



***Developing the 21st Century Grid...
A Look Back and a Look Forward***

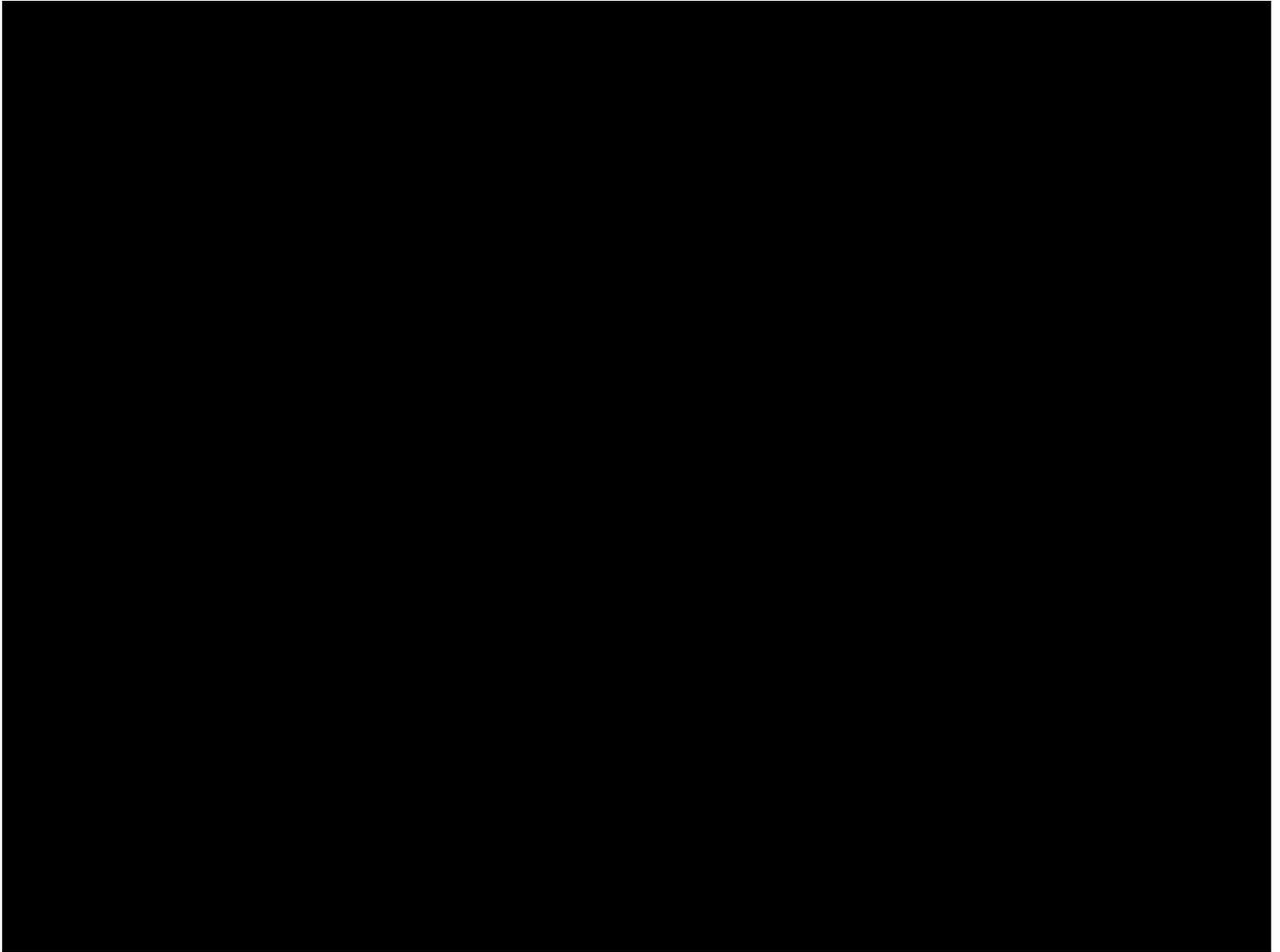
**Modernizing the Grid Midwest Regional Summit
November 16, 2006
Columbus, Ohio**

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PJM Interconnection



**“We’re Mad as Hell
and We’re Not Going
to Take It Anymore!”**





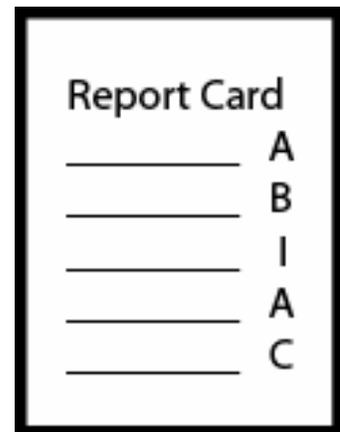
At the Wholesale Level...

