Perspectives on Transmission Congestion

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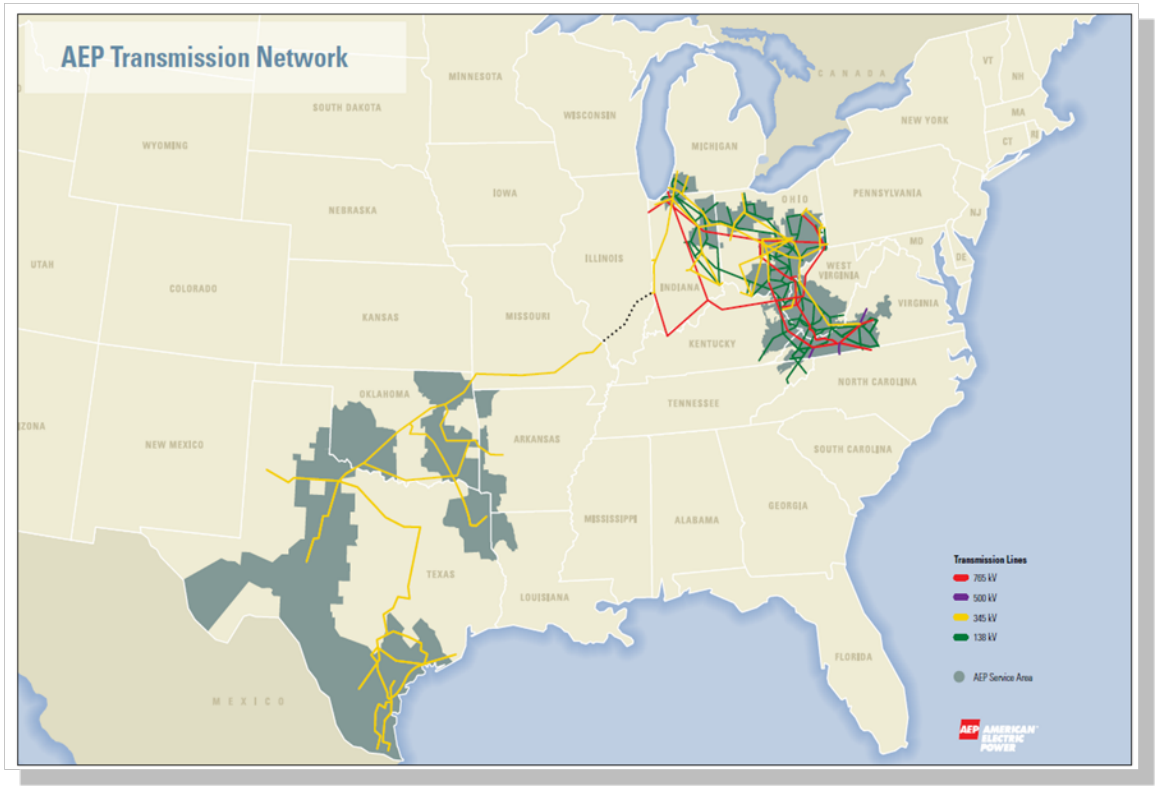
American Electric Power

- 5.2 million customers in 11 states
- ~18,000 employees
- Largest distributor of electricity in the U.S.
  - 215,800 miles
- Largest transmission owner
  - 39,000 miles
- 2nd largest generator
  - 39,000 MW
- Operations in 3 RTOs
  - PJM, SPP, & ERCOT

