

**30th ANNUAL  
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***Cost Allocation Developments  
for Network Upgrades in  
RTOs/ISOs***

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# Discussion Topics:

- **Network Upgrade Background**
- **Varying RTO Approaches:**
  - Midwest ISO
  - ISO-New England
  - PJM Interconnection, L.L.C.
  - California ISO
- **Observations**

# Background:

## Network Upgrades

- **Interstate transmission systems operated by regional transmission entities (“RTOs/ISOs”) generally consist of high-voltage (above 69kV) transmission facilities operated in a “network” fashion.**
  - Electricity, unlike natural gas or water, is transmitted at the speed of light throughout a transmission grid based upon Kirchhoff's law of least impedance.
  - Although D/C electricity (from a battery) can be directed down a line, A/C electricity in an electricity grid does not follow a “contract path.”
  - Transmission upgrades can have widespread reliability benefits due to relieving inherent “congestion” and “loop flow” problems.

# Background: High-Voltage Facilities



Distribution Facilities:  
Low-voltage



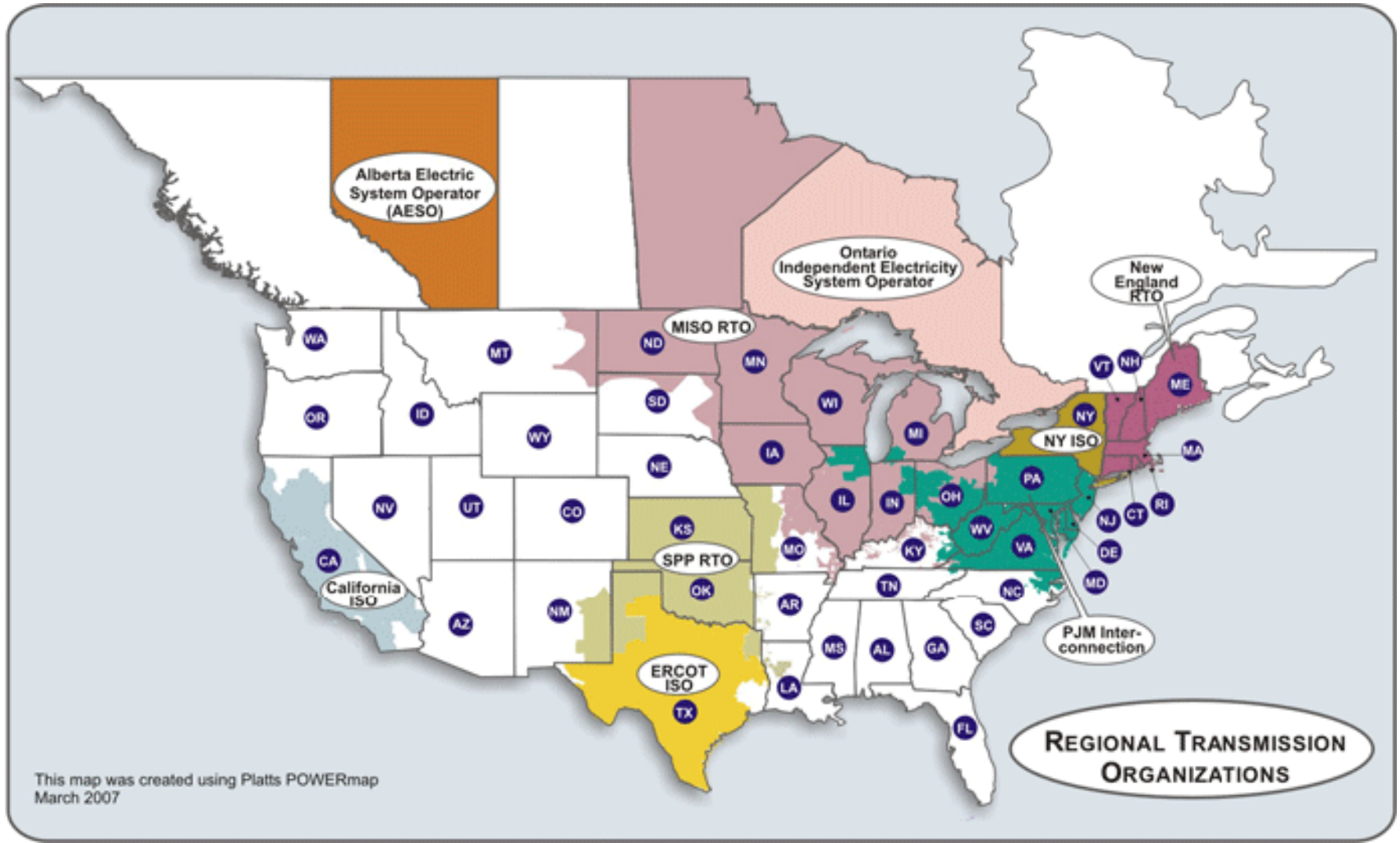
Transmission Facilities:  
Higher-voltage

