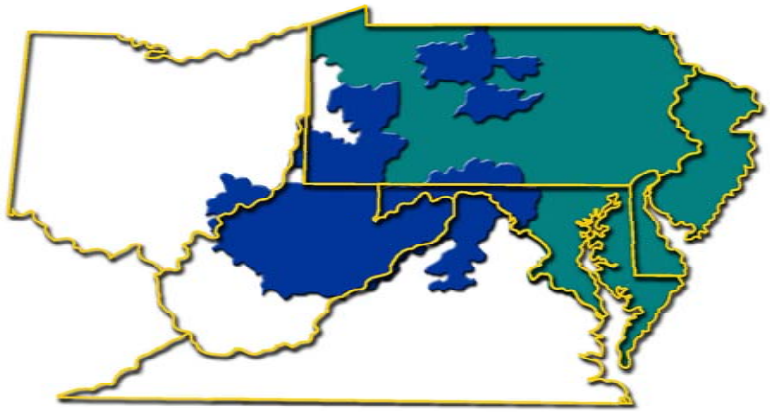
# Carnegie-Mellon University
# Electricity Industry Center



# PJM West
# Expanding the Mid-Atlantic Energy Market
# April 11, 2002

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# 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

- National Energy Policy Act of 1992
  - 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

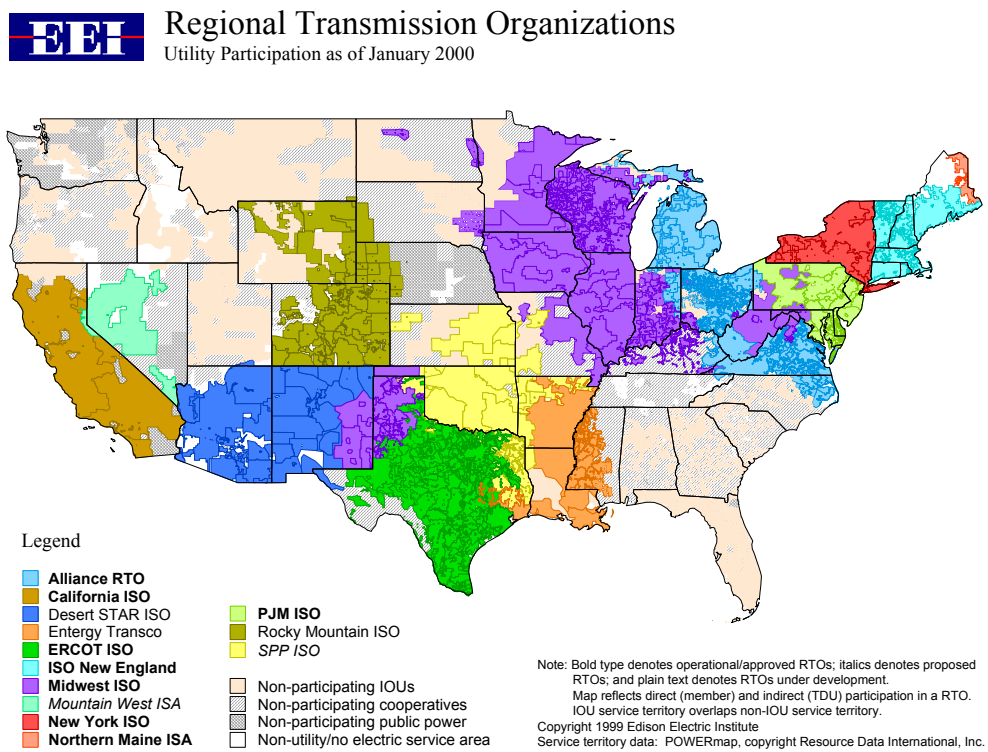
- The Result – FERC Order 2000
  - Voluntary (As In Your Kids Choosing When They Go To Bed – Now or NOW) Participation in an RTO That Meets Certain Functions and Characteristics
    - I.E. – Turn Over Control of Your Transmission Assets To an Independent Third Party
  - In Exchange For
    - Your Generation 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

