Carnegie-Mellon University
Electricity Industry Center

PJM West
Expanding the Mid-Atlantic Energy Market
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Make Safety A Lifetime Commitment
Roadmap

• A Basic Understanding of the Issues
• Why Did Allegheny Choose to Join PJM?
• What Changes for the Allegheny Transmission Business?
• How Will Reliability Be Assured?
• Capacity Expansion – How & By Whom?
• New Transmission Investment – Dead?
• Where To From Here?
A Basic Understanding of the Issues

Or

Why is this happening to me and what was wrong with the way everything was before?
A Basic Understanding of the Issues

• Pre-1992
  – Vertically Integrated Systems
  – Reliability is King
  – Cost – If “Prudent” then Okay
  – In Pennsylvania, with the exception of DQE and PECO, delivered energy price not extravagant
  – Allegheny Among Lowest Cost/Price Energy Providers
  – Regulators Have “Cut Their Teeth” on Telecom, Airlines, Transportation in Terms of Deregulation and Competition in the Name of Lower Prices/More Choices
A Basic Understanding of the Issues

- Electric Transmission = Long-Haul Transportation
- Generators Build Near
  - Fuel Resource
  - Water
  - Environmental Acceptability
- Transmission Built to Get to Load and To Provide Mutual Assistance To Interconnected Neighbors Thus Maintaining Reliability
- Some Systems Operated Assets as a Pool of Resources, While Others Penned Agreements Defining Assistance to be Provided and Cost Sharing Formula
A Basic Understanding of the Issues

  - Develop a Robust, Competitive Energy Supply Marketplace
  - To Do So, Transportation System (Transmission) Had to be Available To All Market Participants
- 1996 FERC Orders 888 & 889
  - Required All Transmission Owners to Provide Non-discriminatory Access to Their Systems on a Basis Equivalent to the Terms Those Systems Were Provided to Their Affiliates
A Basic Understanding of the Issues

• Spate of 3 Letters
  – RTG
  – ISO
  – TRANSCO (okay so it’s not 3 letters)
  – RTO
  – ITC
A Basic Understanding of the Issues

• Devilish Times To Divergent Ends
  – Transmission Owners
    • Maintain Reliability, Maintain Asset Control, Maintain Profitability
    • And For Some – Maintain Generation Market Advantage
  – New Market Entrants
    • Get Product To Market – Inexpensively
    • Cry Foul – Gain Generation Market Advantage
  – Regulators
    • Get Competition In Place – Save Constituents Money
    • Appear Even-Handed
A Basic Understanding of the Issues

• The Result – FERC Order 2000
  – Voluntary (As In Your Kids Choosing When They Go To Bed – Now or NOW) Participation in an RTO That Meets Certain Functions and Characteristics
    • I.E. – Turn Over Control of Your Transmission Assets To an Independent Third Party
  – In Exchange For
    • Your Generation Affiliate Keeping Its Authorization to Charge Market-Based Rates
    • Your M&A Being Approved
    • Keeping Transmission Revenues Over A Transition Period That Would Have Existed But For the Formation of the RTO
    • Maybe Some Other Things (Enhanced ROE)
Why Did Allegheny Choose to Join PJM?

Or

If You Date Around Long Enough, You’re Bound To Find Someone You Like – But Your Reputation May Have Suffered Along the Way
Why Did Allegheny Choose to Join PJM?
Why Did Allegheny Choose to Join PJM?

- Circa 1996
  - Allegheny, Along with First Energy and Virginia Power Formed the Original Alliance TRANSCO
- 1997-1998
  - Allegheny Attempts Merger With DQE – Moves To MidWest ISO (MISO)
- 1999-2000
  - Allegheny Maintains Liaison Relationships with MISO and New Alliance, and Studies PJM
- Summer 2000-2001
  - Allegheny Determines A Relationship with PJM To Be Most Beneficial to Customers and its Own Transmission Interests
Why Did Allegheny Choose to Join PJM?

