c) If the Transmission Provider's Balancing Authority Area is the Receiving Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Sending Balancing Authority Area with respect to the delivery of energy through a Dynamic Schedule from the Sending Balancing Authority Area.

(d) The Transmission Customer must satisfy the requirements of Intermediate Balancing Authority Area(s) with respect to Dynamic Schedules and the arrangement of appropriate transmission services through the Intermediate Balancing Authority Area(s).

(e) The Transmission Customer shall be responsible for all costs related to its own systems and equipment required to dynamically schedule, such as communications equipment, communication circuits and facility upgrades.

(f) The Transmission Customer must ensure sufficient resources are available that are: of the appropriate type; ready to be delivered in the scheduled period; electrically located within the Sending Balancing Authority Area; and responsive to control signals issued by the Sending Balancing Authority.

(g) The Transmission Customer must have an executed Service Agreement with the Transmission Provider under the Tariff.

(h) The Transmission Customer must comply with applicable reliability standards adopted by the Commission and WECC criteria and policies.

If, at any time, a Transmission Customer fails to meet any of the eligibility requirements in this section, the Transmission Provider may immediately suspend the Transmission Customer's eligibility for dynamic scheduling.

4. Approval and Use of Dynamic Scheduling

Eligible Transmission Customers may not submit Dynamic Schedules prior to approval by the Transmission Provider. Eligible Transmission Customers may submit a request to the Transmission Provider for approval of dynamic scheduling. The Transmission Provider will approve such a request based on its reasonable assessment of the availability and limitations of dynamic scheduling between and through specific Balancing Authority Areas as may be required to accommodate the request. The Transmission Provider will make reasonable efforts to enter into the necessary arrangements with other Balancing Authority Areas to accommodate requests for dynamic scheduling.

Once a request for dynamic scheduling is approved by the Transmission Provider, the Eligible Customer may submit Dynamic Schedules for Point-To-Point Transmission

Service or Network Integration Transmission Service by submitting eTags to the Transmission Provider following the procedures set out in the Transmission Provider's business practices.

5. Official Dispatch Signal

The Sending and Receiving Balancing Authority Areas will coordinate and respond to the official dispatch signal for any dynamically scheduled resources.

6. Dispatch Instruction Data

The Transmission Customer is responsible for resolving with the Receiving Balancing Authority Area any discrepancy in data between the Receiving Balancing Authority Area's dispatch instruction data and the Transmission Customer's eTag. The Transmission Customer is responsible for ensuring the accuracy and resolving any discrepancies in eTag information related to the Intermediate Balancing Authority Area.

7. Losses

Any transmission losses attributed to the Dynamic Schedule on transmission systems external to the Transmission System will be the responsibility of the Transmission Customer.

8. Settlement Data Discrepancy

The Transmission Customer is responsible for resolving, with the Receiving Balancing Authority Area and/or the Sending Balancing Authority Area, as applicable, any discrepancy with the integrated energy value used by the Transmission Provider for settlement purposes.

9. Sharing of Information

The Transmission Provider may share with the Sending Balancing Authority Area, Receiving Balancing Authority Area, Intermediate Balancing Authority Areas, reliability

coordinators and relevant market operators, whatever operational information directly related to dynamic scheduling is necessary or desirable to facilitate dynamic scheduling. The foregoing information shall include such information that may be required by applicable tariff provisions and business practices and standards of any of the Sending Balancing Authority Area, Receiving Balancing Authority Area, Intermediate Balancing Authority Areas, and the Transmission Provider, and shall also include such information that may be required by each of the Sending Balancing Authority Area, Receiving Balancing Authority Area, Intermediate Balancing Authority Areas and the Transmission Provider to curtail dynamic schedules in accordance with its Tariff, business practices, standards and applicable service agreements.

10. Charges for Dynamic Scheduling

(a) Dynamic Scheduling using Network Integration Transmission Service is charged in accordance with Part III and Rate Schedule 00 of the Tariff.

(b) Dynamic Scheduling using Point-To-Point Transmission Service is charged in accordance with Part II and Rate Schedule 01 of the Tariff.

(c) Charges for Ancillary Services will be applied in accordance with Rate Schedules 03 through 09 of the Tariff, as applicable.

BC Hydro
Power smart

Open Access Transmission Tariff

Dynamic Scheduling Amendments Application

Appendix B

Consultation Notice

OATT Amendments and Business Practices Changes to Facilitate Transactions with the CAISO EIM

Posted on August 25, 4:30 p.m.

BC Hydro advises that it intends to file an Application with the British Columbia Utilities Commission (Commission) to amend the dynamic scheduling provisions of its Open Access Transmission Tariff (OATT). The dynamic scheduling provisions of the OATT are included as: section 3.1 – Scheduling, System Control and Dispatch Service; and Attachment Q-1 – Dynamic Scheduling. The approved provisions of the OATT permit dynamic scheduling of exports using firm transmission reservation priority.

BC Hydro is issuing this bulletin to consult on the following proposed amendments to its OATT and to certain of its OATT business practices:

- Amendments to Attachment Q-1 to the OATT that expand dynamic scheduling to imports and use on Non-Firm Point-To-Point and Network Integration Transmission Service (NITS), which includes Network Economy Service;
- A new Attachment Q-6 to the OATT that will provide a zero priority scheduling option for participants in the California Independent System Operator's (CAISO) Energy Imbalance Market (EIM);
- An amendment to section 3.1 of the OATT to reflect the scheduling option provided in Attachment Q-6;
- Amendments to business practices related to implementing dynamic and EIM scheduling.

The proposed amendments to the OATT are described further below and the proposed tariff language is attached to this bulletin. Subject to the feedback received during this consultation, BC Hydro plans to file an Application with the Commission in October 2017 seeking approval of these amendments.

Expansion of Dynamic Scheduling under Attachment Q-1

Attachment Q-1 of the OATT currently permits transmission customers to schedule dynamically only on the export path and only using firm transmission service. BC Hydro is considering amendments to Attachment Q-1 to enable transmission customers to schedule dynamically on both import and export paths and to allow dynamic scheduling on any transmission service, including Firm and Non-Firm Point-To-Point Transmission Service, and NITS which includes Network Economy Service. BC Hydro is also considering housekeeping amendments to reorganize and simplify the terms of Attachment Q-1, clarify the availability of dynamic scheduling, and to update the language to reflect current industry practice.

The exchange of energy between regions in the WECC interconnection has normally been managed with scheduled transfers that remain constant for one hour or 15-minute intervals. Dynamic scheduling allows for the exchange of energy between regions that can change continuously through each hour, rather than remain constant. Dynamic scheduling was first incorporated into the OATT on a permanent basis in 2006 upon Commission approval of Attachment O (now Attachment Q-1), as proposed in British Columbia Transmission Corporation's Dynamic Scheduling Application. At that time, dynamic scheduling was relatively new in the industry, and was implemented to allow Transmission Customers to participate in the CAISO's market. It was contemplated that dynamic schedules would be limited to exports on firm transmission service, which were the requirements for participation in CAISO's market.

Since 2006, dynamic scheduling has become more prevalent in the industry and markets have evolved. Notably, dynamic scheduling is widely used in the CAISO's EIM.[1] CAISO's EIM is a voluntary organized market platform in the WECC interconnection for the real-time wholesale purchase and sale of imbalance energy. Developed and operated by the CAISO, the EIM currently facilitates the efficient dispatch of generation resources within each participating Balancing Authority Area (BAA), as well as 15-minute and 5-minute transfers between participating BAAs. Participation in CAISO's EIM 5-minute

transfer market is conducted through dynamic schedules, both imports and exports, and on a variety of transmission reservation priorities including Non-Firm Point-To-Point and NITS.

While BC Hydro will not become a participant in the EIM, its subsidiary Powerex, also a Transmission Customer under the OATT, has executed a participation agreement with the CAISO and is scheduled to enter the EIM in April 2018.

BC Hydro is proposing amendments to Attachment Q-1 to expand dynamic scheduling service to include imports, and for use on Non-Firm Point-To-Point Transmission Service, and NITS. The amended Attachment Q-1 would allow all eligible Transmission Customers to dynamically schedule between BC Hydro and other Balancing Authority Areas, where dynamic scheduling is available and within system limitations.

BC Hydro's proposed amendments to Attachment Q-1 also include amendments to update and simplify the tariff language. These amendments include:

- housekeeping amendments to reorganize and simplify the terms of Attachment Q-1, including removing technical implementation details that are more appropriately addressed in business practices or operating orders;
- amendments to clarify the availability of dynamic scheduling;
- updated tariff language to reflect current industry practice, such as using defined terms from NERC's Glossary of Terms.

Attached to this bulletin is a Concordance Table comparing the approved Attachment Q-1 with an explanation of each change.

Dynamic Schedules and the Calculation of Network Economy Service Utilization

Given evolving energy markets, such as the CAISO's EIM, BC Hydro's proposed expansion of dynamic scheduling would facilitate intra-hour schedules (i.e. schedules of 15, 30 or 45 minutes) and dynamic schedules on Network Economy Service. This expanded use of Network Economy Service will be consistent with the terms of the 2006 Negotiated Settlement Agreement for Network Economy Service approved by BCUC Order G-127-06 (NSA). The key elements of the NSA are: 1) an economic test to ensure Network Economy Service is used when imports can economically displace generation; 2) a utilization test to ensure Network Economy Service reservations are scheduled upon and not used for blocking access by point-to-point customers; and 3) provision of various reports for transparency purposes. As neither intra-hour scheduling[2] nor dynamic scheduling[3] was available for Network Economy Service at the time the NSA was implemented, BC Hydro needs to adjust how it is implementing the utilization test to accurately account for this use of Network Economy Service.

The utilization test required by the NSA compares the volume of Network Economy Service reservations to the volume of energy scheduled on those reservations. For ease of implementation, BC Hydro has been calculating the utilization of Network Economy Service by comparing the volume of transmission reservations to the average scheduled energy in a given hour. This implementation of the utilization test does not accurately measure utilization where there are intra-hour or dynamic schedules. To accurately measure utilization consistent with the NSA, BC Hydro will calculate utilization of Network Economy Service as follows:

- For static schedules (i.e. non-dynamic schedules), BC Hydro will compare the volume of a Network Economy Service reservation to the peak energy volume scheduled over an hour. This will accurately account for intra-hour energy schedules and hourly energy schedules on the Network Economy Service reservation, both of which require transmission capacity to be made available for the scheduling hour.
- For dynamic schedules, BC Hydro will compare the volume of a Network Economy Service reservation to the Transmission Allocation indicated on the eTag. This will accurately account for

EIM transfers, which require transmission capacity to be made available for the scheduling hour for use, as required, by EIM participants.

The use of the Transmission Allocation on the eTag for dynamic schedules is consistent with operating practices. Prior to the operating hour, dynamic schedules only provide an estimate of possible energy that may be dispatched. Since energy can be dispatched and can flow up to the full Transmission Allocation on the eTag, BC Hydro relies upon the Transmission Allocation on the eTag to indicate the maximum flow that may occur for a dynamic schedule. BC Hydro currently performs reliability curtailments based on the expected maximum use in the operating hour for dynamic and capacity service schedules. This practice avoids multiple curtailment or reload situations as the dynamic schedule may change on a real time basis (i.e. every 4 to 8 seconds).

With the above changes, BC Hydro's calculation of the utilization of Network Economy Service will remain consistent with the NSA, while accurately accounting for intra-hour and dynamic schedules.

EIM Scheduling under OATT Attachment Q-6 (New)

BC Hydro is considering a new OATT Attachment Q-6 - EIM Scheduling, which will give eligible Transmission Customers the ability to schedule EIM transactions using their own unused capacity at the lowest transmission curtailment priority (first to be curtailed) at no additional cost. These schedules would not decrement Available Transfer Capability (ATC) that is offered for higher priority transmission services (i.e. would have no impact to ATC). This scheduling option would be available on Point-To-Point Service Agreements and Network Integration Transmission Service Agreements.

For Network Customers, the scheduling would be on an available basis. As the schedules would have the lowest curtailment priority and would have no impact on ATC, they would not be considered in the economic or utilization tests implemented by the NSA.

To implement this Attachment, Section 3.1 of the OATT would also be amended to indicate the Transmission Provider will provide the energy imbalance market scheduling option in accordance with Attachment Q-6.

Feedback

Please provide your thoughts on any or all of the changes identified above and in the attached documents to Brenda Ambrosi by September 15, 2017. Feedback may be included in BC Hydro's Application, which BC Hydro anticipates filing with the Commission in October 2017. If after reviewing the attached documents, you believe a meeting would be helpful, please state this in your feedback. If a meeting is desirable, it will be held after feedback is received and announced in another bulletin.

Attachments

- OATT Attachment Q-1 clean and blacklined versions
- Concordance Table for Amendments to Attachment Q-1
- OATT Attachment Q-6 (new)
- Submitting Energy Schedules Business Practice, clean and blacklined versions
- Curtailment of Transmission and Energy Business Practice, blacklined version
- OATT Section 3.1, blacklined version

Footnotes:
[1] https://www.westerneim.com/Pages/JoinEIM.aspx.
[2] BC Hydro implemented intra-hour scheduling in June 2011.
[3] Dynamic has been limited to exports.

ATTACHMENT Q-1

Dynamic Scheduling

This attachment contains the eligibility requirements and the terms and conditions for the provision of dynamic scheduling to Transmission Customers.

1. Definitions

(a) "Dynamic Schedule" means a time-varying energy transfer that is updated in real-time and is used included in the scheduled net Interchange term in the same manner as an Interchange schedule in the affected Balancing Authorities' area control error equations (or alternate control processes).

(b) "eTag" means an electronic documentation of an energy transaction on an electronic tagging system, as required by BC Hydro for the scheduling of energy transactions.

(c) "Interchange" means energy transfers that cross Balancing Authority boundaries.

(d) "Interchange Transaction" means an agreement to transfer energy from a seller to a buyer that crosses one or more Balancing Authority Area boundaries.

(e) "Intermediate Balancing Authority Area" means a Balancing Authority on the scheduling path of an Interchange Transaction other than the Sending Balancing Authority and Receiving Balancing Authority.

(f) "Receiving Balancing Authority Area" means the Balancing Authority importing the Interchange.

(g) "Sending Balancing Authority Area" means the Balancing Authority Area exporting the Interchange.

(h) "WECC" means the Western Electricity Coordinating Council, or any successor organization.

2. Availability and Limitations

(a) Dynamic scheduling is only available:

(i) while Dynamic Schedules are technically feasible and consistent with all applicable reliability standards adopted by the Commission and WECC criteria and policies;

(ii) while the Transmission Provider has the necessary arrangements in place with any Sending, Receiving, or Intermediate Balancing Authority Areas, as required, for the delivery, receipt, and facilitation of Dynamic Schedules, as applicable.

(iii) while the Transmission Provider and any Sending, Receiving, or Intermediate Balancing Authority Areas, as required, have the necessary systems in place for the delivery, receipt, and facilitation of Dynamic Schedules, as applicable.

(b) Dynamic scheduling will be limited, reduced or suspended as a result of constraints, including, but not limited to: an emergency or other condition that threatens to impair or degrade the reliability of the Transmission System; resource constraints declared by the resource owner; insufficient Transmission Service over the Transmission System is procured for Dynamic Schedules; and any constraints imposed by the Sending Balancing Authority Area, Receiving Balancing Authority Area or any Intermediate Balancing Authority Areas on the scheduling path.

(c) Dynamic Schedules will be limited by the Transmission Provider's cut-off times, and by the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules. Dynamic Schedules will be processed on a first-

come, first-received basis, up to the limit of the number of Dynamic Schedules that may be concurrently delivered and the total volume of energy that may be delivered through Dynamic Schedules.

3. Eligibility Requirements

To be eligible to use transmission for dynamic schedules, a Transmission Customer must satisfy the following eligibility requirements.

(a) The Transmission Customer must satisfy the requirements and standards of the Transmission Provider with respect to dynamic scheduling from the Transmission Provider's Balancing Authority Area, as those requirements and standards are described in this Attachment Q-1 and the Transmission Provider's business practices.

(b) If the Transmission Provider's Balancing Authority Area is the Sending Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Receiving Balancing Authority Area with respect to the delivery of energy through a Dynamic Schedule into the Receiving Balancing Authority Area.

(c) If the Transmission Provider's Balancing Authority Area is the Receiving Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Sending Balancing Authority Area with respect to the delivery of energy through a Dynamic Schedule from the Sending Balancing Authority Area.