- Transmission access
 - Negotiation of “wheeling rights”
 - Discriminatory treatment
 - Lengthy litigation: *“Refunds to a Corpse”*
- Build-out costs
- “Reliability” and “native load” as code
- *TLRs, demand ratchets, price squeeze you name it...*

At the Retail Level...

- Rates significantly above the national average
- Industrial subsidies for public interest programs
- Investment/technology stagnation
- Hit to global competitiveness

- Reminding the Regulator
What We Got Right: *Taking credit for our accomplishments*
- Building on Past Experience:
Learning What Needs Further Work
- Avoiding the Quagmire of
Inaction





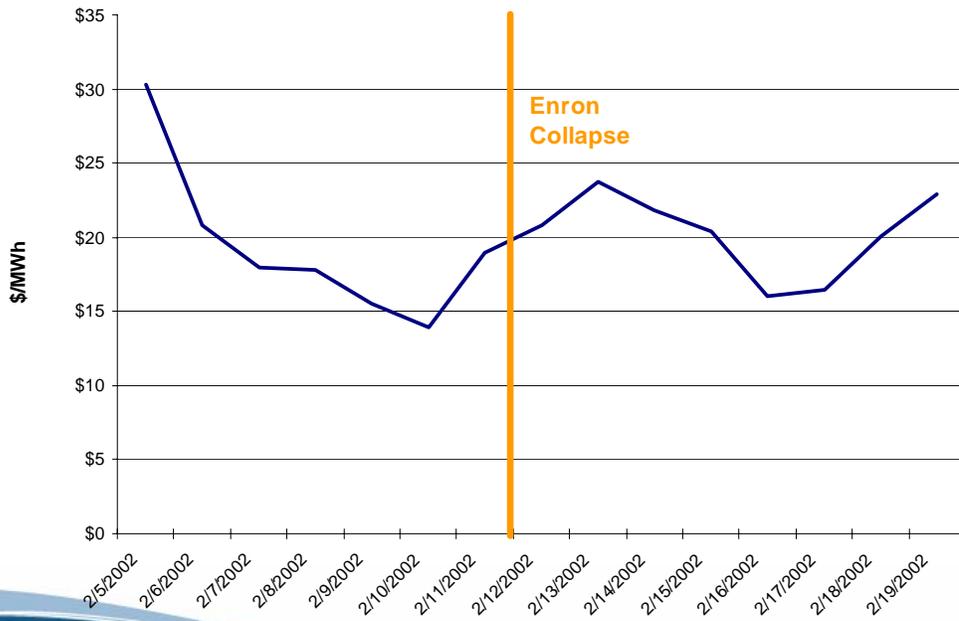
Accomplishment No. 1:

We moved the risk allocation formula:
aka "There was no Enron rate case!"

