

Designing Hedging Instruments for Locational Price Risk: Lessons from North America

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Complementing Locational Marginal Pricing with Financial Transmission Rights

- North American LMP introduction starting in 1998 (in PJM)
 - Security-constrained economic dispatch
- LMP has always been complemented with discussions on:
 - How to distribute congestion revenue?
 - How to hedge locational price risks?
- Accompanying features:
 - Load only exposed to zonal average price
 - FTRs that address multiple objectives
 - Auction Revenue Rights (ARRs) in some ISOs

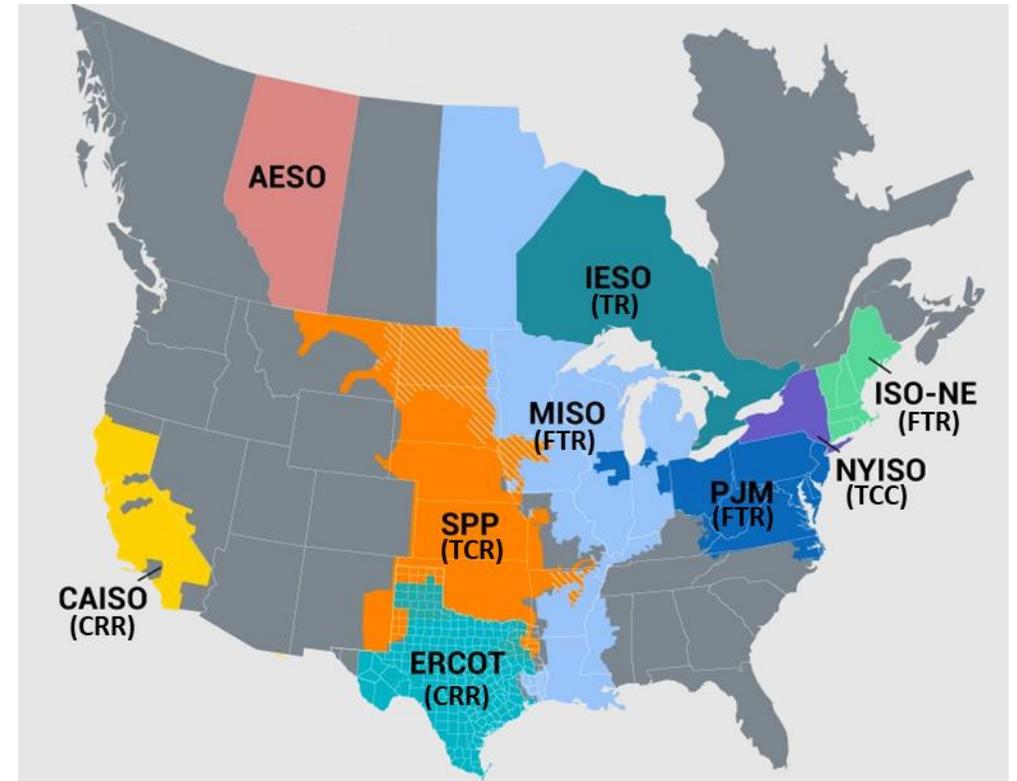


Fig 1: North American ISO Regions

Source: ISO/RTO Council ([link](#)); own addition of instrument name

Introduction to Financial Transmission Rights

- FTRs are financial instruments
 - Entitle holders to revenue (or charges) from hourly DA congestion price difference
 - Specified on a source-to-sink pair and per MW
- Main actors are:
 - Load serving entities
 - Financial participants
 - Electricity generators
- Multiple objectives of FTRs

