

# RTO Overview and Day 2 Markets

EAI Technical Conference

May 26, 2011

# Agenda

- RTO “Day 2” markets and Locational Marginal Pricing (LMP)
- Why RTO Day 2 markets may benefit Entergy’s customers
  - Quantifiable benefits
  - Qualitative benefits
- Costs of RTO Day 2 market participation
- Common misconceptions about RTO Day 2 markets

# “Day Two” Market

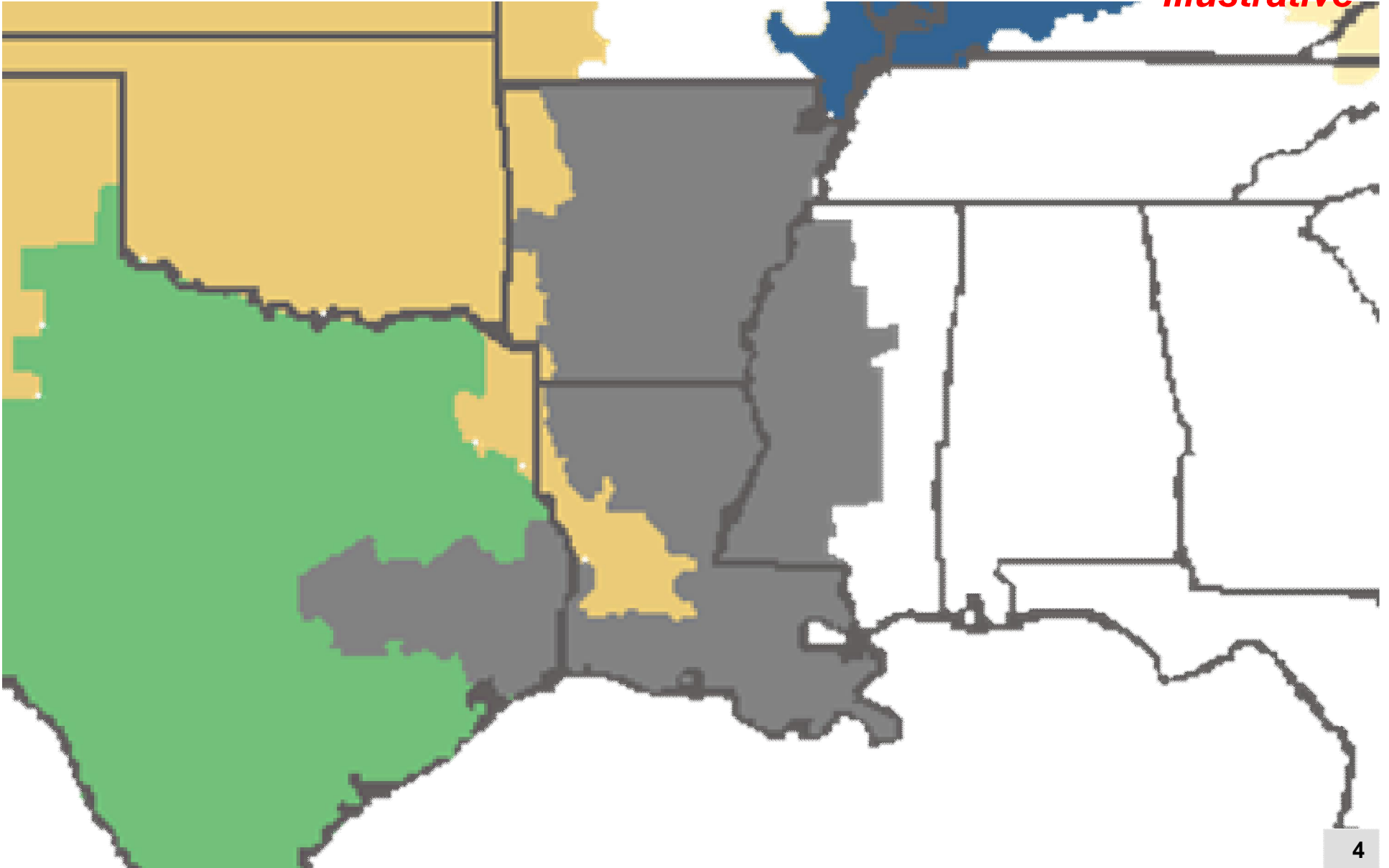
- Central region-wide markets operated by RTO
  - Day ahead unit commitment
  - Real time balancing market
  - Integrated ancillary services markets
- Requirement for generators to schedule or bid into the market
- Use of LMP to price use of the transmission grid – congestion charges replace “first come, first served” transmission service
- Financial transmission rights (FTRs) to hedge congestion
- Conversion plan for all load serving entities to assure existing rights are protected
- Market monitor for all RTO-operated markets

