

WECC Auto Time Error Correction Analysis

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Simulations Performed

- Created a 4 BA Interconnection
- Assumed a Single Error for BA 4
- Simulated WATEC
- Simulated TEC followed by Bilateral Inadvertent Interchange (II) Payback
- Simulated Concurrent TEC and Bilateral II Payback
- Compared Results of 3 Simulations

Simulation & Results

- **Simulation & Results Contained in Time Error Simulation.xls**
- **Discussion and Conclusions in WECC Auto Time Error Correction Analysis Technical Paper**
- **Conclusions Address**
 - ◆ **WATEC Methodology – Not Reviewed**
 - ◆ **General II Settlement**

General Conclusions

- Unilateral II Payback is Unplanned
 - ◆ “Regulating Margin & Reserves” **used**
- Bilateral II Payback is Planned
 - ◆ “Regulating Margins & Reserves” **not used**
- Financial II Settlement is Similar to Bilateral II Payback
 - ◆ “Regulating Margins & Reserves” **not used**

Additional Insights

➤ II Financial Settlement:

- ◆ Reduces Operating Uncertainty
- ◆ Eliminates Value (Price) Difference between Creation and Payback In-Kind
- ◆ Subject to Value (Price) Estimate Error
- ◆ Reduces Financial Settlement Error when Value (Price) Difference between Creation and Payback is greater than the Value (Price) Estimate Error

Results Support FCC

- **WATEC Uses Additional “Regulating Margin & Reserves” for both the initial control error and the error correction.**
- **Any Control Error or Unilateral Payback that Contributes to Frequency Error Uses “Regulating Margin & Reserves”**
- **FCC Provides a Means to Compensate for This Additional Use of “Regulating Margin & Reserves”**

Simulated FCC Settlement

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Simulation Performed

- **Compiled II Data for 16 BA on the Western Interconnection**
- **Created 17th BA to Simulate Total Interconnection**
- **Assumed FCC Value at \$.10 / MW Hz**
- **Used Frequency Data to Calculate Value of II for Each Hour**
- **Calculated FCC Settlement Values for Each BA for Each Hour**

Simulation & Results

- **Simulation & Results Contained in WestSettlement.xls**
- **Discussion and Conclusions in NWPP Inadvertent Interchange Settlement Example Technical Paper**
- **Simulation Results Provide an Example of the Financial Effect of Using FCC in Settlement**

General Conclusions

- **FCC Compensation is Significant**
- **FCC Compensation Always Rewards Good Frequency Control**
- **FCC Compensation Always Sums to Zero Across the Interconnection**

Inadvertent Dead-band Discussion

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Energy Domain Dead-band

➤ Background

- ◆ L_{10} Derived for ACE
 - ◆ Area Interchange Error (AIE) is Hourly ACE Equivalent
 - ◆ II and AIE Origin Differs
- Is it valid to apply L_{10} to II for the purpose of setting a dead-band?

L₁₀ versus L₆₀

➤ **Background**

- ◆ **L₁₀ Derived for 10-minute Intervals**
 - ◆ **It is an Hourly Measure**
 - ◆ **Eastern Interconnection $\epsilon_{10} = 0.0057$**
 - ◆ **Eastern Interconnection $\epsilon_{60} = 0.0023$**
- **Is the correct basis for an II dead-band L₁₀ or L₆₀, about 40% of L₁₀?**

Frequency Dead-band

➤ Background

- ◆ ECAR Used Frequency Dead-band
 - ◆ Frequency Selects All or No BAs
 - ◆ Frequency Insures Energy Balance
- How does a frequency dead-band affect the settlement process?

Value (Price) Dead-band

➤ Background

- ◆ Value (Price) a Primary Variable
 - ◆ Larger Values - Greater Financial Impact
 - ◆ Financial Impact = Difference between Two Values (Prices), Control Error Value (Price) minus Payback Value (Price)
- How can a dead-band be applied to a value (price) difference?

Dead-band Complexity

➤ Background

- ◆ Requires Two Settlement Methods
 - ◆ Only Frequency Assures Counter Party
 - ◆ Energy Requires Method to Manage Lack of Counter Party for Settlement
- How is the additional settlement complexity of a dead-band justified?

Dead-band Counter Party

➤ Assumptions:

- ◆ Four BA Interconnection

- ◆ II Totals for an hour

 - BA 1 = -7; BA 2 = -3; BA 3 = 4; BA 4 = 6

- ◆ Select a dead-band that excludes a BA

➤ Conclusion: There is no dead-band that can be selected that enables all energy to be settled using payback-in-kind.

FCC Dead-band

- Should Dead-band Issues be Investigated for the FCC Settlement Process as well as for the Energy Settlement Process?

Recommendation

- **The Design of the II Settlement Process should be Completed Before a Frequency Domain Dead-band is Investigated for its Impact on the Quality and Complexity of the FCC and Energy Settlement Processes.**

Questions