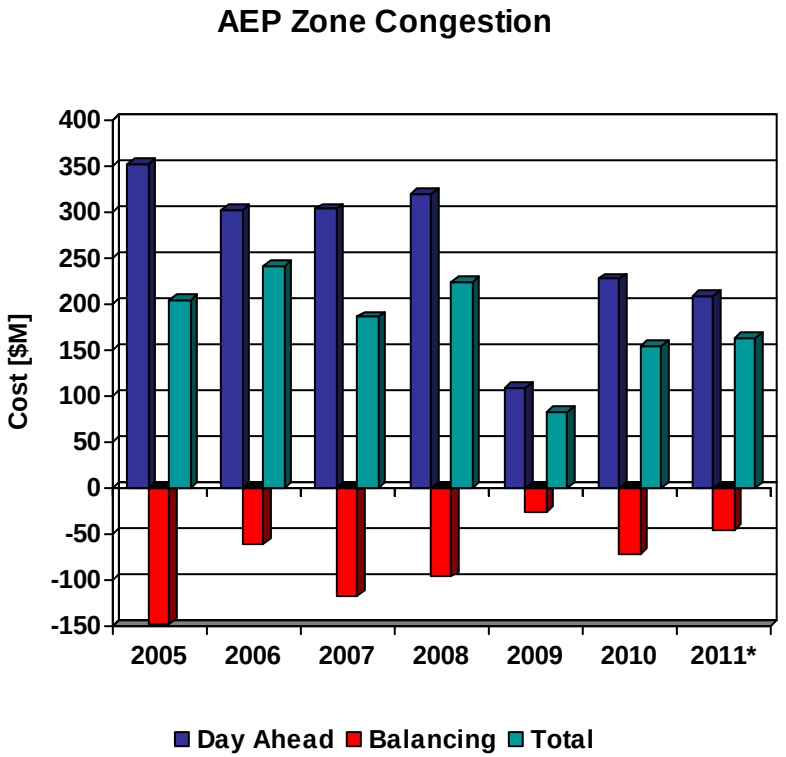


Value of 2009 Study

- The study conclusions were appropriate
  - Identified historical congestion
  - Overly broad, missed some areas
  - Type I and Type II areas are generally accurate but could be improved – especially Type I
  - Limited ability to address emerging issues

Changing “State of Congestion”

- Relatively consistent
  - Dip in 2009 but recovering
  - 2011 through September
- Volatility in the components
  - Load, Gen, DA, RT
- Congestion growing along the PJM/MISO seam
  - Wind belt
  - Capacity disconnect



* Congestion through September 2011

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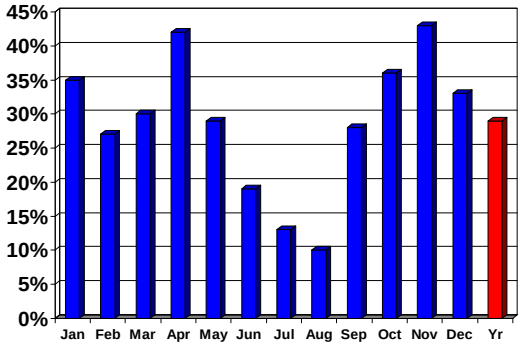
Capacity Disconnect

- Transmission systems have historically been planned on a capacity basis
  - Ability to deliver power to meet the peak demand under a variety of conditions
- Capacity of a wind farm is a moving target
  - Peak output occurs during shoulder months and off-peak hours
  - Planning authority dependent
  - Wind resource dependent

Monthly Capacity Factor



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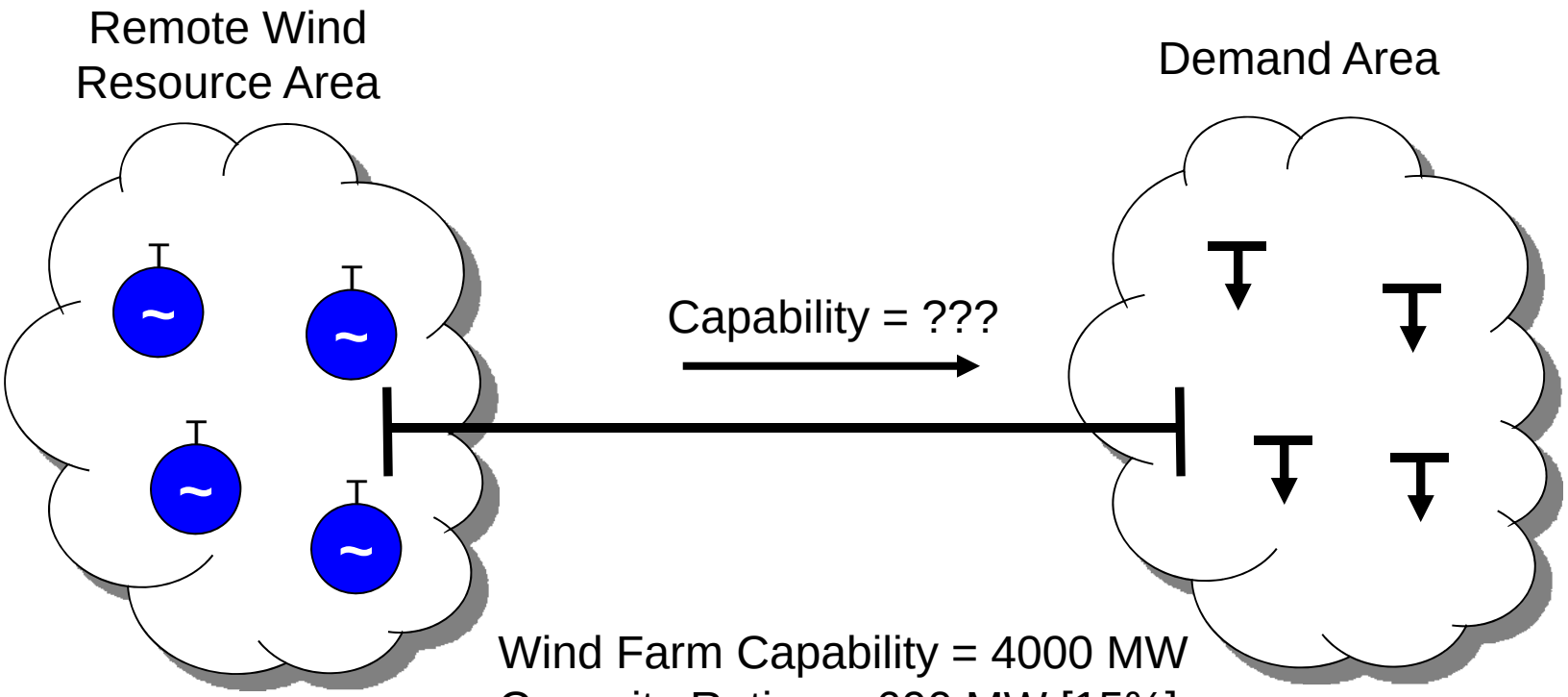
Capacity Disconnect