• Get Allegheny Involved In A Robust Energy Market
• Adopt A Workable Congestion Management System
• Meet FERC and State Commission Expectations in an Expedited Manner
• Utilize the Experience of PJM Across Multiple Reliability Councils and Control Areas
• Develop the Principles of a For-Profit Transmission Entity in the Evolving RTO Model
PJM and PJM West

**APS + DQE Today** *
- Generating Units: 55
- Generation Capacity: 11,340 MW
- Peak Load: 10,554 MW
- Annual Energy: 58,565 GWh
- Transmission Mileage: 5,100
- Area (Square Miles): 32,000
- Customers: 2 Million
- Population Served: 4.1 Million
- States: 5

**PJM Today** *
- Generating Units: 540
- Generation Capacity: 58,700 MW
- Peak Load: 51,700 MW
- Annual Energy: 255,740 GWh
- Transmission Mileage: 8,000
- Area (Square Miles): 48,000
- Customers: 9.6 Million
- Population Served: 22 Million
- States (+ D.C.): 6

**Future: PJM East + PJM West** *
- Generating Units: 595
- Generation Capacity: 70,040 MW
- Peak Load: 62,254 MW
- Annual Energy: 314,305 GWh
- Transmission Mileage: 13,100
- Area (Square Miles): 80,000
- Customers: 11.6 Million
- Population Served: 26.1 Million
- States (+ D.C.): 8

* Data includes estimated values.
Why Did Allegheny Choose to Join PJM?

• Or Why Didn’t We Choose the MISO or Alliance
  – MISO did not embrace the combination of an energy market and transmission operations
    • Also, very high start-up costs
  – Alliance also did not embrace the combination of an energy market and transmission operations
    • Also, did not develop in an open stakeholder fashion leading to doubts about the ultimate success of the effort
What Changes for the Allegheny Transmission Business

Or

If You Don’t Control Your Assets or How They Are Used, Then Why Be In The Business?
• PJM’s responsibilities as the Control Area Operator for PJM West include:
  – Central Unit Commitment and Security Constrained Dispatch
  – Monitoring & control of the PJM West transmission system
  – Oversight and approval of transmission maintenance schedules
  – Coordination of generation maintenance schedules
  – Incorporation of PJM West Transmission Operations into PJM Open Access Same Time Information System (OASIS)
    • One stop shopping for transmission service across larger geography
  – NERC Security Coordinator for PJM West
• PJM’s responsibilities as the Market Administrator for PJM West include:
  – Integration of PJM West entities into PJM’s existing energy markets and Locational Marginal Price (LMP) congestion management system
  – Operation of single day-ahead and real-time energy markets and settlements
  – Fixed Transmission Rights (FTR) allocation, market administration, and settlement
  – Market Monitoring function
  – Development and administration of an Available Capacity Market
• PJM’s responsibilities as the Regional Transmission Planner for PJM West include:
  – On-going Reliability Assessments across the larger geography including interregional seasonal assessments
  – Development of a single Regional Transmission Expansion Plan across the larger geography
  – Consolidation of generation interconnection studies
  – Analysis supporting the West Reliability Assurance Agreement
How Will Reliability Be Assured?

Or

Who Do I Call If My Lights Go Out?
How Will Reliability Be Assured?

• If Your Electricity Is Delivered By Allegheny Power, Call 1-800-ALLEGHENY
• That Of Course Is the Flip Answer
• The Real Question Is, What Has Changed That Causes This Question To Be Asked?
How Will Reliability Be Assured?

- The Pre-1992 System Was Designed and Operated to Simply Be As Reliable As It Could Economically Be
- Transmission Existed to Link Systems Together So Sudden, Unplanned Generation Outages on One System Could Be Backed-Up by Generation on Another System
- While Some Bi-Lateral Power Transactions Occurred, They Were The Bi-Product of the Design
How Will Reliability Be Assured?

• Today, the Transmission System Is Used To Do All It Used To Do **PLUS** Handle Numerous Commercial Transactions
• As A Result, Transmission Paths At Times Become Congested Requiring Either
  – A Reduction In Reliability
  – Or A Reduction In the Transactions
• Either Way, Costs Increase
How Will Reliability Be Assured?