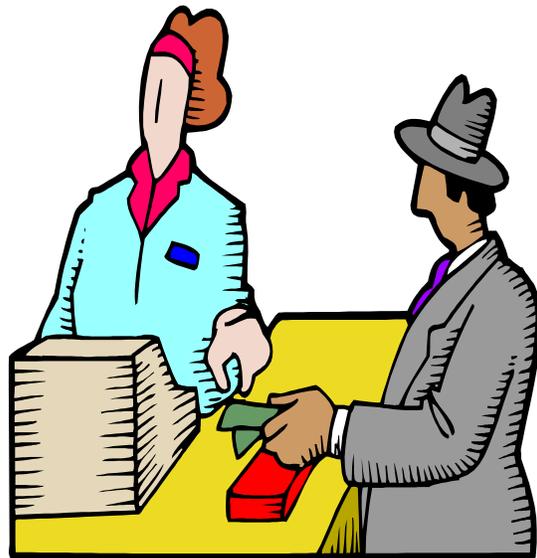


Pre-and post Enron prices

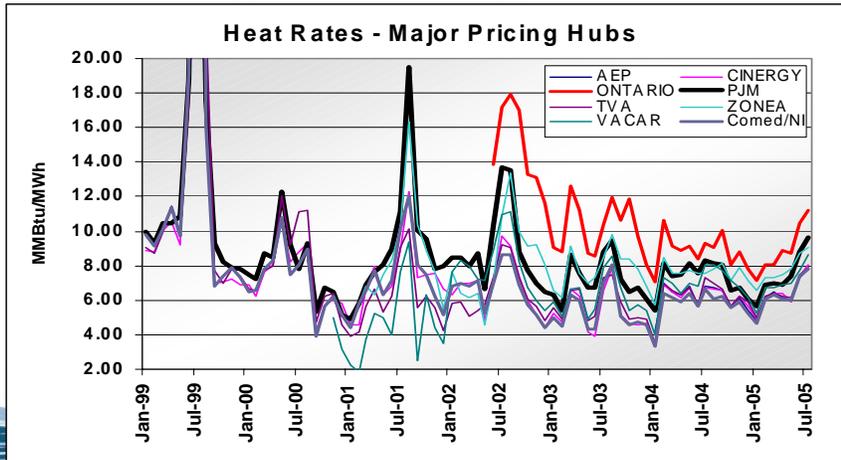
Mean PJM RTO LMP



- Consumers are paying for higher commodity costs not “bail-outs”
- If anything, capacity prices too low
- Markets delivering signals: We need to react to them wisely



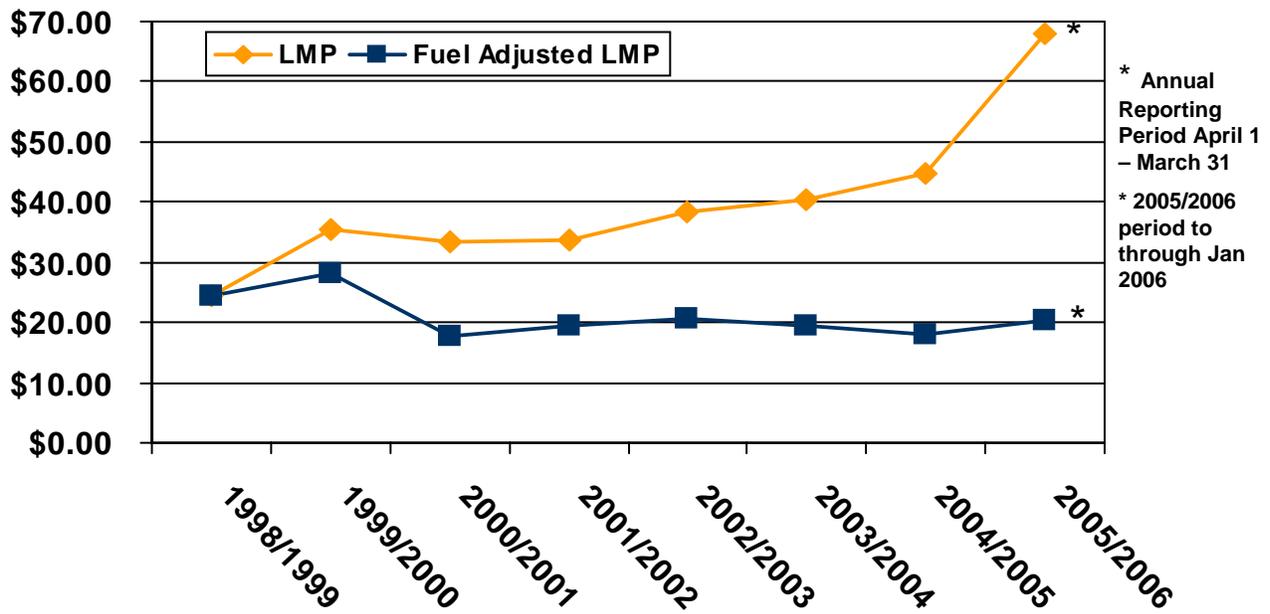
- Market heat rate declines
 - Provides fuel adjusted measure of efficiency
 - Equivalent heat rate at Western Hub reduced from 11 MMBTU/ MWh in 1999 to 7.3 MMBTU/MWh in 2004





Comparison of Load Weighted Energy Prices to Fuel-cost Adjusted Load Weighted Energy Prices

PJM Market Results 1998-2005



* Annual Reporting Period April 1 – March 31
* 2005/2006 period to through Jan 2006

Note: Fuel-cost adjustment performed based on 1998-1999 reference period. Fuel-adjustment based on hourly marginal fuel type

Accomplishment No. 2:

We got the fundamentals right!