# Background:

## Network Upgrades

- **Network Upgrades that benefit a transmission system depend upon the location and configuration of the Upgrade.**
  - In some cases, radial higher-voltage facilities, may be similar to distribution facilities benefiting a defined load.
  - Lower voltage facilities, in some cases, may improve Network reliability by resolving constraints or being associated with higher-voltage facilities.
- **RTOs/ISOs must attempt to equitably allocate the costs of Network Upgrades to the parties that benefit in order to encourage investment in transmission facilities to meet growing demand.**

# Background: RTOs/ISOs



# Background: Reliability vs. Economic Network Upgrades

- **RTOs/ISOs have focused on differentiating between Reliability and Economic Network Upgrades:**
  - Reliability Network Upgrades are those that are required to maintain reliable transmission service.
  - Economic Network Upgrades are those that may reduce the costs of transmission and provide economic benefits, but are not mandated by reliability concerns.
- **Given inevitable growth in demand, some have argued that every Economic Network Upgrade will someday become a Reliability Network Upgrade.**

# Background: Postage Stamp vs. License Plate Cost allocation

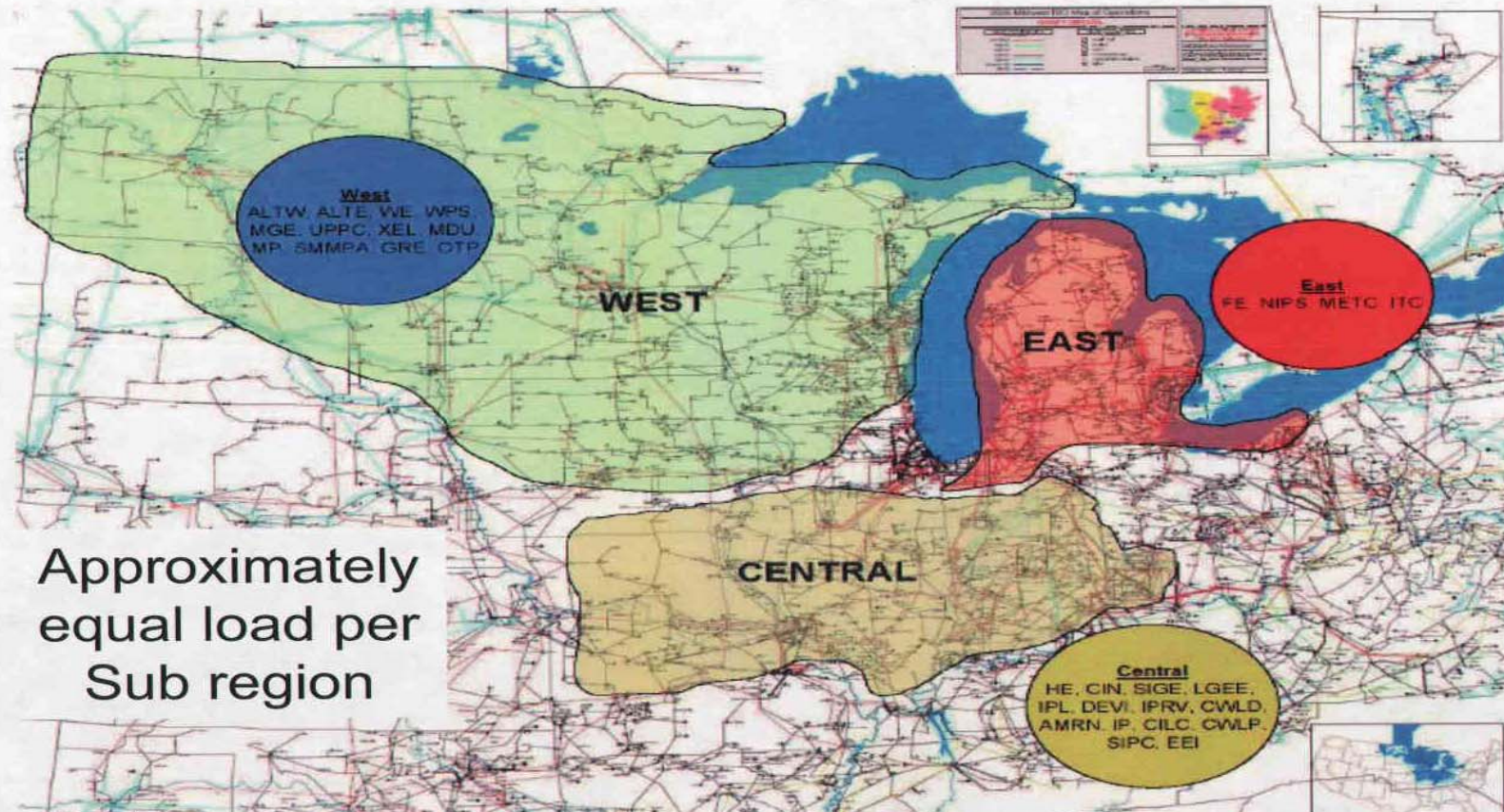
How does an RTO equitably allocate the costs for new Network Upgrades that benefit multiple parties?