***Called “Day Two” market because many RTOs did not start with this market structure***

- ***PJM, ISO NE, MISO, NYISO have Day Two markets***
- ***But NYISO is only RTO that started with one***

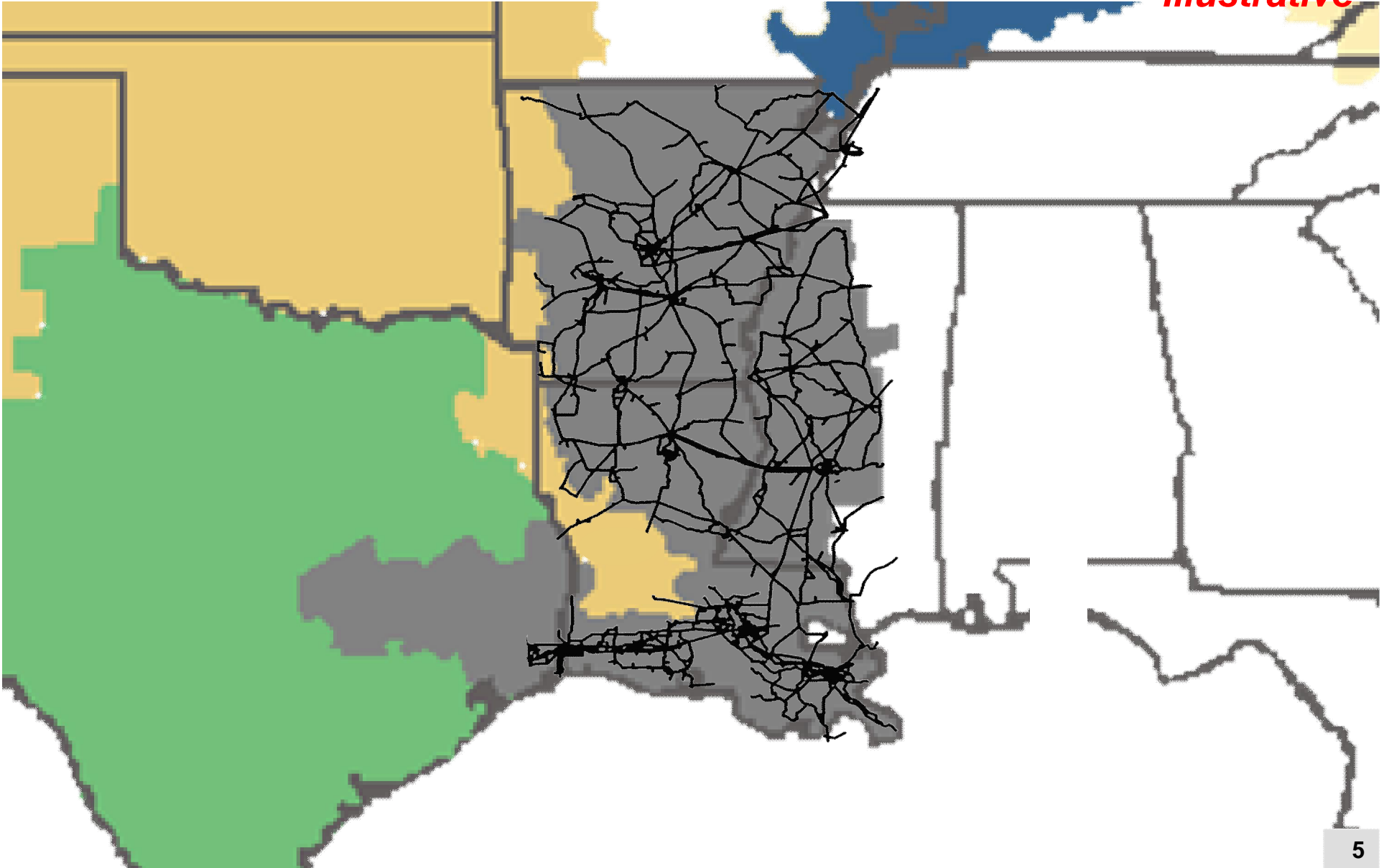
# Entergy Does Not Have Full Transparency On All Assets In Its Footprint