Capacity disconnect laying the foundation for significant future congestion!?

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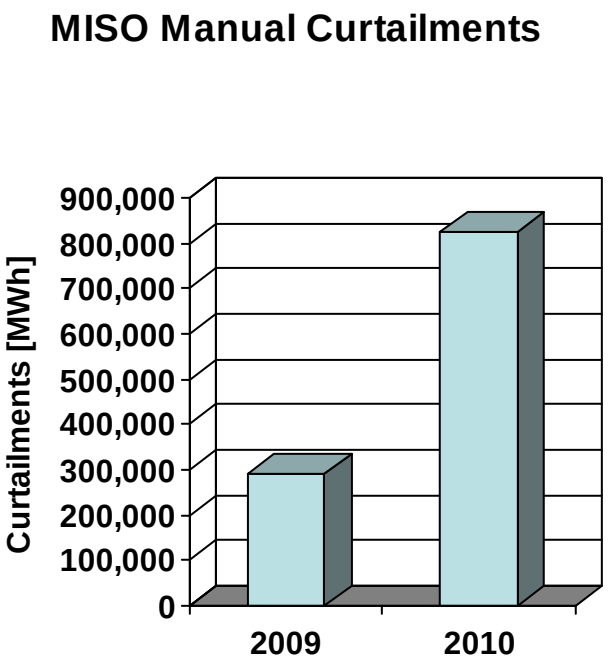
Today's Congestion

- Differences in LMP across the footprint
- Coordinated flowgate transfer payments
  - Payments made between PJM and MISO for congestion created on each others systems
- Transmission Loading Relief
- Manual curtailment of intermittent resources
  - Operational inefficiency of manually curtailing large amounts of wind
  - Dispatch decisions and LMP do not incorporate wind economics
- Increase in transmission switching actions
  - Utilizing protection equipment for routine operations
- Generation interconnection queue
  - Large potential source of generation lacking adequate transmission capacity
- Capacity market congestion
  - Zonal price differences in the capacity market clearing prices



Benefits of Mitigating Congestion

- Benefits of the RITELine Project
  - Significant customer savings
  - Improves reliability
  - Allows for integration of 5,000 MW of wind generation

	PJM 2021 ($m/yr)	MISO 2021 ($m/yr)	System 2021 ($m/yr)
Total Production Cost Savings			$630
Adjusted Production Cost [APC] Savings	$729	-$23	$691
Load [LLMP] Savings	$666	$74	$1,025
70% APC + 30% LLMP Savings	$710	$6	$791

These benefits will be lost if wind generation development is constrained.

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Source Material for 2012

- RTO data and studies
  - Historical, granular, State of the Market
  - Inter-regional congestion not addressed in a robust manner
  - Need to include congestion costs built into capacity prices
- EIPC
  - Interesting insight into future congestion issues
  - Higher level view
- SMARTransmission Study
  - High level focus on the mid-west wind corridor
  - Type of analysis that the DOE should consider
- Other considerations
  - Anything changing faster than “The Speed of Transmission”
  - Fuel prices and switching, environmental regulations, generation retirements, RPS requirements, wind development, RTO membership, etc.