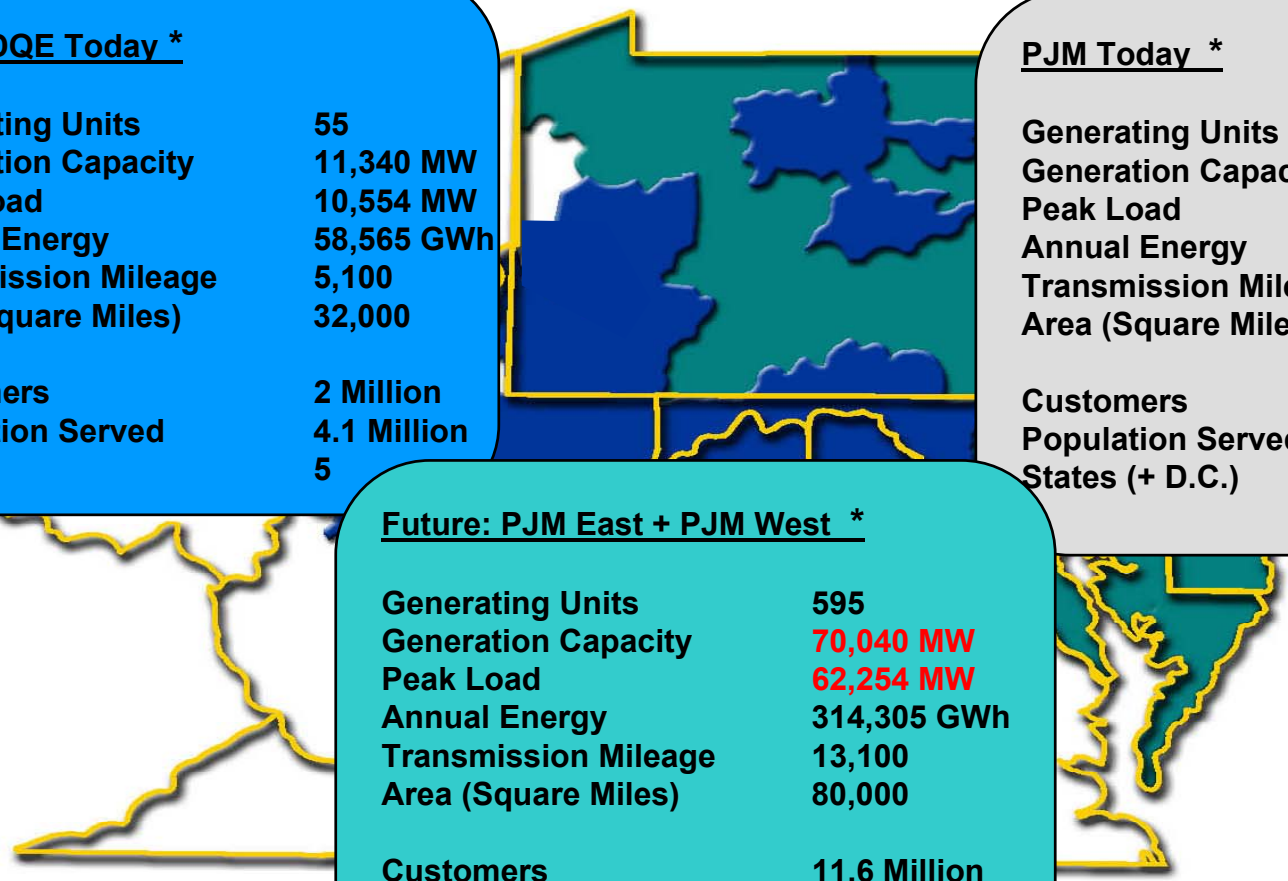
# Why Did Allegheny Choose to Join PJM?

- 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