• Reliability Is Maintained Through
  – Operational Measures
    • Transmission Loading Relief (TLR) Program
    • Generation Redispatch
    • Peak Load Management Programs
  – Market Measures
    • Locational Marginal Price (LMP) Increases
  – Planning Measures
    • Regional Transmission Expansion Planning Process
How Will Reliability Be Assured?

• The Trick Is To Maintain Balance and Perspective Between Reliability Needs and Commercial Needs – Particularly Since It’s Very Difficult to Tell The Two Apart
Capacity Expansion – How & By Whom?

Or

What Is Capacity, Who Needs It, and Who Supplies It
Capacity Expansion – How & By Whom?

- First of All – Capacity In the Electric Energy Market Is Very Different From Capacity In Other Markets
  - Electric Energy Generally Can’t Be Stored
  - Supply Additions Are Lumpy and Not Responsive To Increases in Demand
Capacity Expansion – How & By Whom?

• Capacity Must Be Built To Assure Some Margin Between Expected Peak Load and Expected On-Peak Demand

• Traditionally, Vertically Integrated Utilities Developed Integrated Resource Plans To Assure An Adequate Margin Was Maintained Thus Assuring Reliability
Capacity Expansion – How & By Whom?

• Today, in PJM, An Adequate Margin Is Assured Via A Responsibility Placed On Load to Have Sufficient Capacity To Meet Its Peak Demand Plus Some Margin
  – In Traditional PJM This Is Called the Installed Capacity Requirement (ICAP)
  – In PJM West This Is Called the Available Capacity Requirement (ACAP)
Capacity Expansion – How & By Whom?

• Both ICAP and ACAP Result In The Same Reliability Performance – A Loss of Load Expectation of 1 Day in 10 Years
  – ICAP Is Measured On a Year Ahead Planning Basis
  – ACAP Is Measured On a Day Ahead Operating Reserve Basis
Capacity Expansion – How & By Whom?

• Capacity Additions Are Motivated By Competitive Forces In the Market And By Price Signals Driven Through the LMP Congestion Management System
  – At This Point A Significant Amount (> 20,000 MW) of New Generation Is Being Planned Within The PJM Region
New Transmission Investment – Dead?

Or

Buy High, Sell Low

Sage Investment Advice
New Transmission Investment – Dead?

• Little Transmission Plant Has Been Built Since 1996
• Why?
   – Uncertainty
     • Who Will End Up Owning the Assets
     • What Return Will Be Allowed
   – Competition For Capital
     • Transmission ROE’s Between 8.5 and 12 %
     • Generation ROE’s in High Teens to Low 20% Range
   – System Performance Has Been Stable
New Transmission Investment – Dead?

• Who Will Build
  – Existing Franchised Transmission Owners Retain the Obligation to Build
  – New Generation Projects Are Required To Fund Their Interconnection Facilities Plus System Upgrades Caused By The Addition of Generation
  – Incentive ROE’s and Performance Based Rate-Making Will Open the Way for the Franchised Owner to Build
  – Merchant Transmission May Develop
New Transmission Investment – Dead?

• Making This Happen Is Not As Much A PJM Issue As It Is A FERC Issue
• FERC Must Send Adequate Signals That the Transmission Business of the Future Is Reasonably Stable and Predictable
  – So Far, This Hasn’t Happened
Where To From Here?

Or

Okay Pfirrmann, Rub That Bald Head and Predict What’s To Come
Where To From Here?

- The PJM Market Model Has Been Nominated By FERC To Be The Platform For The Standard Market Design In The Eastern Interconnection
- The Alliance Will Align Partly With the MISO and Partly with PJM West
- MISO Will Establish A Market Using PJM Market Design But Separate From the Existing PJM Market
Where To From Here?

• Reintegration Has Regained Favor On Wall Street. Vertically Integrated Utilities Will Continue To Be the Mainstay of the Industry

• European Utilities Will Determine That the Regulatory Model in the US is Significantly Different Than At Home – Some Will Stay Home, Some Will Leave, and Some Will Change Their Business Strategy in the US.
Where To From Here?

• Further Down the Road, Transmission, Generation, and Load Control/Distributed Generation Will Equally Compete To Solve Congestion and Demand Issues

• Winners Will Focus On Customers, Losers Won’t Focus