- Under a “license plate” rate design, the costs of existing transmission facilities in a particular zone are divided among its load in such zone; customers pay for such service based on the zone(s) in which their loads are located.
- Under a “postage-stamp” rate design the costs of all existing transmission facilities in a large region are “rolled-in” and allocated to all customers according to each customer’s share of the region’s load.

# Background: Regional Cost Allocations

Sub regions

Existing Planning Sub regions



# Background: Incorporating State Views

- RTOs recognize that state utility commissions have a vital role in assuring safe, reliable and efficient wholesale electricity service.
- RTOs consider stakeholder input from organizations representing multiple states:
  - The Organization of Midwest ISO States (“OMS”)
  - Organization of PJM States, Inc. (“OPSI”)
  - The New England Conference of Public Utilities Commissioners, Inc. (“NECPUC”)

# Example: OMS Input into Midwest ISO Network Upgrades

- In December of 2003, the OMS issued Principles for Allocating Transmission Upgrade Costs to propose equitable cost allocation for Generation Interconnections and other Network Upgrades.
- The Midwest ISO studied these Principles and worked with the OMS and its other stakeholders to draft a proposal for Reliability Network Upgrades that was filed with FERC on 10/7/05; it was approved by FERC on 2/3/06.
- The Midwest ISO continued to work with the OMS on cost allocation for Economic Network upgrades, and a compromise proposal was conditionally approved by FERC on 3/15/07.

# OMS: Regional Expansion Principles

1. The cost allocation policy should be designed so that MISO can satisfy the requirements of FERC's Order 2003 [regarding equitable Generation Interconnections].
2. The cost allocation policy should send "appropriate signals to generators" to efficiently locate their plants on the grid.
3. The cost allocation policy should reflect the classic principles of "cost causers should be cost bearers" and "he who benefits should pay."

# OMS: Regional Expansion Principles (cont.)

4. The cost allocation policy's inherent incentives or disincentives to construct network improvements should be made "transparent."
5. The cost allocation policy should be designed to work well within the Midwest ISO's set of general network facility upgrade cost allocation policies (*e.g.*, reliability, load growth or congestion relief driven).
6. The cost allocation policy "should not unnecessarily conflict" with the various transmission company business models (*e.g.*, vertically integrated, stand-alone affiliated, independent, or merchant) employed within the Midwest ISO's footprint.

# Midwest ISO: Reliability Network Upgrade Projects

- 80% of the costs of Baseline Reliability Projects (“BRP”) allocated to the zone that benefits; 20% of costs allocated to all zones, for Network Upgrades of a 345 kV and higher voltage class.
- Costs allocated on a Line Outage Distribution Factor (“LODF”) for each existing transmission branch in the Transmission System, after the addition of the required Network Upgrade.
- Interconnection Customers responsible for 50% of the costs of required Network Resource Upgrades; Interconnection Customers eligible to receive FTRs made feasible by the capability created by the Network Upgrade.