*Illustrative*



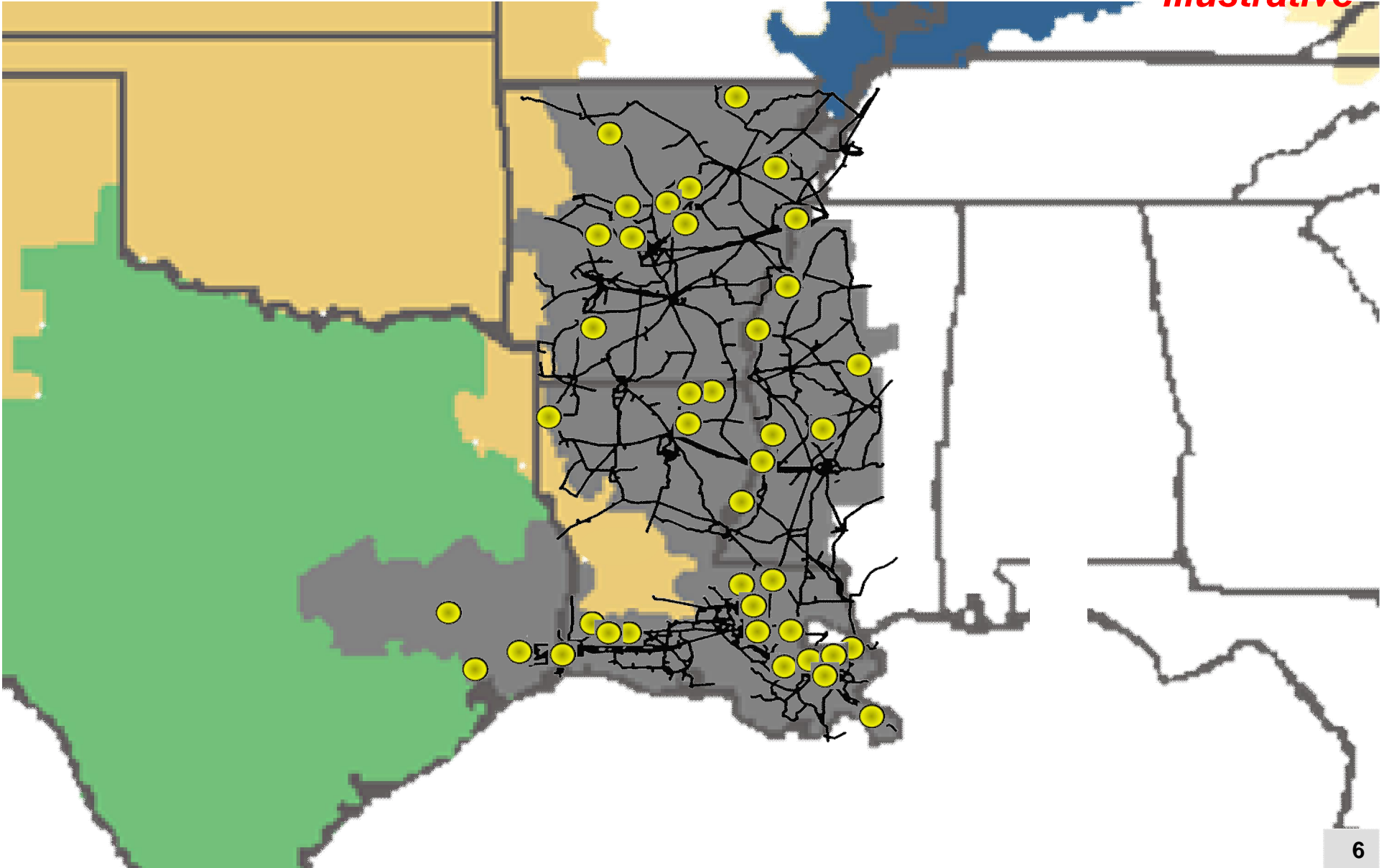
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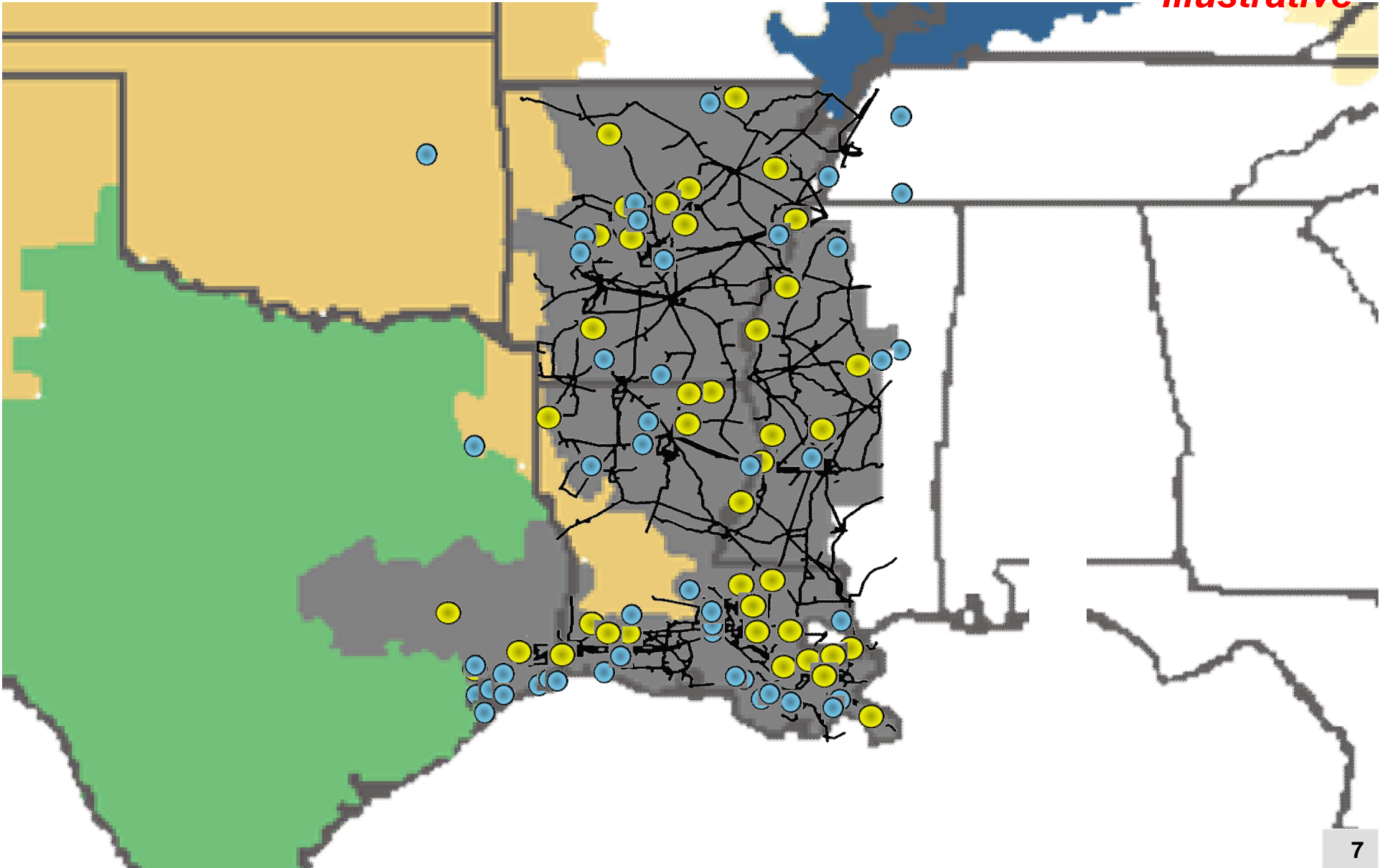