- Regulatory solutions: Order 436, FCC Carterphone Decision
- Behaviorial solutions: Order 436, Telecomm Act of 1992
- Structural solutions: Order 636, AT&T Divestiture

- Structural Solutions Have Worked
 - Eliminating multiple control areas
 - Regional planning
 - Redispatch in lieu of TLRs
 - Maximizing use of the Grid
 - Allowing customers to make economic decisions
 - Transparency

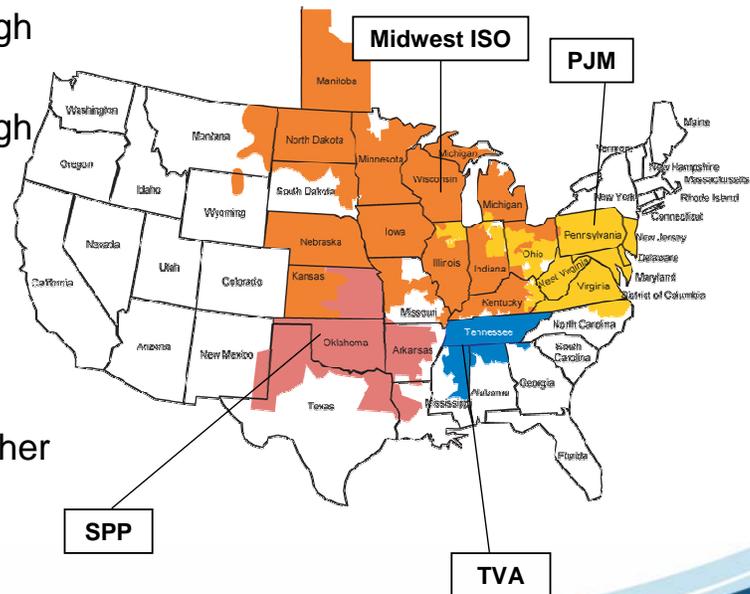


PJM profile

- More than 51 million people served in Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia
- 135,000 megawatts of peak load
- 165,738 megawatts of generation capacity
- 56,070 miles of transmission lines
- 1,082 generation sources with diverse fuel types
- 350 plus members



- *Reliability* enhanced through robust markets
- *Reliability* enhanced through centralized dispatch
- *Reliability* enhanced through comprehensive regional transmission expansion planning
- *Market* facilitated by more efficient dispatch of large generation fleet taking advantage of diverse weather variations and time zone effects



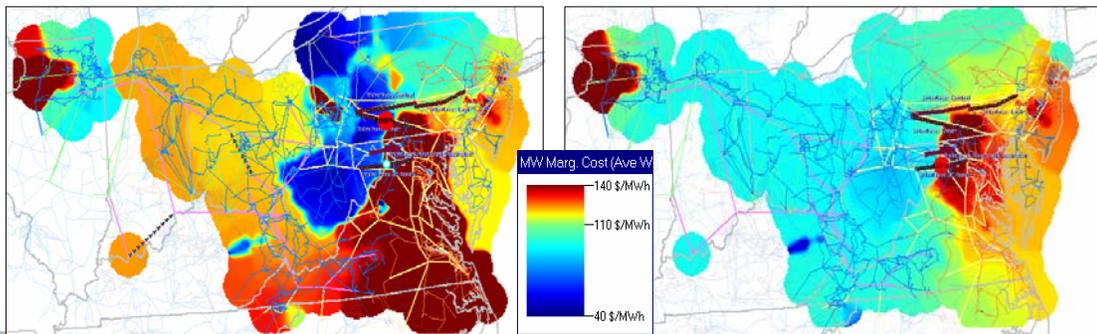


Energy Market: Increased Efficiency

- **Lower energy prices across the expanded PJM region**
 - ESAI's technical study: region-wide energy price without integration would be \$0.78/MWh higher in 2005 than with integration.
 - Spreading these savings over the total PJM RTO's energy demand of 700 terawatt-hours (TWh) per year yields aggregate savings of over **\$500 million per year**.