(d) The Transmission Customer must satisfy the requirements of Intermediate Balancing Authority Area(s) with respect to Dynamic Schedules and the arrangement of appropriate transmission services through the Intermediate Balancing Authority Area(s).

(e) The Transmission Customer shall be responsible for all costs related to its own systems and equipment required to dynamically schedule, such as communications equipment, communication circuits and facility upgrades.

(f) The Transmission Customer must ensure sufficient resources are available that are: of the appropriate type; ready to be delivered in the scheduled period; electrically located within the Sending Balancing Authority Area; and responsive to control signals issued by the Sending Balancing Authority.

(g) The Transmission Customer must have an executed Service Agreement with the Transmission Provider under the Tariff.

(h) The Transmission Customer must comply with applicable reliability standards adopted by the Commission and WECC criteria and policies.

If, at any time, a Transmission Customer fails to meet any of the eligibility requirements in this section, the Transmission Provider may immediately suspend the Transmission Customer's eligibility for dynamic scheduling.

4. Approval and Use of Dynamic Scheduling

Eligible Transmission Customers may not submit Dynamic Schedules prior to approval by the Transmission Provider. Eligible Transmission Customers may submit a request to the Transmission Provider for approval of dynamic scheduling. The Transmission Provider will approve such a request based on its reasonable assessment of the availability and limitations of dynamic scheduling between and through specific Balancing Authority Areas as may be required to accommodate the request. The Transmission Provider will make reasonable efforts to enter into the necessary arrangements with other Balancing Authority Areas to accommodate requests for dynamic scheduling.

Once a request for dynamic scheduling is approved by the Transmission Provider, the Eligible Customer may submit Dynamic Schedules for Point-To-Point Transmission

Service or Network Integration Transmission Service by submitting eTags to the Transmission Provider following the procedures set out in the Transmission Provider's business practices.

5. Official Dispatch Signal

The Sending and Receiving Balancing Authority Areas will coordinate and respond to the official dispatch signal for any dynamically scheduled resources.

6. Dispatch Instruction Data

The Transmission Customer is responsible for resolving with the Receiving Balancing Authority Area any discrepancy in data between the Receiving Balancing Authority Area's dispatch instruction data and the Transmission Customer's eTag. The Transmission Customer is responsible for ensuring the accuracy and resolving any discrepancies in eTag information related to the Intermediate Balancing Authority Area.

7. Losses

Any transmission losses attributed to the Dynamic Schedule on transmission systems external to the Transmission System will be the responsibility of the Transmission Customer.

8. Settlement Data Discrepancy

The Transmission Customer is responsible for resolving, with the Receiving Balancing Authority Area and/or the Sending Balancing Authority Area, as applicable, any discrepancy with the integrated energy value used by the Transmission Provider for settlement purposes.

9. Sharing of Information

The Transmission Provider may share with the Sending Balancing Authority Area, Receiving Balancing Authority Area, Intermediate Balancing Authority Areas, reliability

coordinators and relevant market operators, whatever operational information directly related to dynamic scheduling is necessary or desirable to facilitate dynamic scheduling. The foregoing information shall include such information that may be required by applicable tariff provisions and business practices and standards of any of the Sending Balancing Authority Area, Receiving Balancing Authority Area, Intermediate Balancing Authority Areas, and the Transmission Provider, and shall also include such information that may be required by each of the Sending Balancing Authority Area, Receiving Balancing Authority Area, Intermediate Balancing Authority Areas and the Transmission Provider to curtail dynamic schedules in accordance with its Tariff, business practices, standards and applicable service agreements.

10. Charges for Dynamic Scheduling

(a) Dynamic Scheduling using Network Integration Transmission Service is charged in accordance with Part III and Rate Schedule 00 of the Tariff.

(b) Dynamic Scheduling using Point-To-Point Transmission Service is charged in accordance with Part II and Rate Schedule 01 of the Tariff.

(c) Charges for Ancillary Services will be applied in accordance with Rate Schedules 03 through 09 of the Tariff, as applicable.

ATTACHMENT Q-1

Dynamic Scheduling

This attachment contains the eligibility requirements and the terms and conditions for the provision of dynamic scheduling to Transmission Customers.

1. Definitions

~~(a) "AGC" means Automatic Generation Control.~~

~~(b) "Dynamic Scheduling Business Practices" means the Transmission Provider's published Dynamic Scheduling Spinning Reserve, Dynamic Scheduling Contingency Reserve and Dynamic Scheduling Regulation Reserve business practices, as amended or replaced from time to time.~~

(a) ~~(c)~~ "Dynamic Schedule" means a ~~telemetered reading or value~~time-varying energy transfer that is updated in real-time and is used ~~as a~~ included in the scheduled net Interchange term in the same manner as an Interchange schedule in the ~~Transmission Provider's AGC and Area Control Error equation. The integrated value is treated as a schedule for interchange accounting purposes.~~affected Balancing Authorities' area control error equations (or alternate control processes).

~~(d) "Dynamic Scheduling Energy" means regulating energy or energy delivered from operating reserves.~~

~~(e) "Dynamic Scheduling Transmission" means firm hourly transmission used for the real-time delivery of Dynamic Scheduling Energy to the Receiving Balancing Authority Area and consists of Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes) and Dynamic Scheduling Regulation Reserve (DSRegRes).~~

~~(f) "EMS" means Energy Management System.~~

(b) ~~(g) "Intermediary Balancing Authority Area" means any~~"eTag" means an electronic documentation of an energy transaction on an electronic tagging system, as required by BC Hydro for the scheduling of energy transactions.

(c) "Interchange" means energy transfers that cross Balancing Authority boundaries.

(d) "Interchange Transaction" means an agreement to transfer energy from a seller to a buyer that crosses one or more Balancing Authority Area ~~between~~boundaries.

(e) "Intermediate Balancing Authority Area" means a Balancing Authority on the ~~Host Balancing Authority Area and~~scheduling path of an Interchange Transaction other than the ~~Receiving~~Sending Balancing Authority ~~Area~~and Receiving Balancing Authority.

~~(h) Reserved~~

~~(i)~~ "Receiving Balancing Authority Area" means the Balancing Authority ~~Area which is to dynamically receive Dynamic Scheduling Energy schedules.~~

(f) ~~(j) "Host Balancing Authority Area" means~~importing the ~~Balancing Authority Area which is to send Dynamic Scheduling Energy schedules from system resources within its Balancing Authority Area~~Interchange.

~~(k) "SCADA" means Supervisory Control and Data Acquisition.~~

(g) ~~(l)~~ "Sending Balancing Authority Area" means the Balancing Authority Area exporting the Interchange.

~~(a)~~(h) "WECC" means the Western Electricity Coordinating Council, or any successor organization.

2. Availability ~~of Dynamic Scheduling Transmission~~and Limitations

(a) Dynamic ~~Scheduling Transmission~~scheduling is only available ~~as follows~~:

(~~a~~i) while ~~such~~ Dynamic ~~Scheduling Transmission is~~Schedules are technically feasible and consistent with all applicable reliability standards adopted by the ~~BCUC~~Commission and WECC criteria and policies;

~~(b) if the Transmission Provider's Balancing Authority Area is the Host Balancing Authority Area:~~

~~(i) while~~ (ii) while the Transmission Provider has the necessary arrangements in place with ~~applicable Intermediary~~any Sending, Receiving, or Intermediate Balancing Authority Areas, as required, for the delivery, receipt, and facilitation ~~by each such Intermediary Balancing Authority Area~~ of Dynamic ~~Scheduling Energy~~Schedules, as ~~appropriate, and~~applicable.

(~~i~~ii) while the Transmission Provider ~~has arrangements in place with the~~ and any Sending, Receiving, or Intermediate Balancing Authority ~~Area~~ Areas, as required, have the necessary systems in place for the delivery, receipt, and facilitation of Dynamic Schedules, as applicable.

(b) Dynamic scheduling will be limited, reduced or suspended as a result of constraints, including, but not limited to: an emergency or other condition that threatens to impair or degrade the reliability of the Transmission System; resource constraints declared by the resource owner; insufficient Transmission Service over the Transmission System is procured for Dynamic Schedules; and any constraints imposed by the Sending Balancing Authority Area, Receiving Balancing Authority Area ~~of Dynamic Scheduling Energy, as appropriate; and~~or any Intermediate Balancing Authority Areas on the scheduling path.

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Dynamic Schedules will be limited by the Transmission Provider's cut-off times, and by the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules. ~~(c) if the Transmission Provider's Balancing Authority Area is an Intermediary Balancing Authority Area, while the Transmission Provider has arrangements in place with the Host Balancing Authority Area, Receiving Balancing Authority Area, and any other Intermediary Balancing Authority Area for the delivery, receipt, and facilitation of Dynamic Scheduling Energy, as appropriate.~~

(c) Dynamic Schedules will be processed on a first-come, first-received basis, up to the limit of the number of Dynamic Schedules that may be concurrently delivered and the total volume of energy that may be delivered through Dynamic Schedules.

3. Eligibility Requirements

To be eligible to ~~designate Dynamic Scheduling Transmission~~use transmission for dynamic schedules, a Transmission Customer must satisfy the following eligibility requirements.

~~(a) The Transmission Customer must satisfy the requirements of the Receiving Balancing Authority Area with respect to the delivery of Dynamic Scheduling Energy into the Receiving Balancing Authority Area.~~

~~(b) The Transmission Customer must satisfy the requirements of Intermediary Balancing Authority Area(s) with respect to Dynamic Scheduling Energy and arrangement of appropriate transmission services through the Intermediary Balancing Authority Area.~~

(a) ~~(c)~~ The Transmission Customer must satisfy the requirements and standards of the Transmission Provider with respect to dynamic scheduling from the Transmission Provider's Balancing Authority Area, as those requirements and

standards are described ~~from time to time~~ in this Attachment Q-1 and the ~~Dynamic Scheduling Business Practices~~Transmission Provider's business practices.

(b) ~~(d)~~ If the Transmission Provider's Balancing Authority Area is the Sending Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Receiving Balancing Authority Area with respect to the delivery of energy through a Dynamic Schedule into the Receiving Balancing Authority Area.

(c) If the Transmission Provider's Balancing Authority Area is the Receiving Balancing Authority Area, the Transmission Customer must satisfy the requirements of the Sending Balancing Authority Area with respect to the delivery of energy through a Dynamic Schedule from the Sending Balancing Authority Area.

(d) The Transmission Customer must satisfy the requirements of Intermediate Balancing Authority Area(s) with respect to Dynamic Schedules and the arrangement of appropriate transmission services through the Intermediate Balancing Authority Area(s).

~~(b)~~(e) The Transmission Customer shall be responsible for all costs related to its own systems and equipment required to dynamically schedule, such as communications equipment, communication circuits and facility upgrades.

(f) ~~(e)~~ The Transmission Customer must ~~have~~ensure sufficient resources are available that are: of the appropriate type ~~available and;~~ ready to be delivered in the scheduled period ~~from a resource or resources for dynamic scheduling that are~~; electrically located within the ~~Transmission Provider's~~Sending Balancing Authority Area ~~must be~~; and responsive to control signals issued by the Sending Balancing Authority.

~~(c)~~(g) The Transmission Customer must have an executed Service Agreement with the Transmission ~~Provider's EMS~~Provider under the Tariff.

~~(f) The Transmission Customer must have a Firm Point to Point Transmission Service reservation that is of equal or greater duration and capacity than the duration and capacity designated by the Transmission Customer as Dynamic Scheduling Transmission.~~

~~(d)~~(h) ~~(g)~~ The Transmission Customer must comply with applicable reliability standards adopted by the ~~BCUC~~Commission and WECC criteria and policies.

~~(h)~~ If, at any time, a Transmission Customer fails to meet any of the eligibility requirements in this section ~~3~~, the Transmission Provider may immediately suspend the Transmission Customer's eligibility for dynamic scheduling.

4. ~~Relationship Between~~Approval and Use of Dynamic Scheduling ~~Transmission and Dynamic Scheduling Energy~~

~~The Transmission Customer may reserve Dynamic Scheduling Transmission only up to its reasonably expected share of the total capacity of Dynamic Scheduling commitments to the Receiving Balancing Authority Area. The procedures for scheduling Dynamic Scheduling Energy shall be as set out from time to time in the Dynamic Scheduling Business Practices.~~

~~**5. Resale and Reassignment of Unused Dynamic Scheduling Transmission**~~

~~(a) Transmission Customers cannot resell or reassign any reserved transmission capacity during the time, and to the extent, that it is designated for Dynamic Scheduling Transmission.~~

~~(b) The Transmission Provider will not resell any reserved transmission capacity that has been designated for Dynamic Schedling Transmission.~~

~~**6. Official Dispatch Signal**~~

~~The Transmission Provider, as the Host Balancing Authority Area, is responsible for issuing~~Eligible Transmission Customers may not submit Dynamic Schedules prior to approval by the Transmission Provider. Eligible Transmission Customers may submit a request to the Transmission Provider for approval of dynamic scheduling. The Transmission Provider will approve such a request based on its reasonable assessment of the availability and limitations of dynamic scheduling between and through specific Balancing Authority Areas as may be required to accommodate the request. The Transmission Provider will make reasonable efforts to enter into the necessary arrangements with other Balancing Authority Areas to accommodate requests for dynamic scheduling.

Once a request for dynamic scheduling is approved by the Transmission Provider, the Eligible Customer may submit Dynamic Schedules for Point-To-Point Transmission Service or Network Integration Transmission Service by submitting eTags to the Transmission Provider following the procedures set out in the Transmission Provider's business practices.

5. Official Dispatch Signal

The Sending and Receiving Balancing Authority Areas will coordinate and respond to the official dispatch signal for any dynamically scheduled resources ~~located within its Balancing Authority Area.~~.

~~7~~6. Dispatch Instruction Data

~~(a) When acting as the Host Balancing Authority Area, the Transmission Provider will automatically dispatch Dynamic Scheduling Energy upon receiving the Receiving Balancing Authority Area's dispatch instruction data, based on the value of the dispatch instruction data, up to any existing constraints that might be in place at the time of dispatch and subject to the limitations described in section~~

~~8 of this Attachment Q-1. Receiving Balancing Authority Area's dispatch instruction data will govern provided that there are no constraints.~~

~~(b) For the purpose of this section, the following are deemed to be constraints:~~

~~(i) the reliability of the Transmission System is threatened;~~

~~(ii) resource constraints declared by the resource owner;~~

~~(iii) insufficient firm transmission reservations for Dynamic Scheduling purposes; and~~

~~(iv) any constraints imposed by the Receiving Balancing Authority Area or any Intermediary Balancing Authority Areas on the scheduling path.~~

~~(c)~~ The Transmission Customer is responsible for resolving with the Receiving Balancing Authority Area any discrepancy in data between the Receiving Balancing Authority Area's dispatch instruction data and the Transmission Customer's eTag. The Transmission Customer is responsible for ensuring the accuracy and resolving any discrepancies in eTag information related to the ~~Intermediary~~Intermediate Balancing Authority ~~Areas~~Area.

~~8.~~ ~~Limitations~~

~~7~~~~Dynamic Schedules will be limited by the Transmission Provider's cut-off times, and by the Transmission Provider's reasonable assessment of its capabilities to process Dynamic Schedules. Dynamic Schedules will be processed on a first-come, first-received basis, up to the limit of the number of Dynamic Schedules that may be concurrently delivered and the total volume of Dynamic Scheduling Energy that may be delivered.~~

~~9~~. Losses

Any transmission losses attributed to the Dynamic Schedule on transmission systems external to the Transmission ~~Provider's Transmission~~ System will be the responsibility of the Transmission Customer.

~~10~~8. Settlement Data Discrepancy

~~(a) The Transmission Provider will use its own time-integrated energy value for inter-Control Area check-out and for settlement and billing purposes.~~

~~(b)~~ The Transmission Customer is responsible for resolving, with the Receiving Balancing Authority Area and/or the Sending Balancing Authority Area, as applicable, any discrepancy ~~between~~with the ~~time-~~integrated energy value used by the Transmission Provider ~~and the time-integrated energy value provided by the Receiving Balancing Authority Area prior to sending the value to the Transmission Provider for settlement purposes.~~for settlement purposes.