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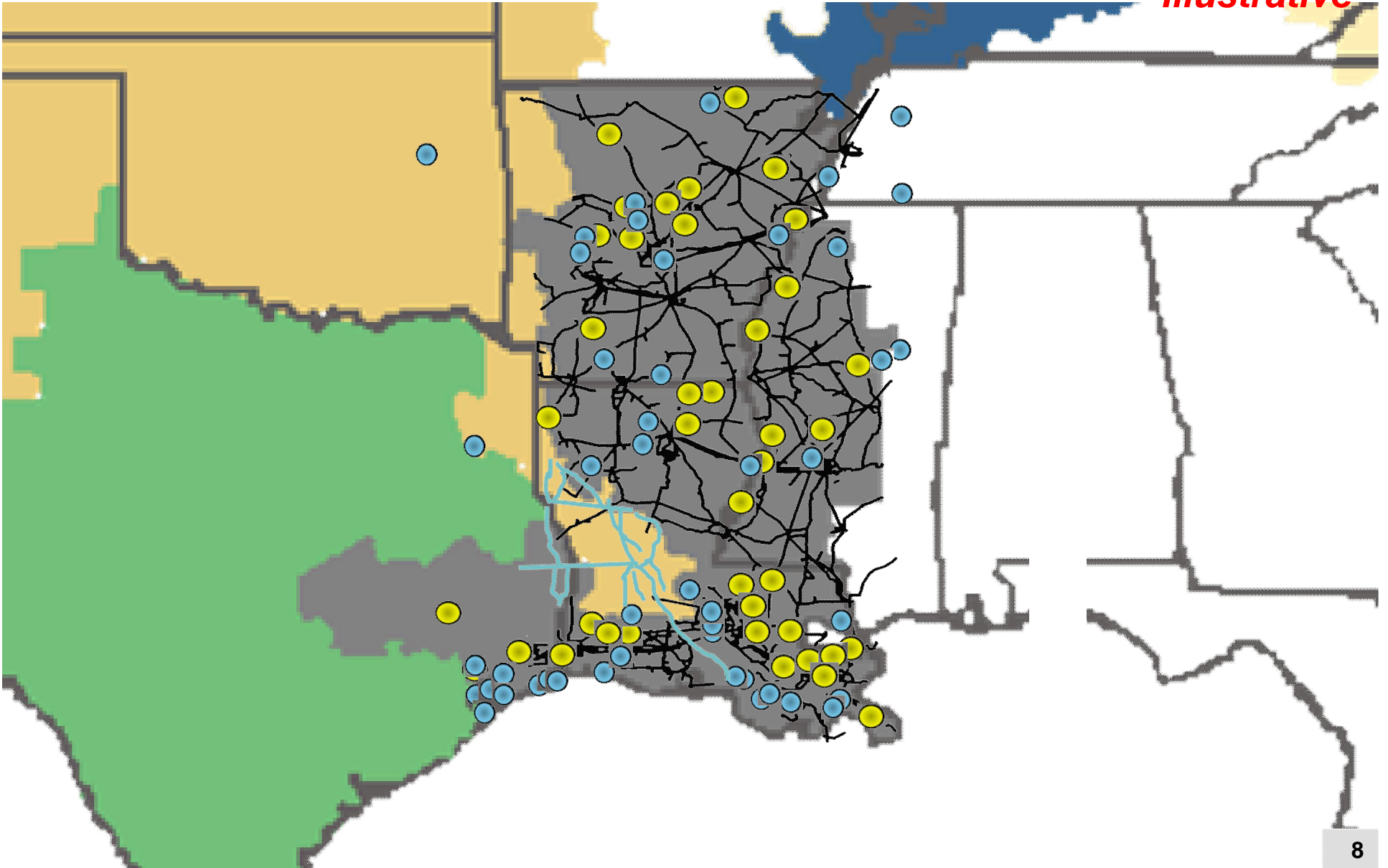
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