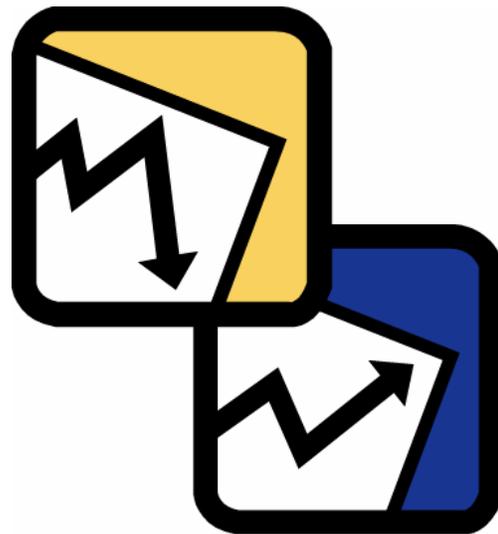
Pre-Integration Price Pattern

Post-integration Energy Price Pattern





- **Lesson One:** We can't ignore the basics
 - *Trees, training and technology*
- **Lesson Two:** We need to decide the role of transmission
 - *Competitor?*
 - *Enabler?*



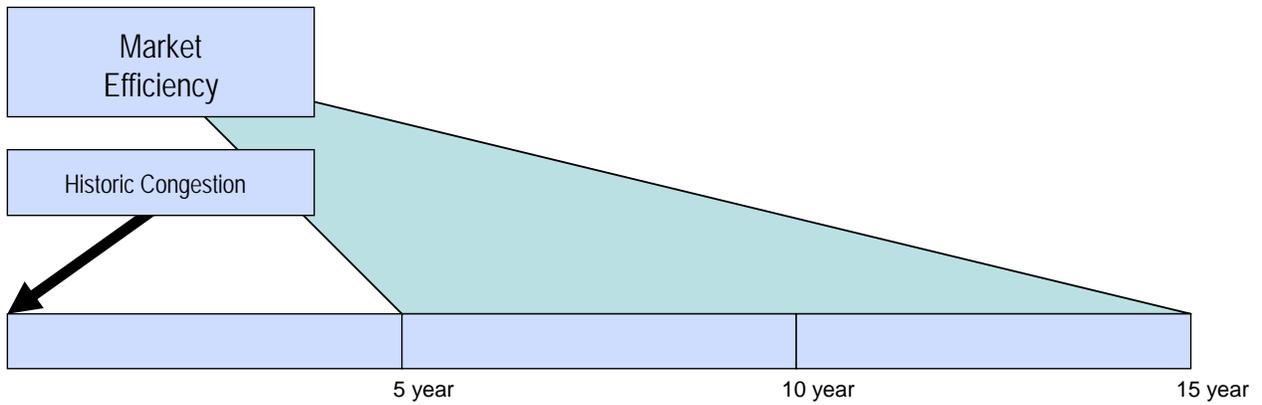


“Let the market propose economic projects”

- Provide transparent information and market windows
- Issues:
 - Free Riders
 - Value of incremental transmission rights to developers
 - Merchant Transmission vs. Rate Base Transmission
 - Feasibility in an AC environment