~~11. Failure of Dynamic Transfer Signal or Official Dispatch Signal~~

~~(a) If the Host Balancing Authority Area's or Receiving Balancing Authority Area's dynamic transfer signal fails, the Transmission Provider's obligation to comply with the Host Balancing Authority or Receiving Balancing Authority Area's request is automatically suspended.~~

~~(b) If the Host Balancing Authority Area's or Receiving Balancing Authority Area's dynamic transfer signal fails or the official dispatch signal from the Transmission Provider fails, the last known value will be used for the remainder of the hour. If the Transmission Provider does not recover the signal by the end of the hour, the Transmission Provider will decrease the value to zero.~~

~~(c) For the purposes of this section, a signal fails if both redundant communication paths fail.~~

~~12. Suspension or Reduction in Dynamic Schedules~~

~~In addition to the limitations and constraints described in sections 7 and 8, the Transmission Provider may suspend or reduce Dynamic Schedules out of its Balancing Authority Area if:~~

~~(a) the reliability of the Transmission System is threatened; or~~

~~(b) the Receiving Balancing Authority Area or an Intermediary Balancing Authority Area requests that Dynamic Schedules be limited or suspended.~~

~~13~~9. Sharing of Information

The Transmission Provider may share with the ~~Host~~Sending Balancing Authority Area, Receiving Balancing Authority Area, ~~Intermediary~~Intermediate Balancing Authority Areas, ~~and~~ reliability coordinators and relevant market operators, whatever operational information directly related to dynamic scheduling is necessary or desirable to facilitate dynamic scheduling. The foregoing information shall include such information that may be required by applicable tariff provisions and business practices and standards of any of the ~~Host~~Sending Balancing Authority Area, Receiving Balancing Authority Area, ~~Intermediary~~Intermediate Balancing Authority Areas, and the Transmission Provider, and shall also include such information that may be required by each of the Sending Balancing Authority Area, Receiving Balancing Authority Area, ~~Intermediary~~Intermediate Balancing Authority Areas and the Transmission Provider to curtail dynamic schedules in accordance with its ~~tariff~~Tariff, business practices, standards and applicable service agreements.

~~14~~10. Charges for Dynamic Scheduling ~~(DS)~~

Dynamic Scheduling using Network Integration Transmission Service

(a) ~~(a) DS Service designated from Short-Term Firm service~~ is charged in accordance with Part III and Rate Schedule 00 of the Tariff.

~~(a)~~(b) Dynamic Scheduling using Point-To-Point Transmission Service is charged in accordance with Part II and Rate Schedule 01 of ~~OATT~~the Tariff.

~~(b) DS Service designated from Long-Term Firm service is charged in acordance with Rate Schedule 01 of OATT.~~

~~(b)~~(c) ~~(c)~~ Charges for ~~Scheduling, System Control and Dispatch~~Ancillary Services will be applied in accordance with Rate ~~Schedule~~Schedules 03 through 09 of ~~OATT~~the Tariff, as applicable.

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Table 1: Concordance Table - Dynamic Scheduling Amendments (Attachment Q-1)

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
General	General	Implementation of a dynamic scheduling framework where both imports and exports can be dynamically scheduled using any transmission reservation priority.	When the Dynamic Scheduling was first approved by the Commission in 2005, dynamic scheduling was relatively new in the industry. Since that time, the use of dynamic scheduling has grown and the markets that support them have changed. As a result of the market and industry changes, BC Hydro is proposing to amend its Tariff to give Transmission Customers flexibility for dynamic scheduling similar to other Transmission Providers in the Western Electricity Coordinating Council (**WECC**). BC Hydro's proposed amendments will allow Transmission Customers to dynamic schedule on imports and exports using any transmission service under the Tariff, including Firm and Non-Firm Point-To-Point Transmission Service and Network Integration Transmission Service, which includes Network Economy Service. BC Hydro is also simplifying Attachment Q-1 by removing technical details that are not customarily addressed in the OATT itself. Technical details that explain how dynamic scheduling is implemented are more appropriately provided in its business practices or operating orders.
Section 1	**Section 1**		
1. Definitions	**1. Definitions**	The Definitions have been updated to reflect relevant terms used in dynamic scheduling industry practice, which align with definitions included in the North American Electric Reliability Corporation (**NERC**) Glossary of Terms dated August 1, 2017.	Some sections of Attachment Q-1 are proposed to be removed as they are technical details more appropriately located in business practices or operating orders. As a result, BC Hydro is proposing to remove a number of defined terms that are no longer required in the Tariff. Since the time the original Dynamic Scheduling attachment was drafted and approved, accepted industry definition of terms have changed. Generally, industry-accepted definitions are reflected in NERC's Glossary of Terms. To the extent possible, BC Hydro is proposing to revise definitions in Attachment Q-1 to be consistent with industry practice. Non-substantive housekeeping amendments have also been made to alphabetize the definitions.
1.(a) Automatic Generation Control		Deleted	The definition is not required as Tariff language using this term was only used in the definition of "Dynamic Schedule". The proposed definition of "Dynamic Schedule" no longer refers to Automatic Generation Control.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
1.(b) Dynamic Scheduling Business Practice		Deleted	BC Hydro no longer has a single business practice for dynamic scheduling. This became redundant when Attachment Q-1 was incorporated into the OATT and has since been discontinued. Business practices related to dynamic scheduling are now addressed in various BC Hydro business practices as appropriate.
1.(c) Dynamic Schedule	1.(a) Dynamic Schedule	Updated	The definition has been amended to align with the definition included in the NERC Glossary of Terms.
	1.(b) eTag	New	New definition aligns with BC Hydro business practices
	1.(c) Interchange	New	New definition aligns with the definition included in the NERC Glossary of Terms.
	1.(d) Interchange Transaction	New	New definition aligns with the definition included in the NERC Glossary of Terms.
1.(d) Dynamic Scheduling Energy		Deleted	The definition is not required as Tariff language is proposed to be simplified.
1.(e) Dynamic Scheduling Transmission		Deleted	The definition is not required as Tariff language is proposed to be simplified.
1.(f) "EMS" or Energy Management System		Deleted	The definition is no longer required. The term "EMS" only occurred in Section 3(e). To simplify the Tariff language, the reference to EMS in 3(e) was removed as it was not necessary to specify in the Tariff the technical system by which the Transmission Provider issues control signals.
1.(g) Intermediary Balancing Authority Area	1.(e) Intermediate Balancing Authority Area	Updated	The term and its definition have been updated to align with the definitions included in the NERC Glossary of Terms, with inconsequential adjustments (using Sending and Receiving, instead of Source and Sink).
1.(i) Receiving Balancing Authority Area	1.(f) Receiving Balancing Authority Area	Updated	The definition has been amended to align with the definition included in the NERC Glossary of Terms.
1.(j) Host Balancing Authority Area	1.(g) Sending Balancing Authority Area	Updated	The term and its definition have been amended to align with the definitions included in the NERC Glossary of Terms.
1.(k) SCADA		Deleted	The term is not used in Attachment Q-1 and is therefore not needed.
1.(l) WECC	1.(h) WECC	Renumbered	No amendment
Section 2	**Section 2**		
2. Availability of Dynamic Scheduling Transmission; **8. Limitations; and** **12. Suspension or Reduction in Dynamic Schedules**	**2. Availability and Limitations**	Amendments to simplify and combine related aspects of the availability and limitations of dynamic scheduling.	This section combines and simplifies the provisions of section 2 (Availability); section 8 (Limitations) and section 12 (Suspension or Reduction in Dynamic Schedules).
2.(a)	2.(a)(i)	Renumbered	No substantive amendment.

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
	2.(a)(ii)	Partially new subsection	This subsection provides that dynamic scheduling will only be available if all arrangements necessary to facilitate dynamic schedules are in place with other Balancing Authority Areas ("**BAAs**").
2.(b) and (c)	2.(a)(ii)	Simplified and Expanded to Cover Situations where BC Hydro may be Receiving or Intermediate BAA	The existing requirements for dynamic scheduling when BC Hydro is Host BAA or Intermediary BAA are incorporated into a generic description in proposed 2.(a)(ii), which is applicable whether BC Hydro is the Sending, Receiving or Intermediate BAA.
	2.(a)(iii)	New	This section clarifies that BAAs need to have the required systems in place to dynamically schedule .
7(a) and (b)	2.(b)	Technical detail of dispatching removed. Description of limitations restated.	Technical description of dispatch in original section 7(a) is removed, as this level of detail is more appropriate in a business practice or operating order. Proposed section 2(b)incorporates description of conditions that may limit Transmission Provider's ability to accommodate dynamic scheduling on transmission capacity reservations. Proposed section 2(b) also describes conditions on which Dynamic Schedules may be suspended or reduced, as indicated in existing section 12.
8. Limitations	2.(c)	Moved.	No substantive amendment.
12. Suspension or Reduction in Dynamic Schedules		Combined into Proposed 2.(b)	See proposed 2.(b) above.
Section 3	**Section 3**		
3. Eligibility Requirements	**3. Eligibility Requirements**	General update to reflect Tariff requirements of a comprehensive dynamic scheduling framework.	Amendments to reflect that BC Hydro may now be the receiving BAA. Other amendments to this section are largely of a non-substantive housekeeping nature.
3.(c)	3.(a)	Renumbered	
3.(a)	3.(b)	Renumbered/Housekeeping amendments	
	3.(c)	New	Sets out the eligibility requirements where BC Hydro is the Receiving Balancing Authority Area.
3.(b)	3.(d)	Renumbered/Housekeeping amendments	
3.(d) , (d) and (g)	3.(e), (f) and (h)	Renumbered/Housekeeping amendments	
3(f)	3(g)	Dynamic scheduling no longer limited to firm transmission	Proposed 3(g) requires a Transmission Customer to have a signed Transmission Service Agreement with BC Hydro.
3.(h)	Concluding paragraph	No amendment	

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 4	**Section 4**		
4. Relationship Between Dynamic Scheduling Transmission and Dynamic Scheduling Energy	**4. Approval and Use of Dynamic Scheduling**	Content of section deleted or revised	Current sentence on reserving dynamic schedules has been incorporated into BC Hydro's Business Practices. Current sentence on procedures for dynamic scheduling has been reworded in new section 4, Dynamic Scheduling. Proposed section 4 clarifies that dynamic scheduling is subject to approval of the Transmission Provider's assessment of the availability and limitations on dynamic scheduling. Once approved, transmission customers may dynamically schedule using eTags in accordance with BC Hydro's business practices.
Section 5	-		
5. Resale and Reassignment of Unused Dynamic Scheduling Transmission		Deleted	This section has been removed, as resale or reassignment rights are addressed in the OATT.
Section 6	**Section 5**		
6. Official Dispatch Signal	**5. Official Dispatch Signal**	General update to reflect BC Hydro may be either the Sending or Receiving BAA.	Expands the approved Attachment Q-1 provision to set the requirement that both Sending and Receiving BAAs have a responsibility to coordinate and respond to dispatches of resources.
Section 7	**Section 6**		
7. Dispatch Instruction Data	**6. Dispatch Instruction Data**		
7.(a) and (b)		Deleted or moved	Dispatch instruction data requirements when BC Hydro is Sending Balancing Authority Area deleted as more appropriate in business practice or operating order. Constraints on dynamic scheduling moved to proposed section 2.(b)(i). See above.
7.(c)	6.	Renumbered/Housekeeping amendments	
Section 8	-		
8. Limitations		Moved to 2(c)	
Section 9	**Section 7**		
9. Losses	**7. Losses**	Renumbered/Housekeeping amendments	
Section 10	**Section 8**		
10. Settlement Data Discrepancy	**8. Settlement Data Discrepancy**	Renumbered/Housekeeping amendments	

Approved Attachment Q-1 Section	Proposed Attachment Q-1 Section	Amendment Proposed	Comment of Substantive Amendment Proposed
Section 11	-		
11. Failure of Dynamic Transfer Signal or Official Dispatch Signal		Deleted	Section deleted as more appropriate in an operating order or business practice.
Section 12	-		
12. Suspension or Reduction in Dynamic Schedules		Content moved to section 2(b)	See proposed 2(b) above.
Section 13	**Section 9**		
13. Sharing of Information	**9. Sharing of Information**	Renumbered/Housekeeping amendments	
Section 14	**Section 10**		
14. Charges for Dynamic Scheduling (DS) Service	**10. Charges for Dynamic Scheduling (DS) Service**	General update to reflect dynamic scheduling of imports and exports on any available transmission service.	In the approved Attachment Q-1, only exports may be dynamically scheduled and only Firm Point-To-Point Transmission Service reservations can be utilized for these schedules. This section has been updated to reflect that dynamic scheduling will be possible for both imports and exports on any transmission reservation, including Firm Point-To-Point, Non-Firm Point-To-Point and Network Integration Transmission Service.
	10.(a)	New	This section provides the applicable Tariff references when imports are dynamically scheduled using Network Integration Transmission Service.
14.(a) and 14.(b)	10.(b)	This section combines Short Term Firm and Long Term Firm provisions from the approved Attachment Q-1 and adds Non-Firm.	This section provides the applicable Tariff Rate Schedule when imports are dynamically scheduled using Point-To-Point Transmission Service.
14.(c)	10.(c)	This section has been expanded to consider all Ancillary Services instead of just Scheduling, System Control and Dispatch per approved Attachment Q-1	This section provides the applicable Tariff Rate Schedules for ancillary services, all of which are applicable to transmission reservations that can be used for dynamic scheduling.

ATTACHMENT Q-6

EIM Scheduling

Preamble

EIM Scheduling set out in this Attachment allows Transmission Customers to schedule EIM Transfers on the unused capacity of their Point-to-Point Transmission Service (**PTP Service**) or Network Integration Transmission Service (**Network Service**) at the lowest curtailment priority.

1. Definitions

"EIM" means the Energy Imbalance Market of the California Independent System Operator (**CAISO**).

"EIM Transfer" means the transfer of real-time energy resulting from a dispatch instruction from the EIM market operator: (i) between the BC Hydro Balancing Authority Area (**BAA**) and the CAISO BAA; or (ii) between the BC Hydro or CAISO BAA and the BAA a participant in the EIM.

"eTag" means an electronic documentation of an energy transaction on an electronic tagging system, as required by BC Hydro for the scheduling of energy transactions.

2. Eligibility Requirements

The Transmission Provider will provide EIM Scheduling to all Transmission Customers that meet the following requirements:

(a) The Transmission Customer must be a participant in CAISO's EIM.

(b) The Transmission Customer must have an executed Service Agreement with BC Hydro for PTP Service or Network Service under the OATT.

If at any time a Transmission Customer fails to meet the eligibility requirements, the Transmission Provider may immediately suspend the Transmission Customer's eligibility for the EIM Scheduling Option.

3. Transmission Customer Responsible for EIM Requirements

It is the Transmission Customer's responsibility to make the necessary arrangements with, and fulfill any necessary requirements of, the CAISO and any other BAAs participating in the EIM to accommodate EIM Transfers.

4. Availability

EIM Scheduling is only available for use for EIM Transfers on the Transmission Customer's unused PTP Service or Network Service capacity.

5. Scheduling

EIM schedules pursuant to this Attachment for PTP Service or Network Service may be submitted to the Transmission Provider via submittal of an eTag. The eTag must designate that it is (i) an EIM Transfer; and (ii) at the lowest curtailment priority.

6. Curtailment Priority

The terms and conditions of PTP Service and Network Service are set out in the Tariff. Notwithstanding those provisions, the priority of EIM schedules pursuant to this Attachment for PTP Service and Network Service shall be governed by the following:

(a) The Transmission Provider reserves the right to curtail, in whole or in part, EIM schedules pursuant to this Attachment for reliability reasons when an emergency or other condition threatens to impair or degrade the reliability of its Transmission System.

(b) The Transmission Provider reserves the right to interrupt, in whole or in part, EIM schedules pursuant to this Attachment for economic reasons in order to accommodate requests for PTP Service, or Network Service under the Tariff not scheduled under this Attachment.

(c) Where required, curtailments or interruptions will be made on a non-discriminatory basis to the transaction(s) that effectively relieve(s) the constraint. However, in the case of a constraint, EIM schedules pursuant to this Attachment will have the lowest curtailment priority.

7. Charges for EIM Scheduling

(a) EIM Scheduling using Network Service is charged in accordance with Part III and Rate Schedule 00 of the Tariff.

(b) EIM Scheduling using PTP Service is charged in accordance with Part II and Rate Schedule 01 of the Tariff.

(c) Charges for Ancillary Services will be applied in accordance with Rate Schedules 03 through 09 of the Tariff, as applicable.

SUBMITTING ENERGY SCHEDULES

In this Section:

1.0 OVERVIEW

A Request for Interchange (RFI) is an eTag that arranges a new transaction or changes an existing transaction for the current or future operating hour. An eTag is an electronic documentation of the energy transaction describing the source, sink, path, transmission contracts to be used, capacity profiles and parties to the transaction. eTags help to maintain reliability by ensuring that all parties to interchange energy transactions receive relevant reliability information. The OATI electronic tagging system is used to submit, modify and approve or deny energy schedules (eTags).