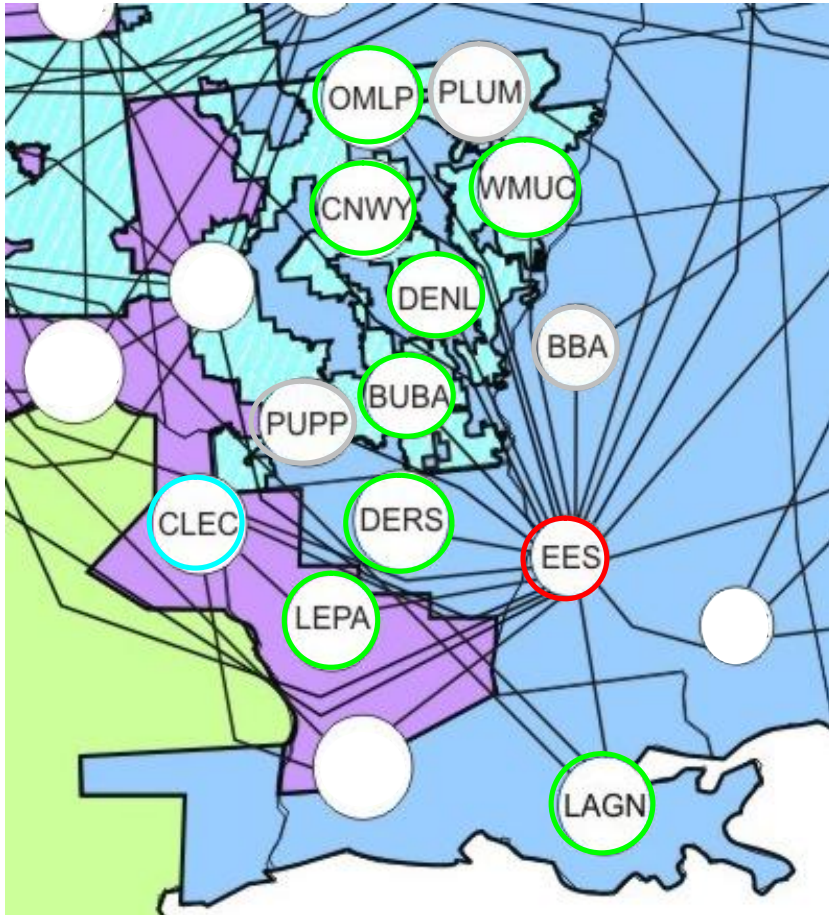
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# Entergy Footprint Also Has Multiple Decision Makers

