

Draft

Issue Paper

A Proposal for a New Process for the Development of Loss Factors

1. Policy and Regulations

The Transmission Development Policy Paper provided clear direction to change the methodology used to calculate transmission loss factors. In particular it suggested that the new methodology should reflect a methodology that uses average losses as opposed to marginal losses. The Transmission Regulation provided further direction in Section 22:

“**22(1)** In accordance with the ISO tariff and the loss factors determined under this Part,

(a) The owner of a generating unit must pay location-based loss charges or receive credits;

(b) Importers of electric energy under a firm service arrangement must pay location-based loss charges or receive credits.

(2) A person receiving transmission service under an interruptible service arrangement for load, import or export must pay location-based loss charges that recover the full cost of losses required to provide this service.”

These sections of the regulation clearly differentiate between STS Service (Section 22(1) (a), firm import service (Section 22(1) (b), and interruptible load, import, and export service (Section 22(2) in the recovery of transmission losses. This discussion paper proposes and describes a process to calculate loss factors for each of these transmission services consistent with the Regulation.

2. Current Loss Factor Process

Generator Loss Factors

The AESO’s current loss factor calculation process uses twelve base cases which include the four climatic seasons and low, median and high load cases for each season. The twelve base cases include the forecasted import and export values. Therefore the current methodology does not provide a distinct separation in loss factors for domestic and inter-tie transactions.

Interruptible Import and Export Transmission Loss Factors

The AESO produces loss factors for interruptible imports and exports for each season. The base cases include on-peak and off-peak transfer curves using the data from the previous three months. The loss factors are calculated based on the 80th percentile of metered transfer level during that period. In the case of the Alberta/BC inter-tie, the calculation of losses is based on the power flow across 1201 Line (Langdon Station to the Alberta-BC inter-tie point). In the case of the Alberta/Saskatchewan inter-tie, the calculation is based on the power flow across the Fort McNeil Bus to the receiving bus at the McNeil Station. The losses incurred in the import or export transfer across these circuits determine the loss factors used for the current season.

The generators complain that the AESO is double dipping because:

- they pay for the incremental losses calculated for the export transaction,
- their generator is charged with the incremental losses associated with the increased output to meet the export requirement and
- the loss factor assigned to their generating unit(s) includes a portion of the forecasted export losses included in the twelve base cases.

3. Proposed Loss Factor Process

The proposed process described below would be independent of any loss factor methodology implemented by the AESO for 2006.

Generator Loss Factors

In the proposed process the AESO would use historical production data to determine the power level to be used for existing generators, and STS contract levels for new generating units in developing the twelve base cases for loss factors. Each base case contains its own dispatch order based on a common annual stacking order. The stacking order stays the same in each base case with respect to the order of dispatch, but the amount of power dispatched by each unit varies because of seasonal considerations. The AESO, through discussions with new generators, would add the new generator to the existing stacking order. Its power output would be based on its Incapability Factor. The Incapability Factor (ICBF) = 1 – Available Capacity Factor (ACF) is a standard used by the Canadian Electricity Association reflecting industry averages for each type of generation technology. If the new unit is an addition to an existing plant, then it will receive the same loss factor as the existing units. The base cases used to calculate the loss factors for the generators would all contain a zero value for the exchange across the inter-ties. Loss Factors calculated with inter-ties set to zero power flows reflect the losses associated with the supply of energy for domestic load. Commencing January, 2006 Loss Factors will be limited to a maximum charge of two times system average losses and credits will be limited to one times system average losses. This restriction is a directive of the Transmission Regulation (Section 19(2) (f)).

Opportunity Import/Export Loss Factors

Alberta's grid currently operates under constraints (which are to be reduced under Section 2(c) of the Transmission Regulation) with respect to exports and the market currently influences when imports are likely to occur on the system. Generally imports occur at peak load periods and exports occur at median and low load periods. To calculate the import or export loss factors for a particular season, the AESO would use the base cases as follows:

- the seasonal median and low load base cases for exports,
- the seasonal high load base case for imports.

When market conditions or system topology changes allow the import and export markets to realize transactions for all hours, the AESO would use the seasonal base cases (all three load cases) for calculating both import and export losses for opportunity service..

The proposal is that the AESO would calculate the total system losses based on increments of 50 or 100 MWs for both import and export transactions for each inter-tie. The stacking order would be used to decrease or increase the output of the Alberta generators (to balance load and generation) to meet the requirements of the transaction(s) across the inter-tie(s). The decrease/increase in total system losses with respect to the system losses calculated using the same base cases (with a zero exchange across the inter-ties), is the losses associated with the import or export transaction.

A loss factor can be determined for the import or export transaction by dividing the decrease or increase in system losses by the value of the import or export (in MWs). Loss Factors for opportunity export transactions are not subject to compression (i.e. their loss factors can exceed the loss factor envelope of three times system average losses). Opportunity import loss factors will be treated the same as firm service and will be compressed to comply with the loss factor envelope of three times system average losses. Import transactions must not result in perverse pricing signals; i.e. an import can not receive a larger credit than a generator in Alberta located at the border.

Demand Opportunity Service (DOS)

Loss Factors for DOS are calculated on a seasonal basis. The benchmark for seasonal system losses would be calculated based on the three base cases for each season with the inter-ties set to zero exchange. The losses associated with the DOS transaction would then be calculated for each season using the three base cases with the value of the DOS transaction added to each of the three seasonal base cases (high, median, and low load). Subtracting the benchmark system losses for each season from the respective system losses for each season with the DOS transaction equals the losses associated with DOS by season. Therefore the DOS Seasonal Loss Factor (%) would equal the DOS losses divided by the DOS transaction (MWs) for each respective season. DOS loss factors are

location based and are not subject to compression, i.e. DOS loss factors can exceed the loss factor envelope of two times system average losses for charges.

Merchant Transmission Lines

The loss factors for Merchant Lines connected to the Alberta grid would be calculated along with the loss factors for the generators. The twelve base cases used would contain zero exchange across each inter-tie. Exports would be modeled as a negative generator and imports would be modeled as a generator. The loss factors would be location based. Depending whether the line is exporting or importing, the merchant line would receive a charge or possibly a credit. If the merchant line has a mid-terminus within Alberta, it would be treated the same as the end of the line (terminus), i.e. imports as generators and exports as loads. Since activity on the merchant facility may be influenced by external market conditions such as the north-west snow pack, the AESO would use a look up table with increments of power (MWs) with loss factors for each range of load or supply.