BC Hydro requires the use of eTags to schedule energy in both Pre-schedule and Real-time for all interchange energy transactions, including internal paths.

These Business Practices provide clarification of the rules, standards and practices used by BC Hydro to implement its OATT, which may supplement but not supersede the terms and conditions specified in non-OATT agreements as approved or exempted under the Utilities Commission Act. While the terms of BC Hydro's OATT and these Business Practices govern, customers should also refer to the NAESB WEQ Business Standards, WECC Regional Criteria, and WECC Regional Standards, which BC Hydro has followed in most, but not all, respects. BC Hydro also complies with the Mandatory Reliability Standards adopted by the BCUC.

2.0 DESIGNATING TRANSMISSION

An important element of the eTag is its specification of which transmission reservation the energy is to be scheduled on.

The CONFIRMED Transmission Service Requests (TSRs) identified through the eTag must satisfy the following conditions:

- be CONFIRMED and **active** in OASIS and BC Hydro's scheduling system;
- in aggregate have sufficient available energy capacity to accommodate the energy schedule and the transmission allocation profile;
- must have the same POR and POD combination;
- the eTag transmission allocation profile must be greater than or equal to the energy profile; and
- must not cause a Reliability Limit infringement. If eTags had previously been approved, BC Hydro will deny the eTag for insufficient capacity.

If any of the above conditions are not satisfied, the eTag will be DENIED by BC Hydro.

The PSE (Purchasing-Selling Entity) can specify the transmission on its eTag by using any one of the following three approaches:

1. OASIS ID Approach by entering either a single or multiple valid CONFIRMED TSR number(s) on the eTag;
2. Blanket Approach by entering an **active** CONFIRMED TSR number on the eTag; or
3. Stacked Transmission Approach by combining different CONFIRMED TSRs with the same POR and POD to support the committed capacity referenced on the eTag.

These three approaches will be explained below. The eTag will be DENIED if transmission is not entered correctly.

2.1 OASIS ID Approach

A PSE may designate specific MW maximums for each of the CONFIRMED TSR OASIS IDs (ARef) referenced using the transmission allocation value.

2.2 Blanket Approach

As an alternative to specifying each CONFIRMED and **active** TSR OASIS number on the eTag, the PSE may select an **active** CONFIRMED TSR OASIS ID (ARef) and add a "B" (upper or lower case) after the OASIS ID to indicate that it wishes to use a Blanket approach.

The Blanket OASIS ID specifies the Transmission Customer, path, POR/POD, and type of transmission service (Firm or Non-Firm) and tells the BC Hydro scheduling system to retrieve all CONFIRMED and **active** TSRs that match those parameters within the transaction time period.

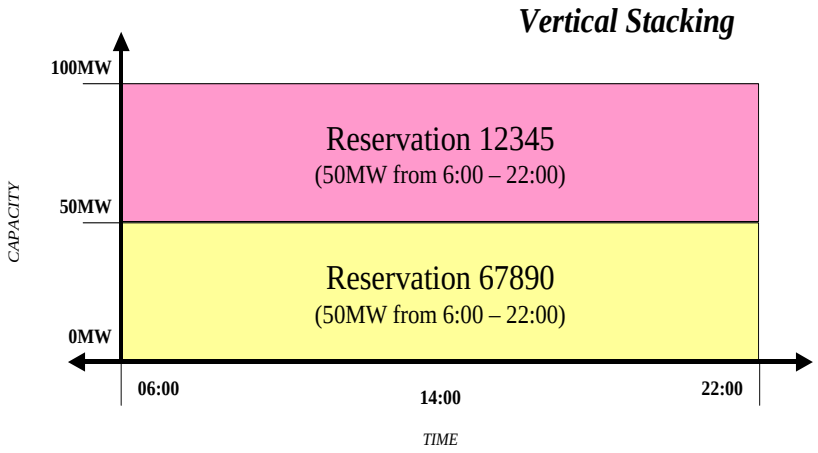
When assigning energy on Firm transmission service specified from a Blanket OASIS ID, all Firm transmission reservations have the same priority and eTags will be assigned by First In – First Scheduled. When assigning energy on Non-Firm transmission reservations specified from a Blanket ID, the eTags will be assigned to Non-Firm transmission reservations in descending NERC priority (5 NM going down to 2NH). Refer to BC Hydro's OATT Business Practice on *Curtailment of Transmission and Energy* for information on NERC priorities for transmission service.

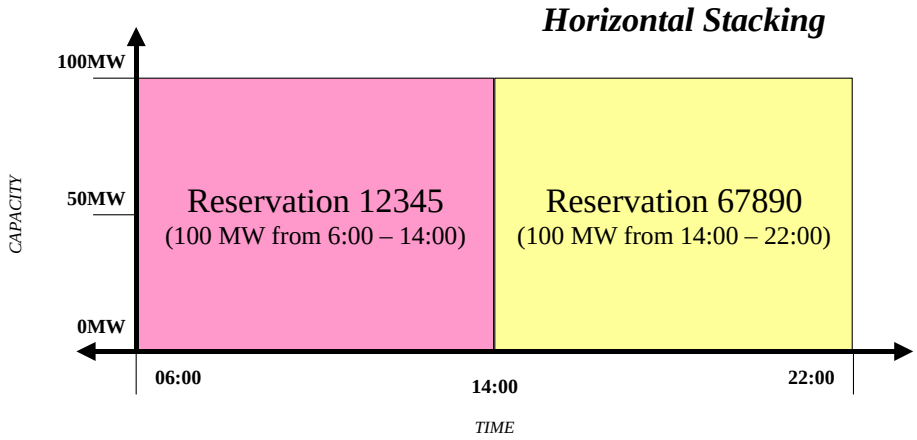
2.3 Stacked Transmission Approach

Transmission stacking allows a PSE to combine different CONFIRMED TSRs, with the same POR and POD, to support the capacity committed in an associated energy profile. There are two types of transmission stacking:

- Vertical Stacking – PSE combines multiple transmission reservations to achieve a certain net level of capacity; and
- Horizontal Stacking – PSE combines multiple transmission reservations to achieve certain capacity over time.

The following diagrams illustrate these concepts more fully. In both cases, the assumed need is 100 MW of transmission capacity for hours 06:00 through 22:00.





If a PSE elects to utilize stacking to support their energy schedules, the PSE must understand the following requirements:

- Stacks must be described through fully qualified profiles for each reservation being used; and
- At no point may the coverage described by the stack be less than the capacity needed for the transaction's energy flow.

3.0 ENERGY PRODUCT CODES

All GPE (Generation-Providing Entity) and LSE (Load-Serving Entity) segments must include an Energy Product Code as a part of their creation profile. An eTag without an Energy Product Code or with an invalid Energy Product Code will be DENIED by BC Hydro with appropriate messaging on the eTag. The list of valid Product Codes is included below. Refer to the WECC Regional Criteria for the definitions associated with each energy product code.

Valid GSE/LSE Product Codes

G-F	Firm Energy
G-NF	Non-Firm Energy
G-FC	Firm Contingent
G-FP	Firm Provisional Energy
G-F1	Hourly Firm Energy
G-EX	Exchange of Firm Energy
C-SP	Capacity for Spinning Reserve
C-NS	Capacity for Non-Spinning Reserve
C-RE	Capacity associated with energy recallable for reserves

eTags within each Product (uninterruptible, interruptible, capacity and dynamic) can have a priority assigned to them by a PSE.

4.0 PSE ASSIGNED CUT PRIORITY

A PSE can assign a "Cut_Priority" to each eTag. This is a numeric value that indicates to BC Hydro the curtailment order of eTags. "1" is the highest priority and will be curtailed last; "2" is the second highest priority, etc. Refer to BC Hydro's OATT Business Practice on *Curtailments of Transmission and Energy* for more information on the curtailment process.

To enter the "Cut_Priority":

1. Click on the Misc Info field on the BC Hydro physical path segment;
2. Enter "Cut_Priority" in the Token column; and
3. Enter a numeric value to indicate curtailment priority in the Value column.

5.0 CAPACITY eTAGS

Capacity eTags are created by selecting the eTag type as Capacity for ConRes or SpinRes. The eligibility requirements and terms and conditions for Spinning Reserve and Contingency Reserve are set out in Attachment Q-3 of BC Hydro's OATT. Currently BC Hydro only exports Capacity Reserves.

Per WECC Regional Criteria, a PSE wishing to schedule reserves must submit an eTag specifying the correct Firm OASIS ID (ARef) and energy type.

The Load Serving Entity (LSE) will submit an adjustment eTag. Once the adjustment is approved by the Sink and Source BA's, the reserve amount requested is delivered for the duration specified.

To submit a Capacity eTag:

1. Create a Firm energy schedule with a CONFIRMED Firm TSR(s).
2. Enter a Transmission Allocation profile.
3. Enter a zero Energy Profile.
4. Select ConRes or SpinRes (C-NS or C-SP) in the Energy Product Code drop-down list.
5. Select Transaction Type as Capacity.
6. When capacity is called upon, the PSE enters an adjustment to the energy profile on the eTag upto the reliability limit or the transmission allocation profile limit.

The Transmission Allocation profile stated in the Capacity eTag will be used to decrement the Firm capacity that is available for further scheduling on the CONFIRMED TSR specified.

6.0 DYNAMIC SCHEDULING

The requirements for dynamic scheduling are set out in Attachment Q-1 of the Open Access Transmission Tariff. PSEs cannot submit Dynamic Schedules or eTags without BC Hydro approval, which will ensure the necessary reviews and system arrangements have been made.

Prior to the submission of any dynamic eTags, BC Hydro will perform an assessment based on the information provided by the PSE. The PSE should provide as much detail as possible including the expected maximum dynamic capability that is to be enacted between the Sending and Receiving Balancing Authority Areas so that BC Hydro can determine the feasibility of the request. If it is techncially feasible, BC Hydro will undertake work within BC Hydro systems to facilitate the submission of Dynamic eTags.

Dynamic Scheduling energy consists of Non-Spinning Reserve (NSPIN), Replacement Reserve (REPL), Positive Supplemental/Incremental (INC), Negative Supplemental/Decremental (DEC), Spinning Reserve (SPIN), Regulation Up (REGUP), and Regulation Down (REGDN).

PSEs must havetransmission for dynamic scheduling purposes up to the amount of the total capacity awarded by the Receiving and Sending Balancing Authority Areas. The transmission reservation can be used for scheduling any of the following Dynamic Scheduling Energy types.

Energy Type	Dynamic Operating Reserve

NSPIN	DSConRes
REPL	DSConRes
INC	DSConRes
DEC	DSConRes
SPIN	DSSpinRes
REGUP	DSRegRes
REGDN	DSRegRes

Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes), and Dynamic Scheduling Regulation Reserve (DSRegRes) are used for the real-time delivery of dynamic schedules and are not available for purchase on OASIS.

To submit a Dynamic eTag:

1. Identify the Transaction Type as Dynamic;
2. Enter Energy Type (from the table above) under the Contract column in the Market Path;
3. Enter the OASIS ID (Aref) of the CONFIRMED Firm TSR under the OASIS column in the Transmission Allocation; and
4. Enter the estimated expected value under the MW column in the Energy Profile and the maximum expected value under the MW column in the Transmission Profile for all energy types.

The Blanket approach as described Section 2.2 above cannot be used for Dynamic eTags.

7.0 Scheduling EIM Transactions

The California Independent System Operator (CAISO) Energy Imbalance Market (EIM) is a real-time market that is comprised of a 15-minute market and a 5-minute dynamic dispatch market. PSEs can schedule on both import and export paths. PSEs participating in the CAISO's EIM should adhere to the CAISO's scheduling timelines.

A PSE has two options for scheduling an EIM transaction.

First, a PSE may use their transmission reservations, of any priority, for EIM transactions.

To submit an eTag for an EIM transaction on a transmission reservation:

1. Identify the Transaction Type as Normal or Dynamic for the 15-minute market and 5-minute market, respectively.
2. In the Misc Info field on the eTag identify the source, interconnection point, sink, and whether it's an export or import transaction using nomenclature as agreed upon with BC Hydro.
3. Enter the appropriate Energy Type under the Contract column in the Market Path; and
4. Enter the OASIS ID (Aref) as provided by OASIS.

Second, a PSE may use EIM Scheduling for EIM transactions. The requirements for EIM Scheduling are set out in Attachment Q-6 of the Open Access Transmission Tariff. To use EIM Scheduling, a PSE may use their own unused transmission service for EIM transactions. This unused transmission can be scheduled upon at no additional cost and will: 1) have the lowest transmission curtailment priority (service priority code 0), and 2) not decrement or effect the posted Available Transfer Capability (ATC) that is offered for higher priority transmission services.

To submit an EIM Scheduling eTag:

1. Identify the Transaction Type as Normal or Dynamic for the 15-minute market and 5-minute market, respectively.
2. In the Misc Info field on the eTag identify the source, interconnection point, sink, and whether it's an export or import transaction using nomenclature as agreed upon with BC Hydro.
3. Enter the appropriate Energy Type under the Contract column in the Market Path; and
4. Enter the OASIS ID (Aref) as provided by BC Hydro.

The Blanket approach as described Section 2.2 above cannot be used for EIM Scheduling.

8.0 INTERRUPTIBLE ENERGY

Interruptible Energy (Non-Firm energy) is energy that the PSE has specified that it may be interrupted. The source Balancing Authority may interrupt the service by giving notice to the sink Adjacent Balancing Authority of the transaction.

As the Balancing Authority for an export Interruptible Energy schedule, BC Hydro has the right to curtail that schedule if the PSE delivering the export fails to meet its Contingency Reserve Obligation with BC Hydro.

To submit an Interruptible eTag:

1. Enter G-NF in the Market Path section in the Product Code drop-down List.

2. Enter the appropriate WECC reserve requirement – the reserve obligation multiplier should be set to 100%.

BC Hydro will deny the eTag if the above settings are not satisfied.

9.0 WHEELTHROUGH ENERGY

There are two approaches to schedule Wheelthrough energy:

- the PSE can submit one eTag that references a matching Wheelthrough CONFIRMED TSR; or
- the PSE can submit **one** eTag that references CONFIRMED import and export TSRs.

10.0 eTAG SUBMISSION TIMELINES

eTags should be submitted in accordance with the NAESB Timing Requirements for WECC. RFIs for one hour energy schedules shall be submitted no later than 20 minutes (XX:40) prior to the Start Time of one hour energy schedules.

Refer to BC Hydro's OATT Business Practices on *Processing of Energy Schedules* and *Intra-Hour Scheduling – Transmission & Energy* for additional energy schedule information and submission times for intra-hour eTags, respectively.

11.0 SUBMITTING MODIFICATIONS TO eTAGS

The Transmission Customer may request modifications to a PENDING, CONFIRMED or IMPLEMENTED eTag for non-reliability related issues according to the NAESB Interchange Timing Requirements for WECC.

1. For an IMPLEMENTED eTag, modifications cannot be made within the scheduling hour and only future hours may be modified.

2. A Correction can only be made to a PENDING eTag. Corrections can be made to:
   - POR and POD
   - Designated transmission reservation
   - Miscellaneous Information Value field on the Load or Generation Line
   - Product Code in the Market Path

3. An Adjustment can only be made to a CONFIRMED or IMPLEMENTED eTag. Adjustments can be made to:
   - Generating Profile
   - Transmission Profile
   - Extension to the energy profile (to include hours not previously specified). The PSE must ensure the necessary transmission capacity for the extension is provided on the eTag.

Refer to BC Hydro's OATT Business Practice on *Processing of Energy Schedules* for further information.

12.0 REAL POWER LOSSES

Pursuant to Section 15.7 of BC Hydro's Open Access Transmission Tariff (OATT), Real Power Losses are associated with all transmission service. The Transmission Customer is responsible for replacing losses associated with transmission service as calculated by BC Hydro in Rate Schedule 10. Refer to Ancilllary Services Business Practice for information on Losses.

Document Change History

Issue	Reason for Issue	Date
4	Updated language to include EIM Scheduling, and tariff changes.	September XX, 2017
3	Included references to Intra-Hour BP, simplified & updated current language, & corrected references & typographical errors.	December 30, 2013
2	Updated reference.	June 14, 2011
1	Updated procedures. Previously Business Practices 10 & 11.	December 1, 2010

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SUBMITTING ENERGY SCHEDULES

In this Section:

1.0 OVERVIEW

A Request for Interchange (RFI) is an eTag that arranges a new transaction or changes an existing transaction for the current or future operating hour. An eTag is an electronic documentation of the energy transaction describing the source, sink, path, transmission contracts to be used, capacity profiles and parties to the transaction. eTags help to maintain reliability by ensuring that all parties to interchange energy transactions receive relevant reliability information. The OATI ~~ETS (E~~electronic ~~T~~tagging ~~S~~system~~)~~ is used to submit, modify and approve or deny energy schedules (eTags).