Can't "find" optimal dispatch

## NERC Balancing Authorities



## Multiple Decision Makers

- 8 load-serving entities that commit and dispatch generation for their own load
- ~40 qualified facilities that decide whether to run their units and “put” to Entergy
- ~15 independent power producers who make independent decisions on commitment and dispatch when they sell to customers outside of the Entergy region (i.e., SPP, SoCo, TVA, MISO)
- 13 balancing authorities

Excerpt from NERC map, Regions and Balancing Authorities, Feb 12, 2010

- Entergy
- Other – generation and/or load
- Cleco
- Other – generation only

# Why Would A Day Two Market Make A Difference?

- Currently, we don't have coordinated generation dispatch in our region
  - Entergy commits its units; Cleco commits their units; IPPs make their own decisions based on their view of markets and availability of transmission
  - OATT transmission service is “use it or lose it”
  - Each participant's actions can affect others – and cause a suboptimal result
- In a Day Two market:
  - One central unit commitment and dispatch, based on economics of generation and transmission – more efficient
  - Participants can make their own decisions, but the effect will be reflected in LMPs – if you create congestion, you pay for it
  - Transmission rights are financial rather than physical
  - Vertically integrated utilities can run their own units when that is lower cost and buy from the market when that is lower cost
  - Energy and capacity costs for customers should be no higher – and likely lower – than today

# What is Locational Marginal Pricing?

- A method for pricing energy at every bus on the system
  - generator busses
  - distribution substations
- Visible, transparent prices published by RTO
- Definition of LMP: the cost to the system operator of serving a (hypothetical) increment of load at that bus, taking into account all generator bids and system conditions
- LMPs are the basis for an integrated energy market and congestion management system.

# FTR Overview

- Financial, not physical
  - no rights needed to schedule
  - holders get financial credit regardless of whether they schedule
- Defined like transmission service
  - quantity (MW)
  - duration
  - Direction – point to point or point to zone
- Issued by RTO – allocated to firm customers and/or auctioned

# Benefits of Day Two Markets

- Enables reliable region – wide generator commitment and dispatch at lowest cost
  - Including ancillary services (e.g. op. reserves)
  - Fully integrate IPPs into regional dispatch
- Maximizes economic use of the grid
  - Use price signals, not ATC (available transmission capacity) and TLRs (transmission loading relief), to manage use of the grid
  - Redispatch happens “automatically”
- Sends efficient price signals for generator siting

# Why Might Day 2 Markets Be of Particular Value in this Region?

- Generation ownership/control is dispersed in this region – Day Two market can improve the efficiency of the dispatch
- RTO Day 2 market will be larger than this region alone -- economies of scale particularly in ancillary services
- Larger market can also result in increased load diversity – combined with a Day Two market, can bring lower reserve margins

# Qualitative Benefits

- Transparency
- Additional resource planning options/flexibility
- Independence

# Potential Costs

- Administrative costs
- Loss of transmission revenues
- Transmission cost allocation

