

Information Document

Automatic Time Error Correction Formula

ID #2016-003RS



Information Documents are not authoritative. Information Documents are for information purposes only and are intended to provide guidance. In the event of any discrepancy between an Information Document and any Authoritative Document(s) in effect, the Authoritative Document(s) governs.

1 Purpose

This Information Document relates to the following Authoritative Document¹: BAL-004-WECC-AB-2, *Automatic Time Error Correction*. The purpose of this Information Document is to provide the formula that is used to calculate automatic time error correction.

2 Automatic Time Error Correction Formula

Automatic time error correction is only applicable in the western interconnection. Automatic time error correction is calculated using the following formula:

$$I_{ATEC} = \frac{PII_{accum}^{on/off\ peak}}{(1-Y)*H}$$
 when operating in automatic time error correction mode. The absolute value of I_{ATEC} shall not exceed L_{max} .

I_{ATEC} shall be zero when operating in any other automatic generation control (AGC) mode.

The variables referenced in the discussion of the automatic time error calculation formula are defined below.

- L_{max} is the maximum value allowed for I_{ATEC} set by each balancing authority between $0.2*|B_i|$ and L_{10} , $0.2*|B_i| \leq L_{max} \leq L_{10}$
- $L_{10} = 1.65 * \epsilon_{10} \sqrt{(-10B_i)(-10B_S)}$.
 - ϵ_{10} is a constant derived from the targeted frequency bound. It is the targeted root-mean-square (RMS) value of ten-minute average frequency error based on frequency performance over a given year. The bound, ϵ_{10} , is the same for every balancing authority area within an Interconnection.
- $Y = B_i / B_S$.
 - B_i = frequency bias setting for the balancing authority area (MW / 0.1 Hz).
 - B_S = Sum of the minimum frequency bias settings for the Interconnection (MW / 0.1 Hz).
- H = Number of hours used to payback primary inadvertent interchange energy. The value of H is set to 3.
 - primary inadvertent interchange (PII_{hourly}) is $(1-Y) * (II_{actual} - B_i * \Delta TE/6)$.
 - II_{actual} is the hourly inadvertent interchange for the last hour.
 - ΔTE is the hourly change in system time error as distributed by the Interconnection time monitor, where: $\Delta TE = TE_{end\ hour} - TE_{begin\ hour} - TD_{adj} - (t)*(TE_{offset})$
 - TD_{adj} is the reliability coordinator adjustment for differences with Interconnection time monitor control centre clocks.

¹ "Authoritative Documents" is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and regulations, and that contain binding legal requirements for either market participants or the AESO, or both. AESO Authoritative Documents include: the ISO rules, the Alberta reliability standards, and the ISO tariff.

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- t is the number of minutes of manual time error correction that occurred during the hour.
- TE_{offset} is 0.000 or +0.020 or -0.020.
- PII_{accum} is the balancing authority area's accumulated PII_{hourly} in MWh. An on peak and off peak accumulation accounting is required, where:

$$PII_{\text{accum}}^{\text{on/offpeak}} = \text{last period's } PII_{\text{accum}}^{\text{on/offpeak}} + PII_{\text{hourly}}$$

Revision History

Posting Date	Description of Changes
2017-01-24	Initial release