BC Hydro requires the use of eTags to schedule energy in both Pre-schedule and Real-time for all interchange energy transactions, including internal paths.

These Business Practices provide clarification of the rules, standards and practices used by BC Hydro to implement its OATT, which may supplement but not supersede the terms and conditions specified in non-OATT agreements as approved or exempted under the Utilities Commission Act. While the terms of BC Hydro's OATT and these Business Practices govern, customers should also refer to the NAESB WEQ Business Standards, WECC Regional Criteria, and WECC Regional ~~Business Practices~~Standards, which BC Hydro has followed in most, but not all, respects. BC Hydro also complies with the Mandatory Reliability Standards adopted by the BCUC.

2.0 DESIGNATING TRANSMISSION

An important element of the eTag is its specification of which transmission reservation the energy is to be scheduled on.

The CONFIRMED Transmission Service Requests (TSRs) identified through the eTag must satisfy the following conditions:

- be CONFIRMED and **active** in OASIS and BC Hydro's scheduling system;
- in aggregate have sufficient available energy capacity to accommodate the energy schedule and the transmission allocation profile;
- must have the same POR and POD combination;
- the eTag transmission allocation profile must be greater than or equal to the energy profile; and
- must not cause a Reliability Limit infringement. If eTags had previously been approved, BC Hydro will deny the eTag for insufficient capacity.

If any of the above conditions are not satisfied, the eTag will be DENIED by BC Hydro.

The PSE (Purchasing-Selling Entity) can specify the transmission on its eTag by using any one of the following three approaches:

1. OASIS ID Approach by entering either a single or multiple valid CONFIRMED TSR number(s) on the eTag;
2. Blanket Approach by entering an **active** CONFIRMED TSR number on the eTag; or
3. Stacked Transmission Approach by combining different CONFIRMED TSRs with the same POR and POD to support the committed capacity referenced on the eTag.

These three approaches will be explained below. The eTag will be DENIED if transmission is not entered correctly.

2.1 OASIS ID Approach

A PSE may designate specific MW maximums for each of the CONFIRMED TSR OASIS IDs (ARef) referenced using the transmission allocation value.

2.2 Blanket Approach

As an alternative to specifying each CONFIRMED and **active** TSR OASIS number on the eTag, the PSE may select an **active** CONFIRMED TSR OASIS ID (ARef) and add a "B" (upper or lower case) after the OASIS ID to indicate that it wishes to use a Blanket approach.

The Blanket OASIS ID specifies the Transmission Customer, path, POR/POD, and type of transmission service (Firm or Non-Firm) and tells the BC Hydro scheduling system to retrieve all CONFIRMED and **active** TSRs that match those parameters within the transaction time period.

When assigning energy on Firm transmission service specified from a Blanket OASIS ID, all Firm transmission reservations have the same priority and eTags will be assigned by First In – First Scheduled. When assigning energy on Non-Firm transmission reservations specified from a Blanket ID, the eTags will be assigned to Non-Firm transmission reservations in descending NERC priority (5 NM going down

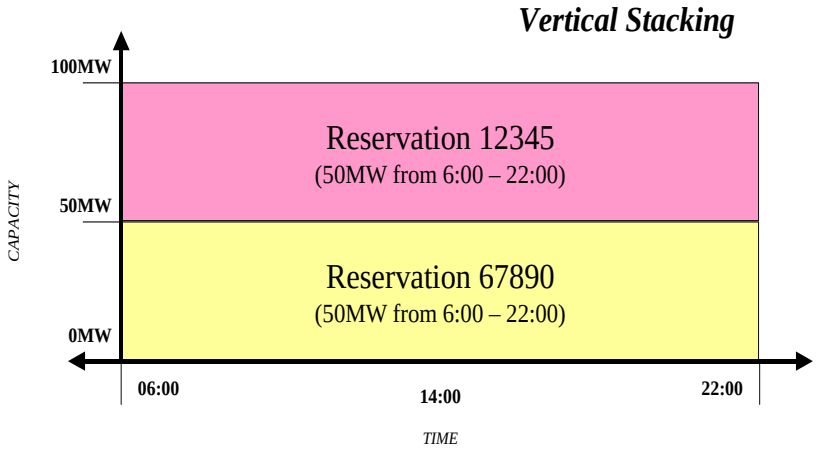
to 2NH). Refer to BC Hydro's OATT Business Practice on *Curtailment of Transmission and Energy* for information on NERC priorities for transmission service.

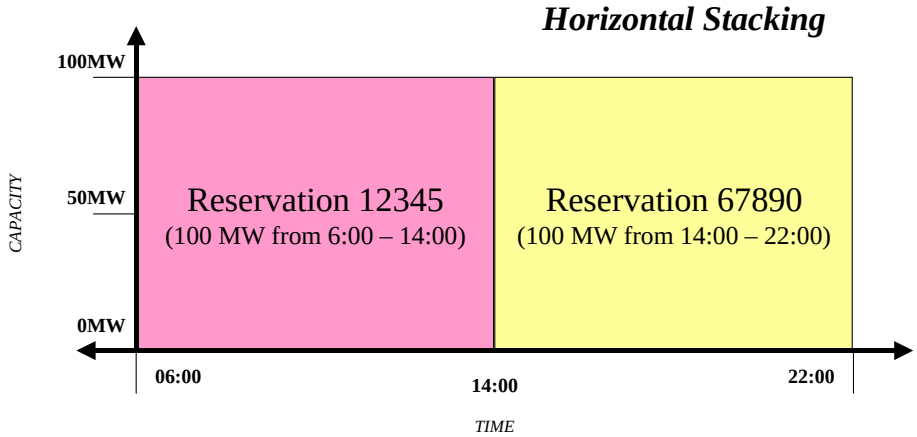
2.3 Stacked Transmission Approach

Transmission stacking allows a PSE to combine different CONFIRMED TSRs, with the same POR and POD, to support the capacity committed in an associated energy profile. There are two types of transmission stacking:

- Vertical Stacking – PSE combines multiple transmission reservations to achieve a certain net level of capacity; and
- Horizontal Stacking – PSE combines multiple transmission reservations to achieve certain capacity over time.

The following diagrams illustrate these concepts more fully. In both cases, the assumed need is 100 MW of transmission capacity for hours 06:00 through 22:00.





If a PSE elects to utilize stacking to support their energy schedules, the PSE must understand the following requirements:

- Stacks must be described through fully qualified profiles for each reservation being used; and
- At no point may the coverage described by the stack be less than the capacity needed for the transaction's energy flow.

3.0 ENERGY PRODUCT CODES

All GPE (Generation-Providing Entity) and LSE (Load-Serving Entity) segments must include an Energy Product Code as a part of their creation profile. An eTag without an Energy Product Code or with an invalid Energy Product Code will be DENIED by BC Hydro with appropriate messaging on the eTag. The list of valid Product Codes is included below. Refer to the WECC Regional Criteria for the definitions associated with each energy product code.

Valid GSE/LSE Product Codes

G-F	Firm Energy
G-NF	Non-Firm Energy
G-FC	Firm Contingent
G-FP	Firm Provisional Energy
G-F1	Hourly Firm Energy
G-EX	Exchange of Firm Energy
C-SP	Capacity for Spinning Reserve
C-NS	Capacity for Non-Spinning Reserve
C-RE	Capacity associated with energy recallable for reserves

eTags within each Product (uninterruptible, interruptible, capacity and dynamic) can have a priority assigned to them by a PSE.

4.0 PSE ASSIGNED CUT PRIORITY

A PSE can assign a "Cut_Priority" to each eTag. This is a numeric value that indicates to BC Hydro the curtailment order of eTags. "1" is the highest priority and will be curtailed last; "2" is the second highest priority, etc. Refer to BC Hydro's OATT Business Practice on *Curtailments of Transmission and Energy* for more information on the curtailment process.

To enter the "Cut_Priority":

1. Click on the Misc Info field on the BC Hydro physical path segment;
2. Enter "Cut_Priority" in the Token column; and
3. Enter a numeric value to indicate curtailment priority in the Value column.

5.0 CAPACITY eTAGS

Capacity eTags are created by selecting the eTag type as Capacity for ConRes or SpinRes. The eligibility requirements and terms and conditions for Spinning Reserve and Contingency Reserve

are set out in Attachment Q-3 of BC Hydro's OATT. Currently BC Hydro only exports Capacity Reserves.

Per WECC Regional Criteria~~Business Practices~~, a PSE wishing to schedule reserves must submit an eTag specifying the correct Firm OASIS ID (ARef) and energy type.

The Load Serving Entity (LSE) will submit an adjustment eTag. Once the adjustment is approved by the Sink and Source BA's, the reserve amount requested is delivered for the duration specified.

To submit a Capacity eTag:

1. Create a Firm energy schedule with a CONFIRMED Firm TSR(s).
2. Enter a Transmission Allocation profile.
3. Enter a zero Energy Profile.
4. Select ConRes or SpinRes (C-NS or C-SP) in the Energy Product Code drop-down list.
5. Select Transaction Type as Capacity.
6. When capacity is called upon, the PSE enters an adjustment to the energy profile on the eTag upto the reliability limit or the transmission allocation profile limit.

The Transmission Allocation profile stated in the Capacity eTag will be used to decrement the Firm capacity that is available for further scheduling on the CONFIRMED TSR specified.

6.0 DYNAMIC SCHEDULING ~~SPINNING, CONTINGENCY RESERVE AND REGULATION RESERVE~~

~~Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes), and Dynamic Scheduling Regulation Reserve (DSRegRes) are used for the real-time delivery of operating reserves to the Receiving Balancing Authority. As such, it is only available on exports. DSSpinRes, DSConRes, and DSRegRes are not available for purchase on OASIS but can be scheduled using existing Firm transmission. PSEs wishing to carry DSSpinRes, DSConRes, and DSRegRes must have sufficient operating reserves of corresponding type available and ready to be delivered in the scheduled period.~~

The ~~Eligibility R~~requirements for dynamic scheduling are set out in Attachment Q-1 of the Open Access Transmission Tariff. PSEs cannot submit Dynamic Schedules or eTags without BC Hydro approval, which will ensure the necessary reviews and system arrangements have been made.

Prior to the submission of any dynamic eTags, BC Hydro will perform an assessment based on the information provided by the PSE. The PSE should provide as much detail as possible including the expected maximum dynamic capability that is to be enacted between the Sending and Receiving Balancing Authority Areas so that BC Hydro can determine the feasibility of the request. If it is techncially feasible, BC Hydro will undertake work within BC Hydro systems to facilitate the submission of Dynamic eTags.

Dynamic Scheduling energy consists of Non-Spinning Reserve (NSPIN), Replacement Reserve (REPL), Positive Supplemental/Incremental (INC), Negative Supplemental/Decremental (DEC), Spinning Reserve (SPIN), Regulation Up (REGUP), and Regulation Down (REGDN).

PSEs must have~~reserve Firm~~ transmission for dynamic scheduling purposes ~~only~~ up to the amount of the total capacity awarded by the Receiving and Sending Balancing Authority Areas. The ~~Firm~~ transmission reservation can be used for scheduling any of the following Dynamic Scheduling Energy types.

Energy Type	Dynamic Operating Reserve
NSPIN	DSConRes
REPL	DSConRes
INC	DSConRes
DEC	DSConRes
SPIN	DSSpinRes
REGUP	DSRegRes
REGDN	DSRegRes

Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes), and Dynamic Scheduling Regulation Reserve (DSRegRes) are used for the real-time delivery of dynamic schedules and are not available for purchase on OASIS.

To submit a Dynamic eTag:

1. Identify the Transaction Type as Dynamic;
2. Enter Energy Type (from the table above) under the Contract column in the Market Path;
3. Enter the OASIS ID (Aref) of the CONFIRMED Firm TSR under the OASIS column in the Transmission Allocation; and
4. Enter the ~~average~~ estimated expected value under the MW column in the Energy Profile and the maximum expected value under the MW column in the Transmission Profile for all energy types.

The Blanket approach as described Section 2.2 above cannot be used for Dynamic eTags.

7.0 Scheduling EIM Transactions

The California Independent System Operator (CAISO) Energy Imbalance Market (EIM) is a real-time market that is comprised of a 15-minute market and a 5-minute dynamic dispatch market. PSEs can schedule on both import and export paths. PSEs participating in the CAISO's EIM should adhere to the CAISO's scheduling timelines.

A PSE has two options for scheduling an EIM transaction.

First, a PSE may use their transmission reservations, of any priority, for EIM transactions.

To submit an eTag for an EIM transaction on a transmission reservation:

1. Identify the Transaction Type as Normal or Dynamic for the 15-minute market and 5-minute market, respectively.
2. In the Misc Info field on the eTag identify the source, interconnection point, sink, and whether it's an export or import transaction using nomenclature as agreed upon with BC Hydro.
3. Enter the appropriate Energy Type under the Contract column in the Market Path; and
4. Enter the OASIS ID (Aref) as provided by OASIS.

Second, a PSE may use EIM Scheduling for EIM transactions. The requirements for EIM Scheduling are set out in Attachment Q-6 of the Open Access Transmission Tariff. To use EIM Scheduling, a PSE may use their own unused transmission service for EIM transactions. This unused transmission can be scheduled upon at no additional cost and will: 1) have the lowest transmission curtailment priority (service priority code 0), and 2) not decrement or effect the posted Available Transfer Capability (ATC) that is offered for higher priority transmission services.

To submit an EIM Scheduling eTag:

1. Identify the Transaction Type as Normal or Dynamic for the 15-minute market and 5-minute market, respectively.
2. In the Misc Info field on the eTag identify the source, interconnection point, sink, and whether it's an export or import transaction using nomenclature as agreed upon with BC Hydro.
3. Enter the appropriate Energy Type under the Contract column in the Market Path; and
4. Enter the OASIS ID (Aref) as provided by BC Hydro.

The Blanket approach as described Section 2.2 above cannot be used for EIM Scheduling.

8.0 INTERRUPTIBLE ENERGY

Interruptible Energy (Non-Firm energy) is energy that the PSE has specified that it may be interrupted. The source Balancing Authority may interrupt the service by giving notice to the sink Adjacent Balancing Authority of the transaction.

As the Balancing Authority for an export Interruptible Energy schedule, BC Hydro has the right to curtail that schedule if the PSE delivering the export fails to meet its Contingency Reserve Obligation with BC Hydro.

To submit an Interruptible eTag:

1. Enter G-NF in the Market Path section in the Product Code drop-down List.
2. Enter the appropriate WECC reserve requirement – the reserve obligation multiplier should be set to 100%.

BC Hydro will deny the eTag if the above settings are not satisfied.

~~8~~9.0 WHEELTHROUGH ENERGY

There are two approaches to schedule Wheelthrough energy:

- the PSE can submit one eTag that references a matching Wheelthrough CONFIRMED TSR; or
- the PSE can submit **one** eTag that references CONFIRMED import and export TSRs.

~~9~~10.0 eTAG SUBMISSION TIMELINES

eTags should be submitted in accordance with the NAESB Timing Requirements for WECC. RFIs for one hour energy schedules shall be submitted no later than 20 minutes (XX:40) prior to the Start Time of one hour energy schedules.

Refer to BC Hydro's OATT Business Practices on *Processing of Energy Schedules* and *Intra-Hour Scheduling – Transmission & Energy* for additional energy schedule information and submission times for intra-hour eTags, respectively.

1~~1~~0.0 SUBMITTING MODIFICATIONS TO eTAGS

The Transmission Customer may request modifications to a PENDING, CONFIRMED or IMPLEMENTED eTag for non-reliability related issues according to the NAESB Interchange Timing Requirements for WECC.

1. For an IMPLEMENTED eTag, modifications cannot be made within the scheduling hour and only future hours may be modified.

2. A Correction can only be made to a PENDING eTag. Corrections can be made to:
    - POR and POD
    - Designated transmission reservation
    - Miscellaneous Information Value field on the Load or Generation Line
    - Product Code in the Market Path

3. An Adjustment can only be made to a CONFIRMED or IMPLEMENTED eTag. Adjustments can be made to:
    - Generating Profile
    - Transmission Profile
    - Extension to the energy profile (to include hours not previously specified). The PSE must ensure the necessary transmission capacity for the extension is provided on the eTag.