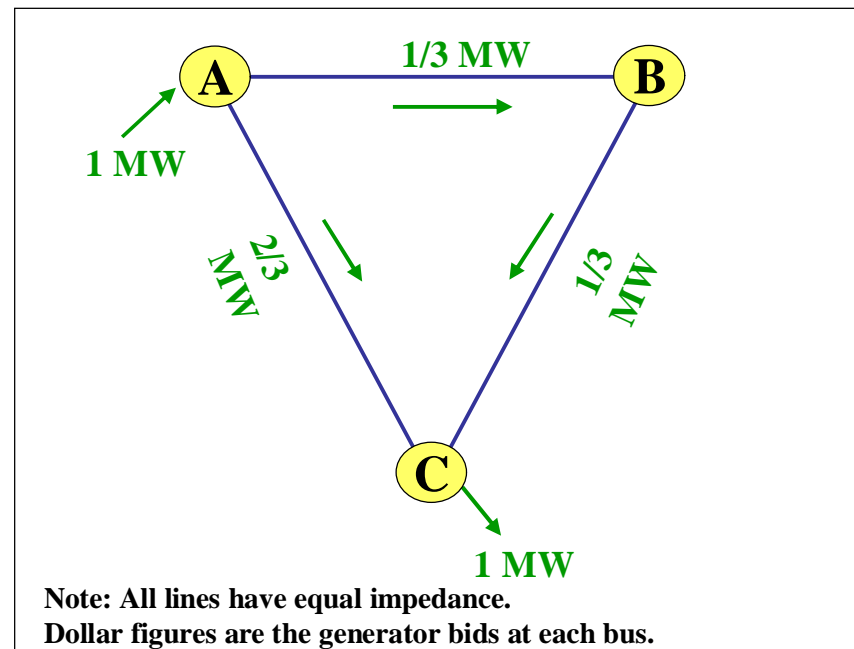
# Common Misconceptions about Day 2 Markets

- Allows regulated utilities to price their generation at market
- Only needed for retail choice

# Appendix

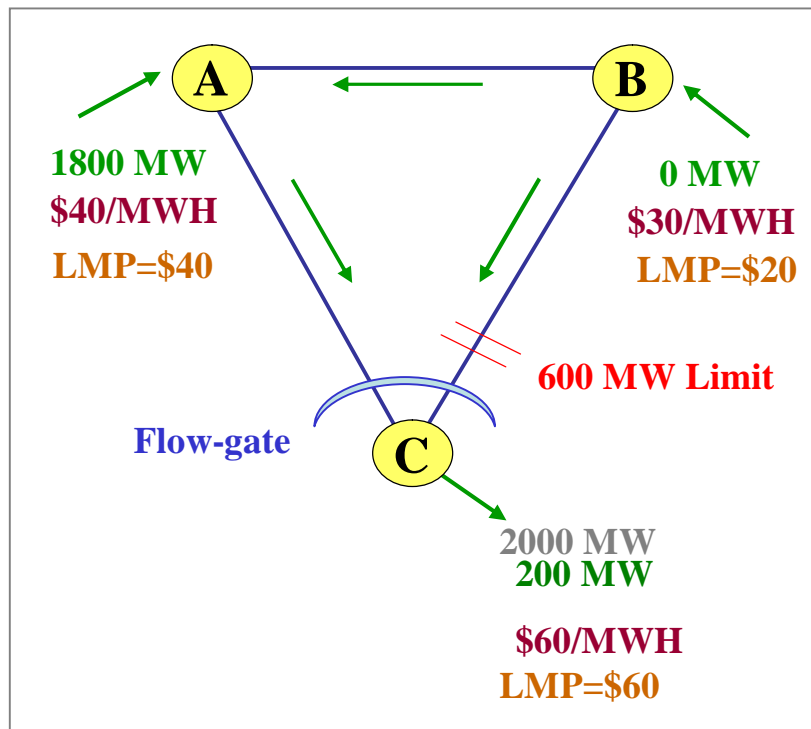
# Network Effects Complicate the Congestion Problem

- Parallel flow means that electricity will flow over all interconnected lines between source and sink. Electricity flows do not follow contract paths.