# Midwest ISO: Reliability Network Upgrade Projects (cont.)

- FERC approved a proposed “Excluded Projects List” based on the planned projects being in the Midwest ISO’s existing 2005 Transmission Expansion Plan (“MTEP 05”).
- Generator Interconnection agreements filed on or after February 5, 2006 must conform to Attachment FF.
- FERC issued an Order on Rehearing on 3/15/07 confirming acceptance of the BRP proposal.

# Midwest ISO: Economic Network Upgrade Projects

## 1. Midwest Transmission Expansion Project (“MTEP”) Identification:

- a. MTEP will identify BRPs needed for reliability by applying ERO Planning Criteria
- b. MTEP will also identify RBPs in addition to BRPs, by screening and reviewing projects for value, and testing benefits against specified economic criteria for inclusion in MTEP as RBPs (“Inclusion Criteria”).
- c. Projects that are identified as RBPs will apply the cost allocation applicable to RBPs notwithstanding the fact that there may be reliability benefits also identified for such projects.
- d. BRPs will not be delayed due to incomplete analyses of a project for economic benefits.

# Midwest ISO: Inclusion Criteria

## 2. Inclusion Criteria (Benefit Metrics to determine if a RBP is included in MTEP for construction and cost sharing) will include multiple metrics:

a. Weighted Gain/No Loss ("WGNL") =  $\Sigma$  (70% APC sub region i + 30% Load LMP Payments sub region i )

- "APC" = Adjusted Production Cost, adjusted for changes in cost of purchases and sales of electricity
- Load LMP Payments calculated as (Load LMP times Load) sub region i

b. Net savings from both  $\Sigma$  APC and  $\Sigma$  Load LMP must  $>0$  for all zones in aggregate for the Project to be included in MTEP subject to cost sharing

## Midwest ISO: Inclusion Criteria (cont.)

- c. Total benefit determined by summing calculated WGNL benefit only for sub regions for which both  $\Sigma \text{ APC} > 0$  and  $\Sigma \text{ Load LMP} > 0$ .
- d. Midwest ISO next uses a threshold Benefit/Cost ratio ("B/C") that is a linear function of service date year referenced from the year of the approved MTEP report identifying the need for the project.
  - The minimum threshold B/C ratio will begin at 1.2:1 for in-service dates one year from MTEP report, and increase linearly to 3.0:1 at year 10.

# Midwest ISO: Project Thresholds

## 3. Thresholds for Designation and for Regional Cost Allocation of RBPs:

- a. 345 kV voltage cutoff for allocation of economic benefits
  - b. A materiality \$5M cutoff for project cost for allocation
  - c. Inclusion Criteria is met
4. Projects that do not meet the thresholds and criteria for Midwest ISO-wide cost sharing as a RBP, may still be endorsed by Midwest ISO for localized cost recovery under Attachment O of the Midwest ISO Tariff, on the basis of localized benefit, where review of such localized benefit analyses indicates value.

# Midwest ISO: Consideration of Other Metrics

5. Midwest ISO staff will continue to evaluate and explore with owners and stakeholders additional transmission infrastructure value drivers (and methods for evaluation and articulation of these value drivers) and adjust Inclusion Criteria for transmission projects from time to time. Additional eligible metrics will include quantifiable economic effects to include, but not be limited to:
  - 1) Generation Reserve Capacity Value of Transmission
  - 2) Societal benefits of economic development
  - 3) Shareholder value of asset investment and utilization
  - 4) National security value of a less vulnerable infrastructure

# Midwest ISO: Monitoring

**6. Midwest ISO will monitor effects of B/C threshold, Include Criteria metrics, and the allocation method for any unduly discriminatory consequences.**

A) Midwest ISO will file a report of process, and any proposed modifications to the tariff, within 3 years of an initial FERC approved Order regarding cost treatment of RBPs.

B) Midwest ISO will seek modifications of metrics where new metrics are measurable and reproducible, and after vetting such proposed changes with the Planning Advisory Committee and the OMS.

# Midwest ISO: Cost Allocation

## 7. Allocation Metric for RBPs

- a. 20% Postage Stamp + 80% Sub regional Postage Stamp; Where Sub Regions are defined as Midwest ISO Planning Regions (3 regions of approx equal load)
- b. 80% Sub regional share of project costs is divided between the three Sub regions based upon relative benefits to each Sub region.
- c. Benefits to a Sub region are determined as the WGNL Inclusion Criteria metric summed over all of the zones within the Sub region.