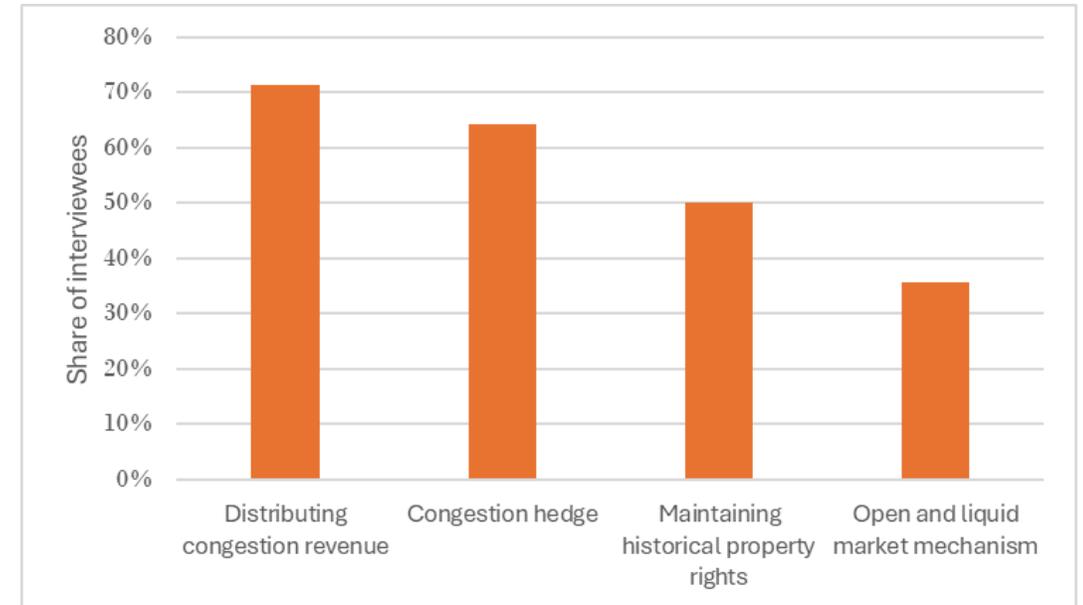


Fig. 2: Primary Objective of Financial Transmission Rights. N=14 interview partners

Identified Challenges with Financial Transmission Rights

- In general, respondents reported positive experiences with FTRs
- Challenges in the design details are continuously being addressed by regulation, and tariff changes through stakeholder process
- North American experience offers guidelines but no specific blueprint for Europe. Context matters:
 - Level of retail competition
 - Renewable energy penetration
 - LMP exposure for load

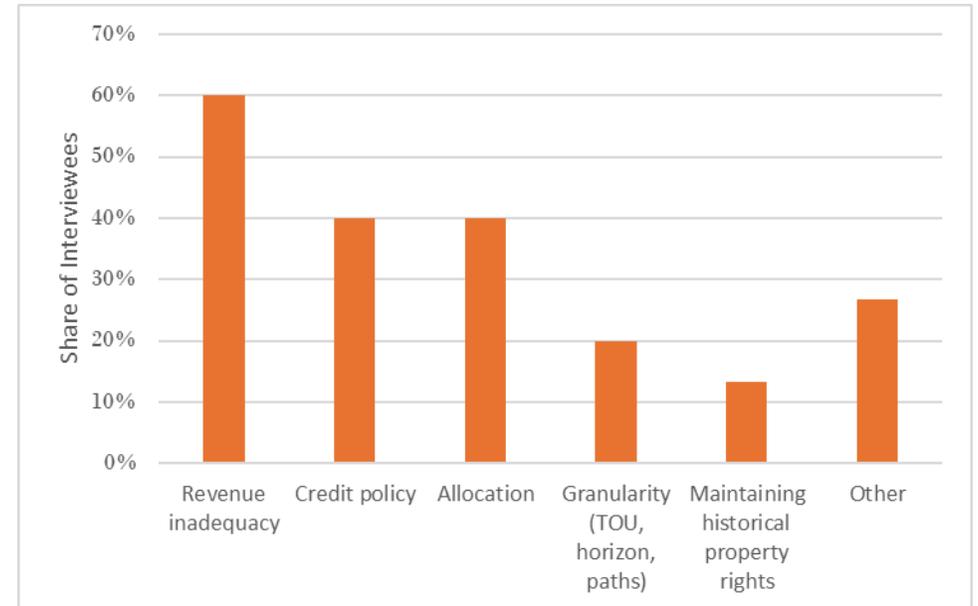


Fig. 3: Main Reported Challenges with Financial Transmission Rights. N=15 interview partners