# Locational Marginal Pricing (LMP)

## LMP Example



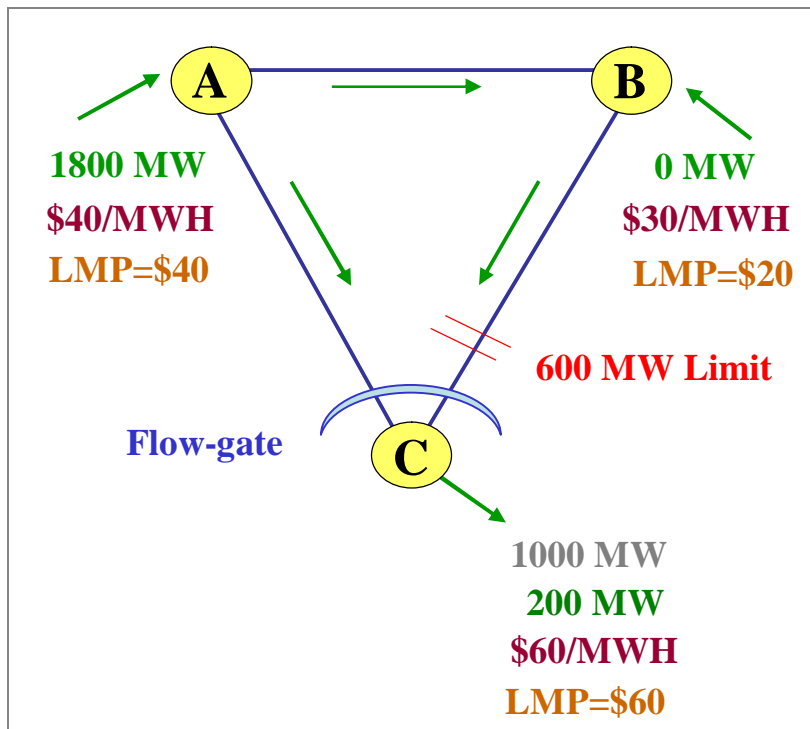
### Cost to serve load

- 1800 MW @ \$40 = \$72000
- 200 MW @ \$60 = \$12000
- Total = \$84000

### Other feasible dispatch

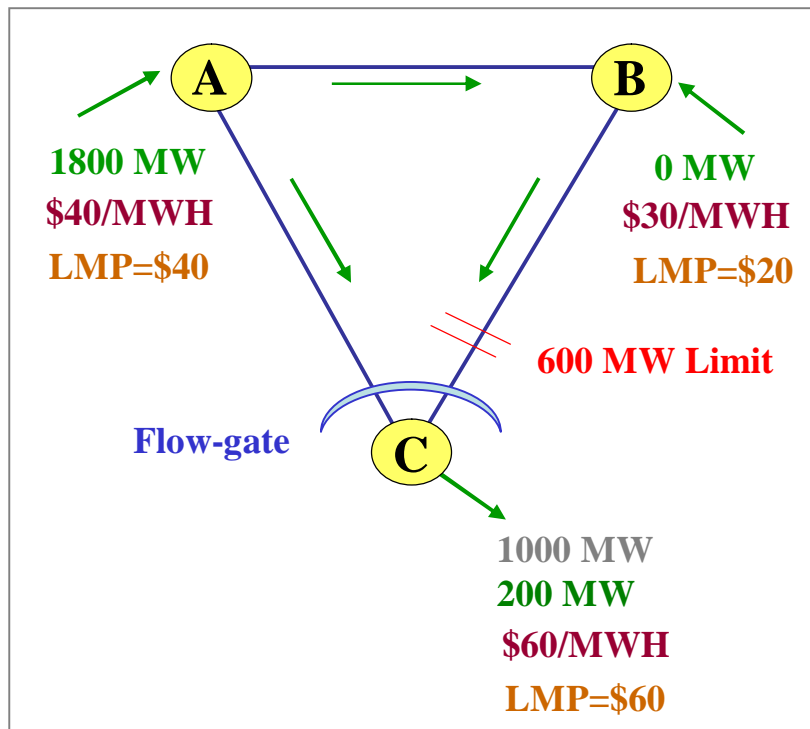
- 1798 MW @ 40 = \$71920
- 1 MW @ 30 = \$30
- 201 MW @ 60 = \$12060
- Total = \$84010

# Congestion Pricing Example



- Two ways to transact:
- Schedule bilaterally, pay congestion charge for transmission
  - A to C = \$20/MWH
  - B to C = \$40/MWH
- Transact in LMP market, with congestion reflected in spot price
  - Buy/sell at A (\$40/MWH)
  - Buy/sell at B (\$20/MWH)
  - Buy/sell at C (\$60/MWH)
- Congestion is charged in both
- Structure is designed to be neutral between the two.

# FTRs Provide a Hedge Against Congestion Charges



- FTR holders paid difference in LMPs
  - A – C paid \$20/MWH
  - B – C paid \$40/MWH
- Paid whether schedule power or not
- FTRs issued must be feasible
  - 900 MW B – C
  - 1800 MW A – C
  - but not both

# FTRs and Price Certainty

- FTRs provide delivered price certainty for transacting parties



- If the seller holds the FTR, it receives the price at B
- If the load holds the FTR, it pays the price at A
- This is true whether the party transacts in the bilateral market or central LMP market
- This is true even if the congestion is “negative.”