Understanding Transmission Seams Issues

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Key Terms & Context

• Transmission Seam: interconnection(s) between neighboring transmission systems.
  – e.g., RTO-to-RTO, RTO-to-non-market, Non-market-to-non-market.

• Seams Issues: barriers to sharing or trading between systems (e.g., wholesale markets), for example, due to different market rules and procedures.

• Today’s presentation provides a general overview of some of these issues.

• National Transmission Planning (NTP) study initiative will be publishing a report, “Barriers and Opportunities to Increase the System Value of Interregional Transmission” ~ June 2024. Deeper dive into these and other issues.
Why care about efficient use of existing (or new) interregional transmission?

• Interregional transmission has several potential benefits:

  – **Avoid Capital Costs** – e.g., avoided generation capacity investments, access to lower cost generation, access to policy incentives (e.g., ITC).

  – **Avoid Operating Costs** – e.g., avoided variable costs for fuel/cycling, reduced transmission losses, access to policy incentives (e.g., PTC).

  – **Contribute to Reliability** – e.g., reduce loss-of-load probability, reduced cost of meeting resource adequacy or ancillary service requirements.

  – **Contribute to Resiliency** – e.g., reduced severity/duration of outages, mitigation of weather/load uncertainty, reduced outages during extreme weather events.
• **Emergency sharing (operational):** Often, neighboring systems have agreements in place that dictate terms and conditions for emergency sharing of energy resources.

• **Economic trading (operational):** Ideally, surplus lower-priced power could flow between systems to higher-priced areas, reducing costs for consumers.

• **Resource adequacy (planning):** Reliance on external resources for meeting reserve margin planning requirements for reliability.
Example Barriers Explored Today

- Market-to-Market Program Inefficiencies
- Extreme Weather Scenarios
- External Resource Adequacy Resources
- Reliance on Bilateral Trading
Market-to-Market Program Inefficiencies

• Typically occur between RTO/ISOs markets, aided by programs established in joint operating agreements (JOAs).

• Examples of these programs:
  – **Coordinated Transaction Scheduling** – meant to facilitate economic trading between markets.
  – **Market-to-Market Congestion Management** – meant to manage congestion on key interconnections (called flowgates) that have the potential to impact each other’s systems.
Coordinated Transaction Scheduling (CTS)

• In simplistic terms, CTS is a market-based platform where market participants can submit bids/offers to import or export power based on price difference between areas.
  – Allows market participants the opportunity to profit from arbitrage.

• CTS is generally seen as an improvement compared to having no interchange scheduling method. (MISO/PJM, PJM/NYISO, NYISO/ISO-NE, SPP/MISO)

• In practice, there may be challenges with these programs, for example:
  – High transaction fees
  – Poor price forecasting
  – Proxy pricing points
Coordinated Transaction Scheduling

• **High transaction fees**: Wide range of potential charges can be imposed on transactions, depending on the area. These charges can reduce the arbitrage opportunity and reduce trading interest.

• **Poor price forecasting**: Price differences between areas may be based on *forecasted* price differences. Real-time prices are extremely volatile and difficult to predict.

• **Proxy pricing points**: Interchange transactions may be priced on proxy interfaces that may be different from where the power is physically injected. This creates the potential for loop flows (power flowing in-and-out of systems), which is difficult to control and can damage equipment.
Large Power Transfers in Extreme Weather Scenarios

• Extreme weather can cause situations (e.g., unplanned generator outages, above normal peak loads) where **large, unplanned power transfers** are needed to maintain reliability.

• These large transfers can result in **atypical transmission constraints** from **abnormal power flows**.

• **Lack of operational awareness** about new constraints, **internal congestion** can reduce opportunities to transfer power when needed.
Different stakeholders have comparably greater or less tolerance for long-distance deliverability of external resource adequacy resources.

For example, accessing capacity in wind-rich areas could lower costs, but also could create deliverability uncertainty.

FERC has approved stringent (e.g., PJM pseudo-tie) and flexible (e.g., western resource adequacy program) approaches to external resources contributing to resource adequacy.
Areas Reliant on Bilateral Trading

• Non-market areas

• Bilateral trading has benefits, but also drawbacks. Historic issues with:
  – Rate pancaking
  – Trade friction
  – Limited real-time options
  – Potential more expensive resources

• Lack of transparency to detect issues
Solution Options Overview

Common Actions
- Develop a framework for resource adequacy sharing among regions
- Support joint studies to identify transfer needs during extreme events and develop operational procedures to mitigate issues.
- Evaluate internal transmission system ability to accommodate large power transfers as the underlying generation mix changes

Non-Market and Hybrid Actions
- Implement coordinated scheduling and operations platforms or consolidation
- Pursue joint congestion management programs and re-evaluate qualified paths for congestion management
- Develop consistent methods to calculate available transfer capacity
- Update processes to prioritize system reliability in scheduling market and wheeling transactions

Market Actions
- Eliminate fees and improve price forecasting for coordinated transaction scheduling or move towards intertie optimization
- Update corridor flow limits, automate procedures, and align assumption for congestion management programs
- Revise interface pricing methods and validate interregional transactions
- Place operational control of merchant HVDC lines with regional market operators

Transformative Actions
- Conduct long-range, nation-wide interregional transmission planning
- Implement interconnection-wide intertie optimization
- Establish a national system operator and planner to coordinate national network planning, scheduling, and resource adequacy functions
General Observations

- Technically **complicated** issues.

- Potentially **difficult stakeholder dynamics**. Solutions have the potential to create **winners and losers**.

- Changing system needs and characteristics (e.g., generation mix, load patterns, extreme weather) may impact these barriers/solution options. This **report examines the past**.

- Some **evolving innovations** too.
Forthcoming NTP Study

“Barriers and Opportunities to Increase the System Value of Interregional Transmission”

• Identifies potential symptoms of barriers.

• Describes common barriers and barriers in market, non-market, and hybrid (market to non-market).

• Provides information on potential solution options that have been proposed.

• Highlights transformative solution concepts.
Thank you. Questions?

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