Refer to BC Hydro's OATT Business Practice on *Processing of Energy Schedules* for further information.

121.0 REAL POWER LOSSES

Pursuant to Section 15.7 of BC Hydro's Open Access Transmission Tariff (OATT), Real Power Losses are associated with all transmission service. The Transmission Customer is responsible for replacing losses associated with transmission service as calculated by BC Hydro in Rate Schedule 10. Refer to Ancilllary Services Business Practice for information on Losses.

Document Change History

Issue	Reason for Issue	Date
4	Updated language to include EIM Scheduling, and tariff changes.	September XX, 2017
3	Included references to Intra-Hour BP, simplified & updated current language, & corrected references & typographical errors.	December 30, 2013
2	Updated reference.	June 14, 2011
1	Updated procedures. Previously Business Practices 10 & 11.	December 1, 2010

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CURTAILMENT OF TRANSMISSION AND ENERGY

In this Section:

1.0 OVERVIEW

Curtailment of transmission service occurs when an emergency or other unforeseen condition and/or commercial activity threatens to impair or degrade the reliability of the transmission system. Curtailments will be made on a non-discriminatory basis to relieve the constraint.

An Economic Interruption of transmission service occurs, up until the end of Real Time scheduling (see Section 10 of BC Hydro's OATT Business Practice on *Submitting Energy Schedules*), when:

1. a valid, higher class transmission reservation interrupts a lower-class transmission reservation; or
2. a Non-Firm transmission reservation is purchased from unused capacity of Firm transmission and the Firm transmission owner schedules on their rights.

BC Hydro reserves the right to interrupt, in whole or in part. Example: Firm Point-to-Point (PTP) transmission service can interrupt Network Economy service, Non-Firm service and Secondary service. BC Hydro does not charge for the transmission reservation if an economic interruption occurs.

These Business Practices provide clarification of the rules, standards and practices used by BC Hydro to implement its OATT. While the terms of BC Hydro's OATT and these Business Practices govern, customers should also refer to the NAESB WEQ Business Standards and WECC Regional Criteria which BC Hydro has followed in most, but not all respects. BC Hydro also complies with the Mandatory Reliability Standards adopted by the BCUC.

2.0 SCHEDULING LIMIT (SL)

The SL of a path is the primary determinant on whether or not curtailment to transmission is required.

$SL = TTC - TRM_u$

TTC is the Total Transfer Capability and TRM_u is the Transmission Reliability Margin. Refer to BC Hydro's OATT Business Practice on *TTC/ATC* for further information. Counterflow is energy scheduled and flowing on the opposite path.

An infringement upon SL can occur when the amount of energy scheduled is greater than the SL for a path and cannot be accommodated while including counterflow energy.

Total energy scheduled > SL + counterflow = infringement upon SL

3.0 CURTAILMENT PRIORITY - TRANSMISSION

At xx:40 if there is an infringement upon SL for the next scheduling hour or if there is a condition that degrades the reliability of the transmission system and causes an infringement upon SL, BC Hydro will proceed with alleviating the infringement by issuing a Reliability Limit to the appropriate transmission reservations. This may also lead to the curtailment of energy schedules.

NAESB eTag 1.8 Functional Specification defines Reliability Limit as the highest MW level at which a transaction should be permitted to run based on system reliability considerations. This limit is typically used to indicate curtailments.

BC Hydro will assign reliability limits based on transmission service priority. All non-firm transmission reservations including Network Economy Service (Type 2) will be assigned Reliability Limits before any firm transmission reservations. Reliability Limits will be assigned until the infringement upon SL is resolved.

Within each priority group, the Reliability Limit will be assigned according to Pro-rata as applicable – refer to Section 3.1 below. If a Reliability Limit is assigned to a transmission reservation, the Transmission Customer can select the Impacted MW on the CONFIRMED TSR to review the details.

3.1 Transmission Service Curtailment Priority

- EIM transactions scheduled at service Priority 0: Pro-rata
- Secondary PTP: Pro-rata
- Non-Firm and Network Economy (Type 2): Pro-rata
- Network Economy (Type 1) and Conditional Firm (Conditional Period): Pro-rata
- Firm and Conditional Firm (Non Conditional Period): Pro-rata

4.0 CURTAILMENT PRIORITY - ENERGY

eTags with the Reliability Limit issued on transmission will be curtailed Pro-rata according to the Product code and cut priority set by the PSE (Purchasing-Selling Entity) on each eTag. For eTags with no assigned PSE cut priority order or for eTags of like assigned PSE priority order, BC Hydro will curtail by Pro-rata.

Refer to BC Hydro's OATT Business Practice on *Submitting Energy Schedules* for Energy Product Codes and PSE assigned Cut_Priority order for eTags.

BC Hydro will prioritize eTags as follows when curtailment is required:

Interruptible / Recallable	Lowest Priority
Normal / Uninterruptible	↓
Reserves / Capacity	
Dynamic	Highest Priority

For example:

TSR 1 is 100 MW with the following eTags scheduled against the TSR:

eTag 1 (G-NF) is for 25 MW
eTag 2 (G-F) is for 25 MW; "Cut_Priority" = 1
eTag 3 (G-F) is for 25 MW; "Cut_Priority" = 2
eTag 4 (G-F) is Dynamic

At xx:40, a Reliability Limit is set to TSR 1 for 55 MW and curtailment of energy schedules is required. BC Hydro will curtail the eTags as follows (based on the priorities discussed above):

eTag 1 is curtailed for 25 MW
eTag 3 is curtailed for 20 MW

If energy curtailment(s) results in an infringement upon SL on the Counterflow path, BC Hydro will assign a Reliability Limit to the appropriate transmission on the Counterflow path. BC Hydro will assign the Reliability Limit in accordance with the transmission curtailment priority defined in Section 3 above.

If BC Hydro, as the Load Control Area or Generating Control Area curtails energy, it will send out a Reliability Adjustment (Curtailment) eTag pursuant to industry rules.

5.0 CURTAILMENT PROCESS

At xx:40, BC Hydro will recall all unscheduled Network Economy Service (Type 1 and 2 priority). BC Hydro will then determine if an infringement upon SL exists for each path for the next scheduling hour.

If there is no infringement upon SL, then a Reliability Limit is not required for transmission reservations.

If there is an infringement upon SL, the following will occur:

1. BC Hydro will assign Reliability Limits on transmission reservations according to the priority defined in Section 3 above.

2. Within each transmission priority group, Reliability Limits will be assigned to transmission reservations according to Pro-rata as applicable – refer to Section 3.1 above.
3. Reliability Limits will be assigned until the infringement upon SL is resolved.
4. If total energy scheduled exceeds the SL, BC Hydro will curtail eTags to the Reliability Limits assigned to the transmission reservation(s). Curtailment of eTags will be performed according to the Product Code and PSE defined Cut_Priority (noted in Section 4 above) within each transmission reservation.
5. If the total of the curtailed energy is below the SL, BC Hydro will reallocate, on a pro-rata basis, the unscheduled capacity of transmission reservation(s) to energy schedules that were to be curtailed. Therefore allowing total energy schedules to equal the SL limit and in some instances, eTags to be above the Reliability Limit of the transmission.

Example:

- SL = TTC – TRM_u = 100 MW
- Energy schedules = 280 MW and Counterflow = 0 MW
- Transmission reservations total 500 MW for this path
- Reliability Limits are assigned to transmission reservations so that the total capacity of the transmission reservations equals the SL.
-

TSR Priority (per Section 3 above)	Original Capacity	Curtailment
	Transmission (MW)	Transmission Reliability Limit (MW)
TSR 8 – Non-Firm	25	0
TSR 4 – Network Type 2	50	0
TSR 1 – Non-Firm	50	0
TSR 2 – Firm	50	13
TSR 3 – Firm	150	40
TSR 5 – Firm	25	7
TSR 6 – Firm	100	27
TSR 7 - Firm	50	13
TOTAL	500	100

- Energy Schedules total 280 MW and therefore exceeds SL. (If total energy schedules had been equal to or below 100 MW, no eTags would need to be curtailed).
- eTags with Reliability Limits assigned to transmission will be curtailed to the Reliability Limit.
- However, the new energy schedules total is 93 MW, which is below the SL of 100 MW.

- TSR 6 has unscheduled capacity (7 MW). The 7 MW is reallocated on a pro-rata basis to the eTags that were curtailed. This results in the final curtailment to the eTags.

TSR Priority (per Section 3 above)	Transmission Reliability Limit (MW)	Original Energy (MW) in Curtailment Priority	Projected Energy Curtailed To Reliability Limit (MW)	Final Energy Curtailed To SL (MW)
TSR 8 – Non-Firm	0	eTag 1 = 25	0	0
TSR 4 – Network Type 2	0	eTag 2 = 50	0	0
TSR 1 – Non-Firm	0	eTag 4 = 20 eTag 3 = 25	0	0
TSR 2 – Firm	13	eTag 11 = 20 eTag 5 = 20	eTag 11 = 0 eTag 5 = 13	eTag 11 = 0 eTag 5 = 14
TSR 3 – Firm	40	eTag 6 = 50	eTag 6 = 40	eTag 6 = 44
TSR 5 – Firm	7	eTag 7 = 10 eTag 8 = 10 (same priority)	eTag 7 = 0 eTag 8 = 7	eTag 7 = 0 eTag 8 = 8
TSR 6 – Firm	27	eTag 9 = 20	eTag 9 = 20	eTag 9 = 20
TSR 7 - Firm	13	eTag 10 = 35	eTag 10 = 13	eTag 10 = 14
TOTAL	100	280	93	100

5.1 Current Hour Curtailments

Following an energy curtailment, BC Hydro will confirm the new Net Scheduled Interchange with the adjacent Balancing Authorities.

If an energy schedule is curtailed across the hour (current hour to next hour) and/or days the integrated energy value will be calculated for both hours.

> Example: A 100 MW schedule for HE 24 and HE 01 the next day is curtailed effective time 23:59 with ramp duration of 20 minutes. The integrated energy values will be calculated for both HE 24 and HE 01.

Customer notification of all energy curtailments will be made available electronically using eTag information.

6.0 CURTAILMENT OF LOSSES

If BC Hydro curtails a Transmission Customer's Losses eTag, the Transmission Customer will not be assessed with a "strike" pursuant to Section 15.7 of BC Hydro's OATT. BC Hydro will financially settle with the Transmission Customer for the Losses for that scheduling hour. Refer to BC Hydro's OATT Business Practice on *Ancillary Services* for information on Real Power Losses.

7.0 RELOADS

7.1 Reloads by BC Hydro

BC Hydro will reload eTags where an eTag has been curtailed in error by BC Hydro. If the approved reload causes an infringement upon SL, BC Hydro will issue Reliability Limits to transmission reservations and curtail energy according to this Business Practice to relieve the SL.

In the case where eTags have been curtailed in the scheduling hour due to a real time reduction of TTC , BC Hydro will reload the curtailed eTags should an increase in TTC be made available. Etags will not be reloaded, where reloads would cause an SL infringement.

7.2 Reloads by Other Balancing Authorities

In the scheduling hour, BC Hydro will approve all eTags reloaded by other Balancing Authorities unless the transmission allocated to the eTag is fully utilized or the reload causes an infringement upon SL.

Document Change History

Issue	Reason for Issue	Date
4	Updated section 3.1 to include all curtailment priorities	September XX, 2017
3	Updated procedures to implement non-firm curtailment methodology	October 25, 2016
2	Corrected typo.	August 8, 2012
1	Updated procedures to implement new curtailment methodology. Previously Business Practice 12.	November 1, 2010

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The Transmission Customer or Eligible Customer will pay for Ancillary Services based on the amount of transmission service it used but did not reserve.

The Transmission Provider shall specify the rate treatment and all related terms and conditions in the event of an unauthorized use of Ancillary Services by the Transmission Customer in the applicable Transmission Provider Rate Schedule 03 through Rate Schedule 09.

The specific Ancillary Services, prices and/or compensation methods are described on the Schedules that are attached to and made a part of the Tariff. Three principal requirements apply to discounts for Ancillary Services provided by the Transmission Provider in conjunction with its provision of transmission service as follows: (i) any offer of a discount made by the Transmission Provider must be announced to all Eligible Customers solely by posting on the OASIS; (ii) any customer-initiated requests for discounts (including requests for use by one's wholesale merchant or an Affiliate's use) must occur solely by posting on the OASIS; and (iii) once a discount is negotiated, details must be immediately posted on the OASIS. A discount agreed upon for an Ancillary Service must be offered for the same period to all Eligible Customers on the Transmission Provider's system. Sections 3.1 through 3.6 below list the six Ancillary Services.

3.1 Scheduling, System Control and Dispatch Service

The rates and/or methodology are described in Rate Schedule 03. The Transmission Provider will provide dynamic scheduling in accordance with Attachment Q-1. The Transmission Provider will provide EIM Scheduling in accordance with Attachment Q-6.

3.2 Reactive Supply and Voltage Control from Generation or Other Sources Service

The rates and/or methodology are described in Rate Schedule 04.

3.3 Regulation and Frequency Response Service

Where applicable the rates and/or methodology are described in Rate Schedule 05.

BC Hydro
Power smart

Open Access Transmission Tariff

Dynamic Scheduling Amendments Application

Appendix B

Attachment 1

Energy Schedules Business Practice

Black-lined and Clean

SUBMITTING ENERGY SCHEDULES

In this Section:

1.0 OVERVIEW

A Request for Interchange (RFI) is an eTag that arranges a new transaction or changes an existing transaction for the current or future operating hour. An eTag is an electronic documentation of the energy transaction describing the source, sink, path, transmission contracts to be used, capacity profiles and parties to the transaction. eTags help to maintain reliability by ensuring that all parties to interchange energy transactions receive relevant reliability information. The OATI ~~ETS (E~~electronic ~~T~~tagging ~~S~~system~~)~~ is used to submit, modify and approve or deny energy schedules (eTags).

BC Hydro requires the use of eTags to schedule energy in both Pre-schedule and Real-time for all interchange energy transactions, including internal paths.

These Business Practices provide clarification of the rules, standards and practices used by BC Hydro to implement its OATT, which may supplement but not supersede the terms and conditions specified in non-OATT agreements as approved or exempted under the Utilities Commission Act. While the terms of BC Hydro's OATT and these Business Practices govern, customers should also refer to the NAESB WEQ Business Standards, WECC Regional Criteria, and WECC Regional Standards~~Business Practices~~, which BC Hydro has followed in most, but not all, respects. BC Hydro also complies with the Mandatory Reliability Standards adopted by the BCUC.

2.0 DESIGNATING TRANSMISSION

An important element of the eTag is its specification of which transmission reservation the energy is to be scheduled on.

The CONFIRMED Transmission Service Requests (TSRs) identified through the eTag must satisfy the following conditions:

- be CONFIRMED and **active** in OASIS and BC Hydro's scheduling system;
- in aggregate have sufficient available energy capacity to accommodate the energy schedule and the transmission allocation profile;
- must have the same POR and POD combination;
- the eTag transmission allocation profile must be greater than or equal to the energy profile; and
- must not cause a Reliability Limit infringement. If eTags had previously been approved, BC Hydro will deny the eTag for insufficient capacity.

If any of the above conditions are not satisfied, the eTag will be DENIED by BC Hydro.

The PSE (Purchasing-Selling Entity) can specify the transmission on its eTag by using any one of the following three approaches:

1. OASIS ID Approach by entering either a single or multiple valid CONFIRMED TSR number(s) on the eTag;
2. Blanket Approach by entering an **active** CONFIRMED TSR number on the eTag; or
3. Stacked Transmission Approach by combining different CONFIRMED TSRs with the same POR and POD to support the committed capacity referenced on the eTag.

These three approaches will be explained below. The eTag will be DENIED if transmission is not entered correctly.

2.1 OASIS ID Approach

A PSE may designate specific MW maximums for each of the CONFIRMED TSR OASIS IDs (ARef) referenced using the transmission allocation value.

2.2 Blanket Approach

As an alternative to specifying each CONFIRMED and **active** TSR OASIS number on the eTag, the PSE may select an **active** CONFIRMED TSR OASIS ID (ARef) and add a "B" (upper or lower case) after the OASIS ID to indicate that it wishes to use a Blanket approach.

The Blanket OASIS ID specifies the Transmission Customer, path, POR/POD, and type of transmission service (Firm or Non-Firm) and tells the BC Hydro scheduling system to retrieve all CONFIRMED and **active** TSRs that match those parameters within the transaction time period.