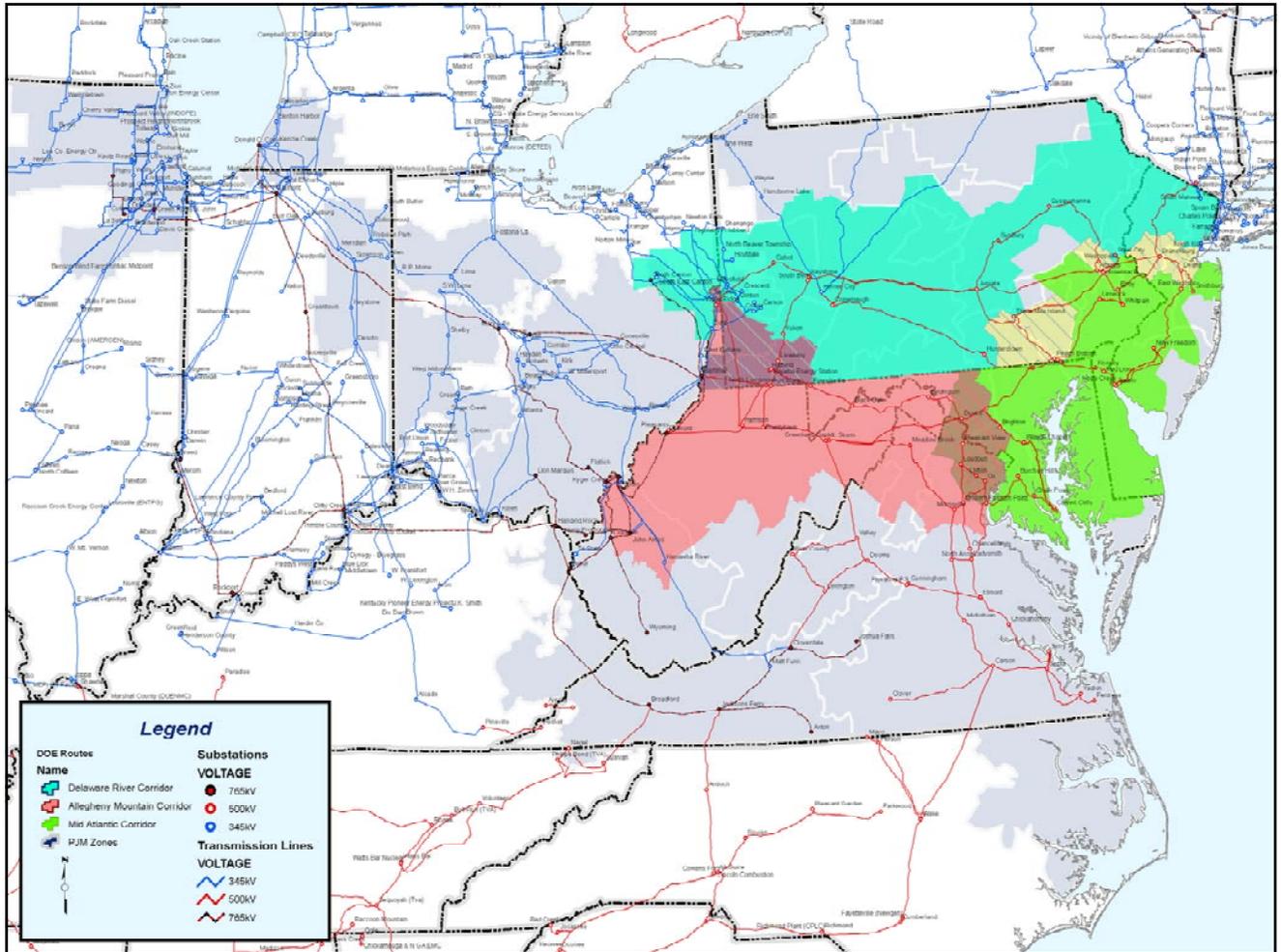
“Develop transmission to meet both economic and reliability needs”

- Recognize the value of transmission in ratemaking
- Issues:
 - Who decides?
 - How are the decisions made?
 - Driving generation distant from load?

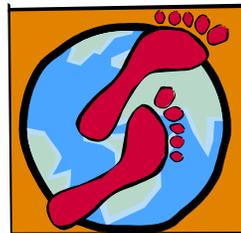


Economic metrics:

- Production cost
- Transmission congestion
- Payments to generators
- Transmission Losses
- Economically justified transmission projects
- Advancement of reliability-based projects
- Increased scope for reliability-based projects



- **Lesson Three: Demand Side Response**
 - *It can have an equal footing in the marketplace*



August 2, 2006:

- New Record Peak: 144,796 MW
- Voluntary reductions in electricity use
- As a result, price reductions estimated to be more than \$230 million





- Electricity Price Reduction impact -
 - Equivalent Consumer savings = \$650 Million in reduced energy payments based on electricity spot price reductions due to voluntary demand response for period from July 31, 2006 through August 3, 2006





Benefits of Voluntary Customer Load Reduction during Peak Usage Period
July 31, 2006 through August 3, 2006

Quantity of fuel displaced by voluntary Load Reduction
July 31, 2006 through August 3, 2006

