Joint and Common Market

PARALLEL FLOW VISUALIZATION

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Issue Review

Purpose: An introduction to Parallel Flow Visualization and the updates to the NAESB standards that enact it

Key Takeaways:

- Deficiencies exist in how TLR relief obligations are calculated
  - Calculation relies on a mix of static and real-time information
  - Outside of the market flows submitted by the Market-Based Operating Entities within the Congestion Management Process, current rules assume all generation serving load is using Firm Transmission Service
- PFV Enhances TLR relief obligation calculations
  - Assigns a specific curtailment priority of each generator based on expanded electronic tagging or a transmission service provider's tariff
  - Requires all Balancing Authorities to submit real-time state estimator data to a common powerflow model

Overview

- Introduction and Background
- Parallel Flow Visualization
- PFV, MISO, and PJM
- Summary

Acronyms

TLR – Transmission Loading Relief
CMP – Congestion Management Process
FFE - Firm Flow Entitlement
FFL – Firm Flow Limit
TLR – Transmission Loading Relief
HBAA – Historical Balancing Authority Area
TSR – Transmission Service Reservation
CMR – Congestion Management Resource
BAA – Balancing Authority Area
GTL – Generation-to-Load
PTP – Point-to-Point

INTRODUCTION AND BACKGROUND

Review – Interregional Congestion Management

- Reliability Coordinators (RC) use Flowgates to allow neighboring RCs to re-dispatch impacting neighboring generation
- Prioritization of flows (Firm vs Non-Firm)
- Two Primary congestion management mechanisms
  - **Transmission Loading Relief (TLR)**
    - Generation or Interchange Transactions (Tags) above a ‘Curtailment Threshold’ can be re-dispatched or ‘cut’ to provide relief on a Flowgate
  - **Market-to-Market (M2M)**
    - Economic re-dispatch includes all generation as an input to its solution to provide relief on a Flowgate
    - Financial payments made after the fact to compensate for ‘overuse’

Review – Interregional Congestion Management

Transmission Loading Relief (TLR)

- NERC standard procedure in place since 1990's (Now IRO-006-EAST) addresses reliability
- NAESB WEQ-008 standard addresses equitability
- Ensures interregional reliability for the Eastern Interconnection
- Administered by RCs through the Interchange Distribution Calculator (IDC)

Congestion Management Process (CMP)

- Attachment II of MISO-PJM JOA, PJM-TVA JRCA, MISO-SPP JOA, etc.
- A mechanism introduced in 2004 to facilitate market integrations, and their impact on TLR by introducing firm and non-firm Market Flow distinctions

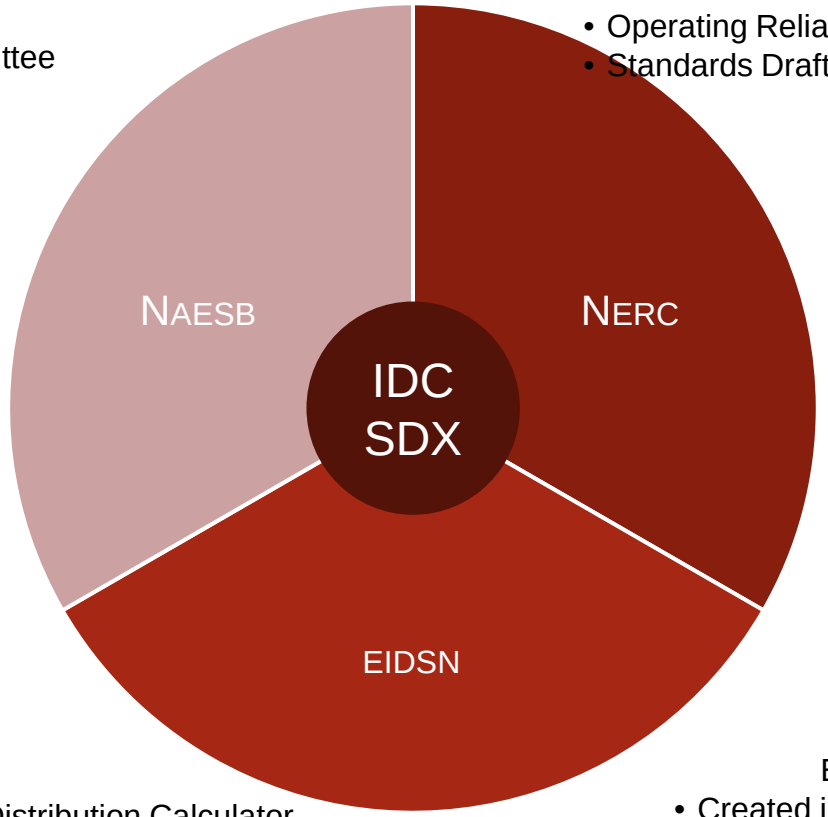
Market-to-Market (M2M) Coordination

- Has existed between MISO and PJM since 2005
- Coordinates Locational Marginal Pricing (LMP) based congestion management between two bid-based market entities
- Built upon the rules created by the CMP

Implementing TLR: Primary Players

NAESB
- Executive Committee
- BPS
- OASIS Subcommittee
- JESS

NERC
- Standards Committee
- Operating Reliability Subcommittee
- Standards Drafting Teams



IDC - Interchange Distribution Calculator
SDX - System Data eXchange

EIDSN
- Created in January 2014
- **IDC Working Group**

IDCWG Reliability Coordinator Representation

The Interchange Distribution Calculator Working Group (IDCWG)

Background – Parallel Flow Visualization

Beginnings of PFV

- Starting in 2006, PFV adopts similar aspects of the EMS based calculations originally constructed in the CMP
- Creation of PFV standards started under the NERC, but commercial aspects ultimately fell under the scope of the NAESB
- Initial scope had an 18-month field trial originally scheduled to begin in 2010.