# ISO New England: Network Upgrades

FERC approved “TCA Amendments” in 2003 which are a combination of participant funding and regional cost support, depending on the type of upgrade, modification or addition to the transmission system.

- “Participant funding” means the payment for transmission by those entities that request, require or voluntarily undertake the building of new transmission in New England. As a practical matter, such entities create the costs and/or will derive the benefits of the new transmission.
- “Regional cost support” refers to the costs of the transmission facilities that will be rolled into the regional transmission rates paid by all network transmission customers under the NEPOOL Tariff.

# ISO New England: Reliability Network Upgrades

- Transmission facilities rated 115kV and above would be eligible for regional cost support (facilities rated 115kV and above make up approximately 95% of the existing pool)
- Regional cost sharing plan would further apply to those upgrades that provide parallel looped capacity to transmission facilities.
- FERC concluded that regional cost support would benefit the region as a whole (“upgrade of transmission networks often benefit essentially the entire grid rendering any specific cost assignment impractical because net benefits are too diffuse.”)

# ISO New England: Economic Network Upgrades

- Economic Upgrades, as defined in the planning process, are those that provide net economic benefits to the region.
  - To determine net economic regional benefit, the ISO analyzes, among other things, regional and local load projections, generator availability and fuel costs.
- Upgrades of a sufficient size to one part of New England “virtually always provide diffuse benefits throughout the integrated network, often immediately and certainly over the useful life of those facilities.”
- “Default cost allocation” is objective and non-discriminatory, which applies in the absence of participant funding of transmission, and is consistent with the principles of cost causation.

# PJM: Network Upgrades

- On April 19, 2007, FERC issued two rate design orders concerning PJM Interconnection, L.L.C. (“PJM”) affecting future FERC Network Upgrade proceedings.
- **FERC held that:**
  - Existing PJM transmission facilities costs should continue to be recovered based upon a license plate rate design; and
  - PJM should re-design its cost allocation procedures for new Network Upgrade facilities of less than 500 kV, in part, because PJM’s tariff lacks sufficient detail and thus has resulted in considerable litigation.

# PJM: High Voltage Network Upgrades

- FERC also held that PJM should allocate costs for new facilities of 500 kV or higher to all of its customers with postage stamp rates.
- On 5/16/07, the Illinois Commerce Commission (and others) sought rehearing, in part, of the 4/19/07 PJM Orders.
  - FERC allegedly did not demonstrate that PJM's western region will benefit from all 500+ kV facilities (which are likely to be constructed east of the Ohio river).
- FERC rehearing is pending.

# CAISO: Resource Constrained Generation Resources

- On April 19, 2007, FERC granted CAISO petition for a declaratory order approving CAISO's proposed financing mechanism for the construction of interconnection facilities to connect location constrained resources
  - "Constrained Resources" = wind, geothermal, solar
- FERC explained that "the difficulties faced by generation developers seeking to interconnect location-constrained resources are real, are distinguishable from the circumstances faced by other generation developers, and such impediments can thwart the efficient development of needed infrastructure."

# CAISO: Resource Constrained Generation Resources

- FERC also noted that the proposal satisfied its responsibilities under the FPA to further initiatives encouraging the development of renewable generation on the state, regional and federal levels.
- Financing mechanisms need to be developed to connect multiple location-constrained renewable resources to the CAISO grid.
- The costs of these facilities will be “rolled-in” through the transmission revenue requirement of the Participating Transmission Owner that constructs the facility, via the CAISO Transmission Access Charge (“TAC”).

# CAISO: Resource Constrained Generation Resources

- Generators that interconnect to the grid would only be responsible for paying a *pro rata* share of the going-forward costs of the line (through TAC), until the line is fully subscribed.
- Eligibility for this rate treatment will be contingent upon the interconnection facility being approved in the CAISO transmission planning process as a facility that provides needed system benefits.
- Imperial Irrigation District sought rehearing on 5/21/07.

# Observations

- Definition of “Who Benefits” from a Network Upgrade will continue to present challenges in an RTO environment.
- Postage Stamp (*i.e.*, “everyone benefits”) may be appropriate for very high voltage transmission or for small RTO areas.
- License Plate (*i.e.*, identified “regional benefits”) will always be easier for utilities to obtain recovery from state commissions.
- Hybrid Arrangements (Postage Stamp % + License Plate %) may continue to be used to attempt to more closely assign costs to the actual beneficiaries.