When assigning energy on Firm transmission service specified from a Blanket OASIS ID, all Firm transmission reservations have the same priority and eTags will be assigned by First In – First Scheduled. When assigning energy on Non-Firm transmission reservations specified from a Blanket ID, the eTags will be assigned to

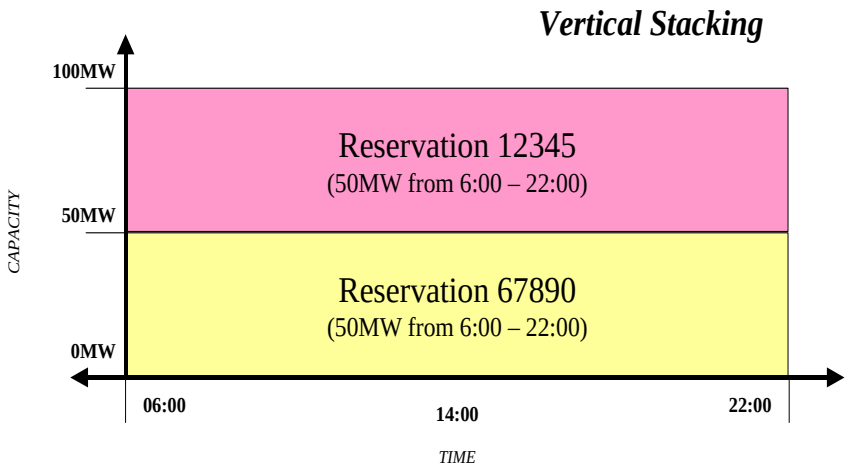
Non-Firm transmission reservations in descending NERC priority (5 NM going down to 2NH). Refer to BC Hydro's OATT Business Practice on *Curtailment of Transmission and Energy* for information on NERC priorities for transmission service.

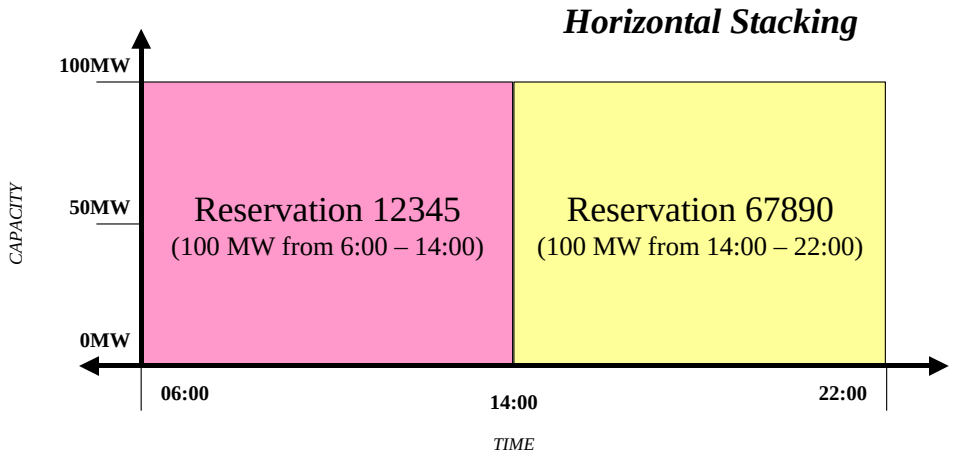
2.3 Stacked Transmission Approach

Transmission stacking allows a PSE to combine different CONFIRMED TSRs, with the same POR and POD, to support the capacity committed in an associated energy profile. There are two types of transmission stacking:

- Vertical Stacking – PSE combines multiple transmission reservations to achieve a certain net level of capacity; and
- Horizontal Stacking – PSE combines multiple transmission reservations to achieve certain capacity over time.

The following diagrams illustrate these concepts more fully. In both cases, the assumed need is 100 MW of transmission capacity for hours 06:00 through 22:00.





If a PSE elects to utilize stacking to support their energy schedules, the PSE must understand the following requirements:

- Stacks must be described through fully qualified profiles for each reservation being used; and
- At no point may the coverage described by the stack be less than the capacity needed for the transaction's energy flow.

3.0 ENERGY PRODUCT CODES

All GPE (Generation-Providing Entity) and LSE (Load-Serving Entity) segments must include an Energy Product Code as a part of their creation profile. An eTag without an Energy Product Code or with an invalid Energy Product Code will be DENIED by BC Hydro with appropriate messaging on the eTag. The list of valid Product Codes is included below. Refer to the WECC Regional Criteria for the definitions associated with each energy product code.

Valid GSE/LSE Product Codes

G-F	Firm Energy
G-NF	Non-Firm Energy
G-FC	Firm Contingent
G-FP	Firm Provisional Energy
G-F1	Hourly Firm Energy
G-EX	Exchange of Firm Energy
C-SP	Capacity for Spinning Reserve
C-NS	Capacity for Non-Spinning Reserve
C-RE	Capacity associated with energy recallable for reserves

eTags within each Product (uninterruptible, interruptible, capacity and dynamic) can have a priority assigned to them by a PSE.

4.0 PSE ASSIGNED CUT PRIORITY

A PSE can assign a "Cut_Priority" to each eTag. This is a numeric value that indicates to BC Hydro the curtailment order of eTags. "1" is the highest priority and will be curtailed last; "2" is the second highest priority, etc. Refer to BC Hydro's OATT Business Practice on *Curtailments of Transmission and Energy* for more information on the curtailment process.

To enter the "Cut_Priority":

1. Click on the Misc Info field on the BC Hydro physical path segment;
2. Enter "Cut_Priority" in the Token column; and
3. Enter a numeric value to indicate curtailment priority in the Value column.

5.0 CAPACITY eTAGS

Capacity eTags are created by selecting the eTag type as Capacity for ConRes or SpinRes. The eligibility requirements and terms and conditions for Spinning Reserve and Contingency Reserve are set out in Attachment Q-3 of BC Hydro's OATT. Currently BC Hydro only exports Capacity Reserves.

Per WECC Regional Criteria~~Business Practices~~, a PSE wishing to schedule reserves must submit an eTag specifying the correct Firm OASIS ID (ARef) and energy type.

The Load Serving Entity (LSE) will submit an adjustment eTag. Once the adjustment is approved by the Sink and Source BA's, the reserve amount requested is delivered for the duration specified.

To submit a Capacity eTag:

1. Create a Firm energy schedule with a CONFIRMED Firm TSR(s).
2. Enter a Transmission Allocation profile.
3. Enter a zero Energy Profile.
4. Select ConRes or SpinRes (C-NS or C-SP) in the Energy Product Code drop-down list.
5. Select Transaction Type as Capacity.
6. When capacity is called upon, the PSE enters an adjustment to the energy profile on the eTag upto the reliability limit or the transmission allocation profile limit.

The Transmission Allocation profile stated in the Capacity eTag will be used to decrement the Firm capacity that is available for further scheduling on the CONFIRMED TSR specified.

6.0 DYNAMIC SCHEDULING SPINNING~~, CONTINGENCY RESERVE AND REGULATION RESERVE~~

~~Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes), and Dynamic Scheduling Regulation Reserve (DSRegRes) are used for the real-time delivery of operating reserves to the Receiving Balancing Authority. As such, it is only available on exports. DSSpinRes, DSConRes, and DSRegRes are not available for purchase on OASIS but can be scheduled using existing Firm transmission. PSEs wishing to carry DSSpinRes, DSConRes, and DSRegRes must have sufficient operating reserves of corresponding type available and ready to be delivered in the scheduled period.~~

The ~~Eligibility R~~requirements for dynamic scheduling are set out in Attachment Q-1 of the Open Access Transmission Tariff. PSEs cannot submit Dynamic Schedules or eTags without BC Hydro approval, which will ensure the necessary reviews and system arrangements have been made.

Prior to the submission of any dynamic eTags, BC Hydro will perform an assessment based on the information provided by the PSE. The PSE should provide as much detail as possible including the expected maximum dynamic capability that is to be enacted between the Sending

and Receiving Balancing Authority Areas so that BC Hydro can determine the feasibility of the request. If it is techncially feasible, BC Hydro will undertake work within BC Hydro systems to facilitate the submission of Dynamic eTags.

Dynamic Scheduling energy consists of Non-Spinning Reserve (NSPIN), Replacement Reserve (REPL), Positive Supplemental/Incremental (INC), Negative Supplemental/Decremental (DEC), Spinning Reserve (SPIN), Regulation Up (REGUP), and Regulation Down (REGDN).

PSEs must have~~reserve Firm~~ transmission for dynamic scheduling purposes ~~only~~ up to the amount of the total capacity awarded by the Receiving and Sending Balancing Authority Areas. The ~~Firm~~ transmission reservation can be used for scheduling any of the following Dynamic Scheduling Energy types.

Energy Type	Dynamic Operating Reserve
NSPIN	DSConRes
REPL	DSConRes
INC	DSConRes
DEC	DSConRes
SPIN	DSSpinRes
REGUP	DSRegRes
REGDN	DSRegRes

Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes), and Dynamic Scheduling Regulation Reserve (DSRegRes) are used for the real-time delivery of dynamic schedules and are not available for purchase on OASIS.

To submit a Dynamic eTag:

1. Identify the Transaction Type as Dynamic;
2. Enter Energy Type (from the table above) under the Contract column in the Market Path;
3. Enter the OASIS ID (Aref) of the CONFIRMED ~~Firm~~ TSR under the OASIS column in the Transmission Allocation; and
4. Enter the ~~average~~ estimated expected value under the MW column in the Energy Profile and the maximum expected value under the MW column in the Transmission Profile for all energy types.

The Blanket approach as described Section 2.2 above cannot be used for Dynamic eTags.

7.0 Scheduling EIM Transactions

The California Independent System Operator (CAISO) Energy Imbalance Market (EIM) is a real-time market that is comprised of a 15-minute market and a 5-minute dynamic dispatch market. PSEs can schedule on both import and export paths. PSEs participating in the CAISO's EIM should adhere to the CAISO's scheduling timelines.

A PSE may use their transmission reservations, of any priority, for EIM transactions.

To submit an eTag for an EIM transaction on a transmission reservation:

1. Identify the Transaction Type as Normal or Dynamic for the 15-minute market and 5-minute market, respectively.
2. In the Misc Info field on the eTag identify the source, interconnection point, sink, and whether it's an export or import transaction using nomenclature as agreed upon with BC Hydro.
3. Enter the appropriate Energy Type under the Contract column in the Market Path; and
4. Enter the OASIS ID (Aref) as provided by OASIS.

The Blanket approach as described Section 2.2 above cannot be used for EIM Scheduling.

8.0 INTERRUPTIBLE ENERGY

Interruptible Energy (Non-Firm energy) is energy that the PSE has specified that it may be interrupted. The source Balancing Authority may interrupt the service by giving notice to the sink Adjacent Balancing Authority of the transaction.

As the Balancing Authority for an export Interruptible Energy schedule, BC Hydro has the right to curtail that schedule if the PSE delivering the export fails to meet its Contingency Reserve Obligation with BC Hydro.

To submit an Interruptible eTag:

1. Enter G-NF in the Market Path section in the Product Code drop-down List.
2. Enter the appropriate WECC reserve requirement – the reserve obligation multiplier should be set to 100%.

BC Hydro will deny the eTag if the above settings are not satisfied.

~~8~~9.0 WHEELTHROUGH ENERGY

There are two approaches to schedule Wheelthrough energy:

- the PSE can submit one eTag that references a matching Wheelthrough CONFIRMED TSR; or
- the PSE can submit **one** eTag that references CONFIRMED import and export TSRs.

~~9~~10.0 eTAG SUBMISSION TIMELINES

eTags should be submitted in accordance with the NAESB Timing Requirements for WECC. RFIs for one hour energy schedules shall be submitted no later than 20 minutes (XX:40) prior to the Start Time of one hour energy schedules.

Refer to BC Hydro's OATT Business Practices on *Processing of Energy Schedules* and *Intra-Hour Scheduling – Transmission & Energy* for additional energy schedule information and submission times for intra-hour eTags, respectively.

11~~0~~.0 SUBMITTING MODIFICATIONS TO eTAGS

The Transmission Customer may request modifications to a PENDING, CONFIRMED or IMPLEMENTED eTag for non-reliability related issues according to the NAESB Interchange Timing Requirements for WECC.

1. For an IMPLEMENTED eTag, modifications cannot be made within the scheduling hour and only future hours may be modified.

2. A Correction can only be made to a PENDING eTag. Corrections can be made to:
   - POR and POD
   - Designated transmission reservation
   - Miscellaneous Information Value field on the Load or Generation Line
   - Product Code in the Market Path

3. An Adjustment can only be made to a CONFIRMED or IMPLEMENTED eTag. Adjustments can be made to:
   - Generating Profile
   - Transmission Profile
   - Extension to the energy profile (to include hours not previously specified). The PSE must ensure the necessary transmission capacity for the extension is provided on the eTag.

Refer to BC Hydro's OATT Business Practice on *Processing of Energy Schedules* for further information.

12~~1~~.0 REAL POWER LOSSES

Pursuant to Section 15.7 of BC Hydro's Open Access Transmission Tariff (OATT), Real Power Losses are associated with all transmission service. The Transmission Customer is responsible for replacing losses associated with transmission service as calculated by BC Hydro in Rate Schedule 10. Refer to Ancilllary Services Business Practice for information on Losses.

Document Change History

Issue	Reason for Issue	Date
4	Updated industry language, to reflect expansion of dynamic scheduling service, & include EIM Scheduling.	October XX, 2017
3	Included references to Intra-Hour BP, simplified & updated current language, & corrected references & typographical errors.	December 30, 2013
2	Updated reference.	June 14, 2011
1	Updated procedures. Previously Business Practices 10 & 11.	December 1, 2010

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SUBMITTING ENERGY SCHEDULES

In this Section:

1.0 OVERVIEW

A Request for Interchange (RFI) is an eTag that arranges a new transaction or changes an existing transaction for the current or future operating hour. An eTag is an electronic documentation of the energy transaction describing the source, sink, path, transmission contracts to be used, capacity profiles and parties to the transaction. eTags help to maintain reliability by ensuring that all parties to interchange energy transactions receive relevant reliability information. The OATI electronic tagging system is used to submit, modify and approve or deny energy schedules (eTags).

BC Hydro requires the use of eTags to schedule energy in both Pre-schedule and Real-time for all interchange energy transactions, including internal paths.

These Business Practices provide clarification of the rules, standards and practices used by BC Hydro to implement its OATT, which may supplement but not supersede the terms and conditions specified in non-OATT agreements as approved or exempted under the Utilities Commission Act. While the terms of BC Hydro's OATT and these Business Practices govern, customers should also refer to the NAESB WEQ Business Standards, WECC Regional Criteria, and WECC Regional Standards, which BC Hydro has followed in most, but not all, respects. BC Hydro also complies with the Mandatory Reliability Standards adopted by the BCUC.

2.0 DESIGNATING TRANSMISSION

An important element of the eTag is its specification of which transmission reservation the energy is to be scheduled on.

The CONFIRMED Transmission Service Requests (TSRs) identified through the eTag must satisfy the following conditions:

- be CONFIRMED and **active** in OASIS and BC Hydro's scheduling system;
- in aggregate have sufficient available energy capacity to accommodate the energy schedule and the transmission allocation profile;
- must have the same POR and POD combination;
- the eTag transmission allocation profile must be greater than or equal to the energy profile; and
- must not cause a Reliability Limit infringement. If eTags had previously been approved, BC Hydro will deny the eTag for insufficient capacity.

If any of the above conditions are not satisfied, the eTag will be DENIED by BC Hydro.

The PSE (Purchasing-Selling Entity) can specify the transmission on its eTag by using any one of the following three approaches:

1. OASIS ID Approach by entering either a single or multiple valid CONFIRMED TSR number(s) on the eTag;
2. Blanket Approach by entering an **active** CONFIRMED TSR number on the eTag; or
3. Stacked Transmission Approach by combining different CONFIRMED TSRs with the same POR and POD to support the committed capacity referenced on the eTag.

These three approaches will be explained below. The eTag will be DENIED if transmission is not entered correctly.

2.1 OASIS ID Approach

A PSE may designate specific MW maximums for each of the CONFIRMED TSR OASIS IDs (ARef) referenced using the transmission allocation value.

2.2 Blanket Approach

As an alternative to specifying each CONFIRMED and **active** TSR OASIS number on the eTag, the PSE may select an **active** CONFIRMED TSR OASIS ID (ARef) and add a "B" (upper or lower case) after the OASIS ID to indicate that it wishes to use a Blanket approach.