Recent History (2013-2019)

- A whitepaper, and 8 status updates filed with the FERC by the NAESB
- Responsibility for PFV shifted with the governing bodies overseeing the IDCWG - NERC, the IDC Association, and the Eastern Interconnection Data Sharing Network (EIDSN)
- 20 Month Field trial started in September 2017, ending in May 2019

Regulatory Activity in 2020

- March 30th, 2020 - NAESB notifies the FERC that new standards (v3.3) exist, including changes to WEQ-008 Transmission Loading Relief that include PFV functionality
- July 16th 2020 - The FERC issues a NOPR on the NAESB v3.3 standards
- November 4th 2020 – The ISO/RTO Council files comments on behalf of MISO and PJM

PARALLEL FLOW VISUALIZATION

PFV Prognosis

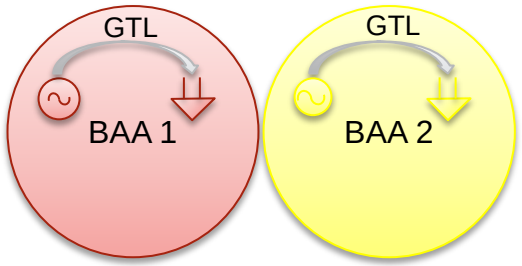
- The IDCWG is aiming to be operationally ready with PFV by May 1, 2021
- However, PFV will likely go-live 12-18 months from final FERC order per the NOPR

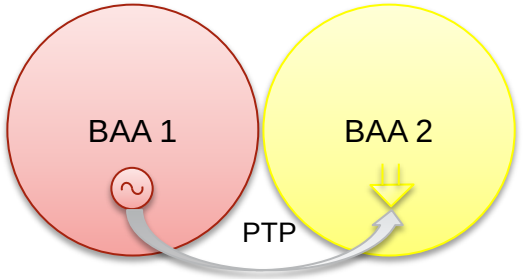
PFV Benefits

- Accuracy
  - Uses near real-time data (generation, zonal load, etc.) provided by each RC
  - Uncovers the reality of cross-border system use

- Equitability
  - Assigns generation-to-load into more appropriate categories

PFV Impact Components





Generation-To-Load (GTL)

Interchange Transactions (PTP)

PFV – Setting GTL Priorities

- Two ways to establish the transmission priority of a generator(s)

Tagged Secondary Non-Firm

- Allows non-firm generation-to-load to be represented by Intra-BA e-tags

Generator Priority Schedules

- Each generator's priority is set according to the Transmission Providers OATT

Relief Obligation and Credit For Redispatch

- Under TLR level 3 and higher a BA may redispatch its system to meet the target GTL flow, which is the difference between the net GTL flow (net of the forward and reverse impacts) and the IDC calculated relief obligation

- Meeting the target GTL flow may be accomplished by redispatching any generation that may either reduce forward flows or increase reverse flows

- The IDC will determine if a Credit for the Redispatch was accomplished from the start of the redispatch time. If so, the Credit for Redispatch will be applied to the next hour relief obligation calculation by the IDC and will not result in a double counting of non-firm impacts.

Pseudo-Ties

- PFV provides a clear path for consistent modeling of Pseudo-Ties under two general approaches:
  - Tagged Pseudo-Ties using Pseudo-BAs (PTP)
  - Attaining BA includes IDC base-case modeling (GTL)

PFV, MISO, AND PJM

CMP Firm Flow Limit Overrides

- The CMP will still determine how much flow is firm and non-firm on Flowgates covered under the agreement

- Each CMP party will submit firm (FFL) overrides to the IDC, which will be used to quantify firm and non-firm PFV GTL

Review: Coordination Today

TLR

- Market Flow - Calculated to respect HBAA boundaries
- FFL - Calculated to respect HBAA boundaries

Same Calculation

Market-to-Market

- Market Flow - Calculated to respect HBAA boundaries
- FFE - Calculated to respect HBAA boundaries

Review: Coordination Tomorrow

TLR

- GTL – Calculated by the IDC once Parallel Flow Visualization (PFV) goes live
- FFL – Status quo, ongoing discussion

Different Calculation

Market-to-Market

- Market Flow - Calculated at the current BAA/Market boundary
- FFE – Reconciles pre-integration (HBAA) and post-integration (BAA/Market) boundaries

What Determines Firm and Non-Firm Flows for TLR

Current

Entity Type	Real-time GTL	Firm & Non-Firm
Market Based	CMP (Market Flow)	CMP (FFL)
Non-Market Based	NAESB (IDC NNL)	All Firm (Default)

After PFV

Entity Type	Real-time GTL	Firm & Non-Firm
Market Based	NAESB (PFV)	CMP (FFL Overrides)
Non-Market Based	NAESB (PFV)	NAESB (PFV)

NAESB WEQ-008 still allows for overrides on Flowgates covered under a seams agreement (i.e. the CMP)

Summary

- PFV has many benefits, and is a long awaited step forward for the industry in achieving equitable congestion management
- MISO and PJM are accommodating PFV by complying with the NAESB standards, and modifying the CMP for compatibility
- More to come on PFV in the near future

Contacts

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