- Coal  1367 Tons
- Oil  15,855 Barrels
- Natural Gas  227,965 MCF

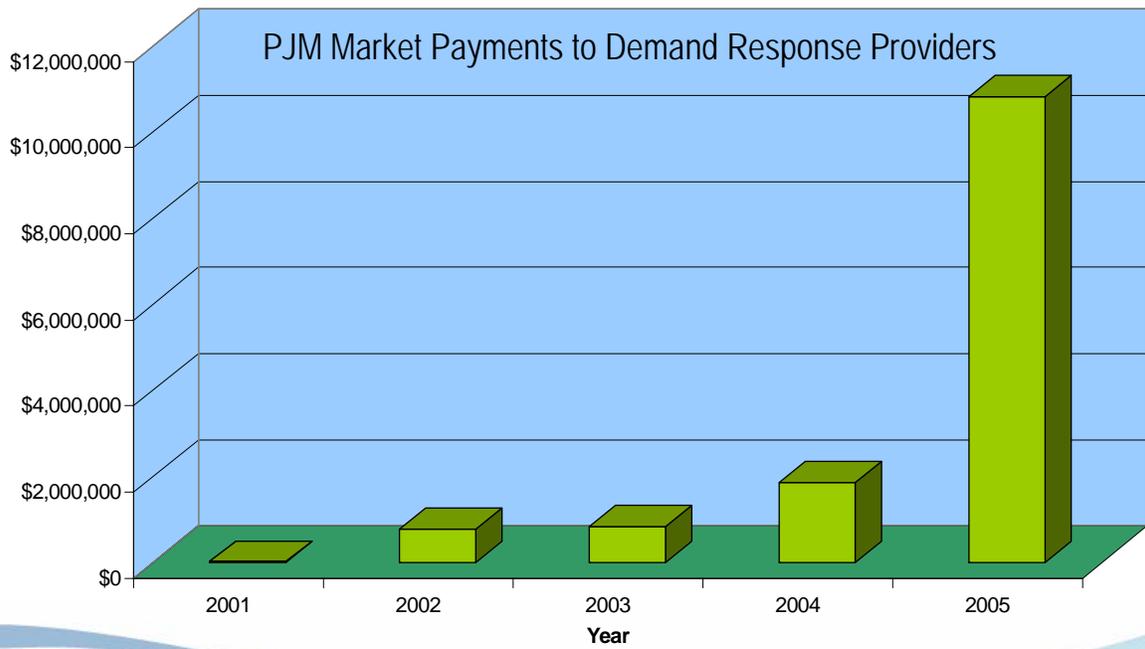


Opportunities for Demand Response as PJM has Evolved in 2005

Revenue Opportunity	Central Station Generation (PJM)		PJM (January 2005)	PJM (as of December 31, 2005)	PJM with approval of RPM	PJM with addition of Forward Energy
Real-Time/ Spot Energy Sales		?				
Day-Ahead Energy Sales		Demand Side Response				
Forward Energy Sales			No	No	No	Forward Energy Reserve
Forward Capacity Sales	RPM will enhance	?	Limited	Limited	RPM auction	RPM auction
Energy & Capacity payment for emergencies		?	Not in all cases			
Ancillary Services	Spin, regulation, etc...	?	No			



PJM Market Annual Demand Response Activity



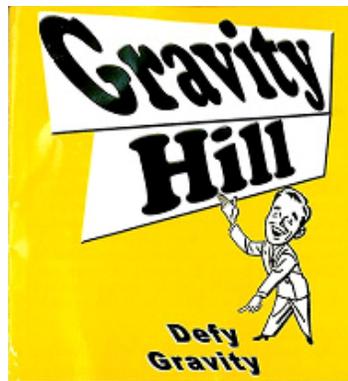
- **Lesson Four:** Avoid the ‘race to the bottom’
 - Use transparency of the market to drive the “smart grid”
 - Use the disaggregated model to drive new technology
 - Don’t choose technologies
 - Avoid gaming the regulatory model



Don't lose sight of the key goals:

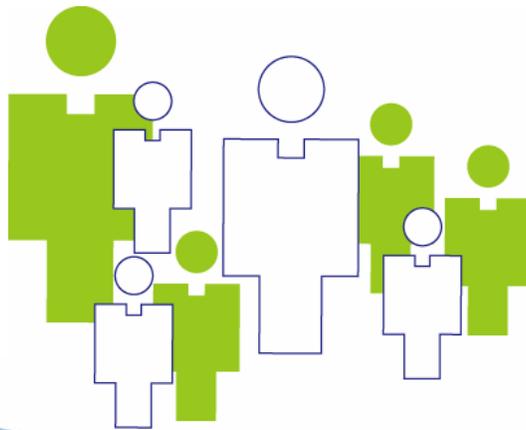
- Raising the Bar
- Making the 2/3rds/1/3rd world work
- Markets shift the risk of poor decision-making: More important than ever
- Don't rely on regulatory solutions: get the right structures in place

“Hanging in mid-air”: a dangerous place





- A restructured industry or “Golden memories of yesteryear...”
 - The choice is ours





Let's Talk

LET'S TALK...

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