The Blanket OASIS ID specifies the Transmission Customer, path, POR/POD, and type of transmission service (Firm or Non-Firm) and tells the BC Hydro scheduling system to retrieve all CONFIRMED and **active** TSRs that match those parameters within the transaction time period.

When assigning energy on Firm transmission service specified from a Blanket OASIS ID, all Firm transmission reservations have the same priority and eTags will be assigned by First In – First Scheduled. When assigning energy on Non-Firm transmission reservations specified from a Blanket ID, the eTags will be assigned to Non-Firm transmission reservations in descending NERC priority (5 NM going down

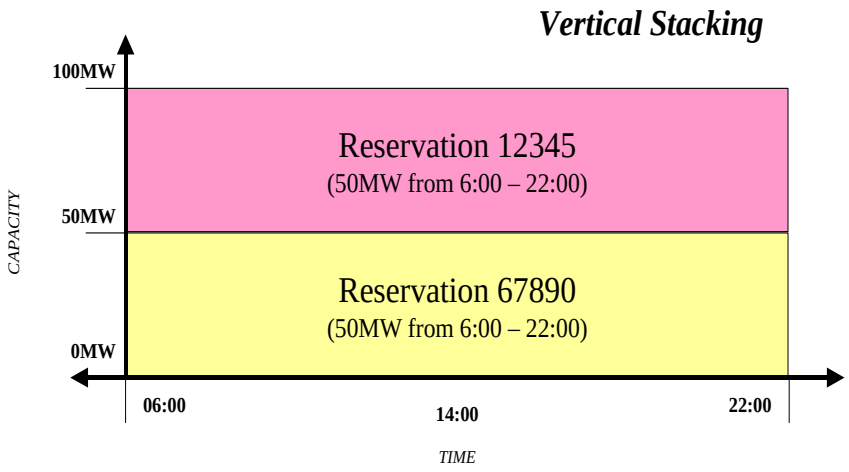
to 2NH). Refer to BC Hydro's OATT Business Practice on *Curtailment of Transmission and Energy* for information on NERC priorities for transmission service.

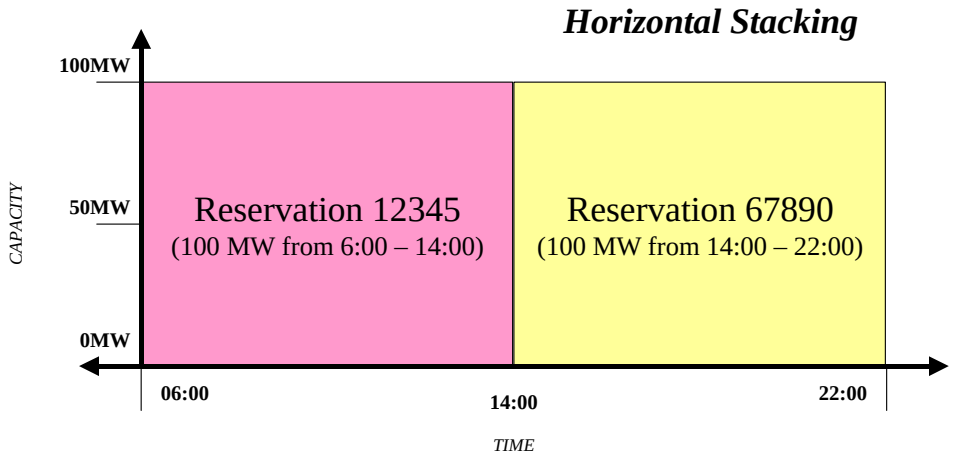
2.3 Stacked Transmission Approach

Transmission stacking allows a PSE to combine different CONFIRMED TSRs, with the same POR and POD, to support the capacity committed in an associated energy profile. There are two types of transmission stacking:

- Vertical Stacking – PSE combines multiple transmission reservations to achieve a certain net level of capacity; and
- Horizontal Stacking – PSE combines multiple transmission reservations to achieve certain capacity over time.

The following diagrams illustrate these concepts more fully. In both cases, the assumed need is 100 MW of transmission capacity for hours 06:00 through 22:00.





If a PSE elects to utilize stacking to support their energy schedules, the PSE must understand the following requirements:

- Stacks must be described through fully qualified profiles for each reservation being used; and
- At no point may the coverage described by the stack be less than the capacity needed for the transaction's energy flow.

3.0 ENERGY PRODUCT CODES

All GPE (Generation-Providing Entity) and LSE (Load-Serving Entity) segments must include an Energy Product Code as a part of their creation profile. An eTag without an Energy Product Code or with an invalid Energy Product Code will be DENIED by BC Hydro with appropriate messaging on the eTag. The list of valid Product Codes is included below. Refer to the WECC Regional Criteria for the definitions associated with each energy product code.

Valid GSE/LSE Product Codes

G-F	Firm Energy
G-NF	Non-Firm Energy
G-FC	Firm Contingent
G-FP	Firm Provisional Energy
G-F1	Hourly Firm Energy
G-EX	Exchange of Firm Energy
C-SP	Capacity for Spinning Reserve
C-NS	Capacity for Non-Spinning Reserve
C-RE	Capacity associated with energy recallable for reserves

eTags within each Product (uninterruptible, interruptible, capacity and dynamic) can have a priority assigned to them by a PSE.

4.0 PSE ASSIGNED CUT PRIORITY

A PSE can assign a "Cut_Priority" to each eTag. This is a numeric value that indicates to BC Hydro the curtailment order of eTags. "1" is the highest priority and will be curtailed last; "2" is the second highest priority, etc. Refer to BC Hydro's OATT Business Practice on *Curtailments of Transmission and Energy* for more information on the curtailment process.

To enter the "Cut_Priority":

1. Click on the Misc Info field on the BC Hydro physical path segment;
2. Enter "Cut_Priority" in the Token column; and
3. Enter a numeric value to indicate curtailment priority in the Value column.

5.0 CAPACITY eTAGS

Capacity eTags are created by selecting the eTag type as Capacity for ConRes or SpinRes. The eligibility requirements and terms and conditions for Spinning Reserve and Contingency Reserve are set out in Attachment Q-3 of BC Hydro's OATT. Currently BC Hydro only exports Capacity Reserves.

Per WECC Regional Criteria, a PSE wishing to schedule reserves must submit an eTag specifying the correct Firm OASIS ID (ARef) and energy type.

The Load Serving Entity (LSE) will submit an adjustment eTag. Once the adjustment is approved by the Sink and Source BA's, the reserve amount requested is delivered for the duration specified.

To submit a Capacity eTag:

1. Create a Firm energy schedule with a CONFIRMED Firm TSR(s).
2. Enter a Transmission Allocation profile.
3. Enter a zero Energy Profile.
4. Select ConRes or SpinRes (C-NS or C-SP) in the Energy Product Code drop-down list.
5. Select Transaction Type as Capacity.
6. When capacity is called upon, the PSE enters an adjustment to the energy profile on the eTag upto the reliability limit or the transmission allocation profile limit.

The Transmission Allocation profile stated in the Capacity eTag will be used to decrement the Firm capacity that is available for further scheduling on the CONFIRMED TSR specified.

6.0 DYNAMIC SCHEDULING SPINNING

The requirements for dynamic scheduling are set out in Attachment Q-1 of the Open Access Transmission Tariff. PSEs cannot submit Dynamic Schedules or eTags without BC Hydro approval, which will ensure the necessary reviews and system arrangements have been made.

Prior to the submission of any dynamic eTags, BC Hydro will perform an assessment based on the information provided by the PSE. The PSE should provide as much detail as possible including the expected maximum dynamic capability that is to be enacted between the Sending and Receiving Balancing Authority Areas so that BC Hydro can determine the feasibility of the request. If it is techncially feasible, BC Hydro will undertake work within BC Hydro systems to facilitate the submission of Dynamic eTags.

Dynamic Scheduling energy consists of Non-Spinning Reserve (NSPIN), Replacement Reserve (REPL), Positive Supplemental/Incremental (INC), Negative Supplemental/Decremental (DEC), Spinning Reserve (SPIN), Regulation Up (REGUP), and Regulation Down (REGDN).

PSEs must have transmission for dynamic scheduling purposes up to the amount of the total capacity awarded by the Receiving and Sending Balancing Authority Areas. The transmission reservation can be used for scheduling any of the following Dynamic Scheduling Energy types.

Energy Type	Dynamic Operating Reserve
NSPIN	DSConRes
REPL	DSConRes
INC	DSConRes
DEC	DSConRes
SPIN	DSSpinRes
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REGDN	DSRegRes

Dynamic Scheduling Spinning Reserve (DSSpinRes), Dynamic Scheduling Contingency Reserve (DSConRes), and Dynamic Scheduling Regulation Reserve (DSRegRes) are used for the real-time delivery of dynamic schedules and are not available for purchase on OASIS.

To submit a Dynamic eTag:

1. Identify the Transaction Type as Dynamic;
2. Enter Energy Type (from the table above) under the Contract column in the Market Path;
3. Enter the OASIS ID (Aref) of the CONFIRMED TSR under the OASIS column in the Transmission Allocation; and
4. Enter the estimated expected value under the MW column in the Energy Profile and the maximum expected value under the MW column in the Transmission Profile for all energy types.

The Blanket approach as described Section 2.2 above cannot be used for Dynamic eTags.

7.0 Scheduling EIM Transactions

The California Independent System Operator (CAISO) Energy Imbalance Market (EIM) is a real-time market that is comprised of a 15-minute market and a 5-minute dynamic dispatch market. PSEs can schedule on both import and export paths. PSEs participating in the CAISO's EIM should adhere to the CAISO's scheduling timelines.

A PSE may use their transmission reservations, of any priority, for EIM transactions.

To submit an eTag for an EIM transaction on a transmission reservation:

1. Identify the Transaction Type as Normal or Dynamic for the 15-minute market and 5-minute market, respectively.
2. In the Misc Info field on the eTag identify the source, interconnection point, sink, and whether it's an export or import transaction using nomenclature as agreed upon with BC Hydro.
3. Enter the appropriate Energy Type under the Contract column in the Market Path; and
4. Enter the OASIS ID (Aref) as provided by OASIS.

The Blanket approach as described Section 2.2 above cannot be used for EIM Scheduling.

8.0 INTERRUPTIBLE ENERGY

Interruptible Energy (Non-Firm energy) is energy that the PSE has specified that it may be interrupted. The source Balancing Authority may interrupt the service by giving notice to the sink Adjacent Balancing Authority of the transaction.

As the Balancing Authority for an export Interruptible Energy schedule, BC Hydro has the right to curtail that schedule if the PSE delivering the export fails to meet its Contingency Reserve Obligation with BC Hydro.

To submit an Interruptible eTag:

1. Enter G-NF in the Market Path section in the Product Code drop-down List.
2. Enter the appropriate WECC reserve requirement – the reserve obligation multiplier should be set to 100%.

BC Hydro will deny the eTag if the above settings are not satisfied.

9.0 WHEELTHROUGH ENERGY

There are two approaches to schedule Wheelthrough energy:

- the PSE can submit one eTag that references a matching Wheelthrough CONFIRMED TSR; or
- the PSE can submit **one** eTag that references CONFIRMED import and export TSRs.

10.0 eTAG SUBMISSION TIMELINES

eTags should be submitted in accordance with the NAESB Timing Requirements for WECC. RFIs for one hour energy schedules shall be submitted no later than 20 minutes (XX:40) prior to the Start Time of one hour energy schedules.

Refer to BC Hydro's OATT Business Practices on *Processing of Energy Schedules* and *Intra-Hour Scheduling – Transmission & Energy* for additional energy schedule information and submission times for intra-hour eTags, respectively.

11.0 SUBMITTING MODIFICATIONS TO eTAGS

The Transmission Customer may request modifications to a PENDING, CONFIRMED or IMPLEMENTED eTag for non-reliability related issues according to the NAESB Interchange Timing Requirements for WECC.

1. For an IMPLEMENTED eTag, modifications cannot be made within the scheduling hour and only future hours may be modified.

2. A Correction can only be made to a PENDING eTag. Corrections can be made to:
    - POR and POD
    - Designated transmission reservation
    - Miscellaneous Information Value field on the Load or Generation Line
    - Product Code in the Market Path

3. An Adjustment can only be made to a CONFIRMED or IMPLEMENTED eTag. Adjustments can be made to:
    - Generating Profile
    - Transmission Profile
    - Extension to the energy profile (to include hours not previously specified). The PSE must ensure the necessary transmission capacity for the extension is provided on the eTag.

Refer to BC Hydro's OATT Business Practice on *Processing of Energy Schedules* for further information.

12.0 REAL POWER LOSSES

Pursuant to Section 15.7 of BC Hydro's Open Access Transmission Tariff (OATT), Real Power Losses are associated with all transmission service. The Transmission Customer is responsible for replacing losses associated with transmission service as calculated by BC Hydro in Rate Schedule 10. Refer to Ancilllary Services Business Practice for information on Losses.

Document Change History

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4	Updated industry language, to reflect expansion of dynamic scheduling service, & include EIM Scheduling.	October XX, 2017
3	Included references to Intra-Hour BP, simplified & updated current language, & corrected references & typographical errors.	December 30, 2013
2	Updated reference.	June 14, 2011
1	Updated procedures. Previously Business Practices 10 & 11.	December 1, 2010

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BC Hydro
Power smart

Open Access Transmission Tariff

Dynamic Scheduling Amendments Application

Appendix C

Draft Order

bcuc
British Columbia
Utilities Commission

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

ORDER NUMBER
G-xx-xx

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Hydro and Power Authority (BC Hydro)
Open Access Transmission Tariff (OATT)
Dynamic Scheduling Amendments Application

BEFORE:
Commissioner
Commissioner
Commissioner

on Date

ORDER

WHEREAS:

A. On April 14, 2005, the British Columbia Transmission Corporation (BCTC) filed an Application for Approval of Dynamic Scheduling Provisions of the OATT, which were approved, as Attachment O, on an interim basis through Commission Order No. G-37-05 and a permanent basis through Order No. G-12-06 dated February 2, 2006;

B. The Commission approved amendments to the dynamic scheduling provisions of the OATT, renamed as Attachment Q-1, on September 10, 2009 through Commission Order No. G-102-09;

C. The approved dynamic scheduling provisions of Attachment Q-1 were limited to dynamic scheduling on exports using Firm Point-To-Point Transmission Services (Firm Service) reservations only;

D. To facilitate its OATT transmission customer's participation in new and growing energy and capacity markets, BC Hydro believes that it is necessary to allow dynamic scheduling for both imports and exports using any transmission reservation priority;

E. BC Hydro consulted with its OATT transmission customers by way of a transmission bulletin posted on its transmission website on August 25, 2017 requesting feedback on proposed expansion of the dynamic scheduling provisions of the OATT and the need to hold a workshop, and requested feedback by September 15, 2017;

F. No comments were received by BC Hydro in response to the consultation bulletin;

.../2

G. On October 2, 2017, BC Hydro submitted its OATT Dynamic Scheduling Amendments Application (Application) pursuant to sections 59 to 61 of the *Utilities Commission Act*, seeking approval of Amendments to Attachment Q-1, Dynamic Scheduling:

   a. to allow for dynamic scheduling on imports, as well as exports as currently allowed;

   b. to allow dynamic scheduling on Firm Service, Non-Firm Point-To-Point Transmission Service (Non-Firm Service), and Network Integration Transmission Service (NITS), which includes Network Economy Service;

   c. to make changes of a housekeeping nature relating to the definition of terms, correction of typographical errors, simplification and clarification of the language;

H. BC Hydro requested Commission approval of the proposed amendments by January 31, 2018 to enable its subsidiary, Powerex Inc., to participate in parallel operations in advance of full participation in the California Independent System Operator's (CAISO) Energy imbalance Market (EIM) on April 4, 2018.

I. The Commission reviewed the Application and determines the proposed amendments to the OATT are just, and reasonable, and not unduly discriminatory or unduly preferential.

NOW THEREFORE the Commission orders as follows:

1. The proposed amendments to Attachment Q-1 of the OATT, as applied for in the Application dated October 2, 2017, are approved and are effective as of the date of this Order.

2. BC Hydro must notify Transmission Customers of this Order by way of a transmission bulletin posted to its transmission website within 15 days of the date of this Order.

3. BC Hydro must file amended OATT Tariff pages in accordance with the terms of this Order within 30 days of the date of this Order.

DATED at the City of Vancouver, in the Province of British Columbia, this (XX) day of (Month Year).

BY ORDER

(X. X. last name)
Commissioner

Attachment Options