Electric Resource Choices, Electric Resource Imperatives on the Demand Side

Council of State Governments Annual Meeting
November 13, 2007
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Introduction

Regulatory Assistance Project

RAP is a non-profit organization, formed in 1992, that provides workshops and education assistance to state government officials on electric utility regulation. RAP is funded by the Energy Foundation, US EPA & US DOE.

Richard Sedano was Commissioner of the Vermont Department of Public Service, 1991-2001
The Regulatory Assistance Project

- RAP Mission:

  RAP is committed to fostering regulatory policies for the electric industry that encourage economic efficiency, protect environmental quality, assure system reliability, and allocate system benefits fairly to all customers.
Traditional View of the Power System

Great Potential on the Demand Side!
Demand Side Resources: First Priority Resources?

- Energy Efficiency
- Demand Response
- Distributed Generation (incl. Combined Heat and Power -- CHP)
- Dynamic Rates (enabled by Advanced Meters)
Texas urged to press for more power plants
Capacity expected to start getting tight by 2009

Friday, February 10, 2006
HOUSTON – It's time to plan new power plants in the U.S., and in Texas, speed is more critical than in some other areas of the country.

The number of new power plants planned for the U.S. in the next 10 years won't increase capacity enough to meet demand, experts at a Cambridge Energy Research Associates conference said Thursday. And in Texas, capacity will become uncomfortably tight by 2009, some experts predicted. "If that's when we start building coal and nuclear, we will be in a world of hurt," said CERA power expert Daniel Mahoney.

In order to meet electricity demand with cheaper fuel sources, such as coal and nuclear energy, Texas and other states must begin planning the plants now, Mr. Mahoney said, because building such generators takes many years. Otherwise, power generation companies will be left with only one quick-to-build option: natural gas, with its high and volatile price.

Trouble is, planning new power plants is difficult these days because it's unclear whether natural gas prices will drop. Further, talk among some lawmakers of new environmental rules could put coal plant investments at risk, and even though public perception of nuclear power seems to have improved, no one's tested that popularity by breaking ground on a new facility.

This adds up to caution among power plant investors at the very time the country needs them. "I think people are going to keep that capital powder dry," said Bruce Williamson, chief executive of Dynegy Inc., which owns power generators across the country, including one in Texas.

Even when electricity markets are stable, power plant investment is a risky business that depends on fuel price projections and the amount of time before there's a return on investment. "The key drivers as we invest in these markets are fuel prices," said Alex Urquhart, chief executive of GE Energy Financial Services. "The decision whether to build a new coal plant is: What do you think will happen to gas prices?"
NERC: Where will these power stations come from?
Growth in Electric Use and Demand has **Risks**

- More power generation (cost control, siting)
- More exposure to **fuel price increases**
- More exposure to fuel price and availability **volatility**
- More exposure to energy security concerns
- More transmission
- More air emissions (caps) and **water use**
Significant recognition of demand resources

How much can the US deflect current growth rates in electric use?
Goal

To create a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations.
Energy Efficiency
Advantages

- **Cost-effective** compared with other resources
- **Offset growth**-driven construction, pollution, losses, etc.
- **Promote reliability and security**
- **Inherent barriers exist** for electric and gas consumers to do efficiency on their own
- The utility system is a good **delivery** mechanism
- Government clarity and **leadership** are important
- It can be a sustainable **economic development** tool
Value of Energy Efficiency

- Mature energy efficiency programs are being delivered at a life cycle cost to consumers of roughly 3 cents per kWh – costs pretty stable
- Avoid more expensive, volatile and intrusive supply
- Fits into existing and new buildings, promotes competitiveness and comfort
1. Recognize energy efficiency as a high-priority energy resource.

2. Make a strong, long-term commitment to implement cost-effective energy efficiency as a resource.

3. Broadly communicate the benefits of and opportunities for energy efficiency.

4. Provide sufficient, timely and stable program funding to deliver energy efficiency where cost-effective.

5. Modify policies to align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy efficiency investments.
Leadership and Clarity

- Leadership is important with energy efficiency
  - It is a departure from traditional strategies to meet energy needs, and some experts and highly experienced professionals are skeptical of EE value
  - It relies on investments in assets not owned or controlled by utilities
  - To overcome “legacy friction” and apply current imperatives and lessons of success, clear, unambiguous leadership is key
For high spending and saving states:

- Spending ranges to 3% of utility revenues
- Savings are approaching 1% of sales and 1% of peak (MN expects to get 1.5%, IL: 2%!)
- Considering how to get “all cost-effective”
- Increasing attention to measuring success by savings as a first priority, with spending more of an indicator of commitment
Connection to Codes and Standards

- If standard practice for energy consumption is more efficient, consumer funded energy efficiency programs can focus on more valuable objectives.
  - This is the way building energy codes and appliance and equipment efficiency standards work with consumer funded energy efficiency programs.
Energy Efficiency and Climate Change

- The most cost-effective and effective means to address climate change are energy efficiency programs
  - Energy efficiency programs are cheaper than low-carbon generation alternatives
  - Energy efficiency programs are reliable
  - Energy efficiency programs are within the control of states, and states can do them well
System Planning and Demand Resources

- Demand Resources can lighten system load and relieve congestion
  - System plans that already identify system deficiencies and congestion over a 10 year horizon, and identifies large asset solutions, can also identify equivalent demand resource (EE, DR, DG) deployment that accomplishes similar results

- Note: many G&T&D investments are load growth driven
Integration of EE into Resource Planning and Investment

- Is EE an afterthought? Just a social program? A resource?
  - Are utility generation expansion plans created with a static load forecast?
  - Are transmission expansion plans created with a static load forecast?
  - Is energy efficiency deployed with any consideration of avoiding generation or wires?
Integration of EE into Resource Planning and Investment

- Energy efficiency emerges as the least cost alternative for meeting consumer electricity needs if planners ask the right questions
  - How much energy efficiency (reduced load growth) would alleviate the need for this new transmission line?
  - How much energy efficiency would it take (at cost?) to achieve sustained zero load growth?
- Should EE and DR and renewables be “first?”
QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.
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Delivering Energy Efficiency through Utility Rates

- All Consumers pay because there are system benefits to all from energy efficiency
- Utilities or other administrator delivers
- Network of contractors to the program
- Supply chain of services and products (trade allies, manufacturers, salespeople)
- Leadership reinforces success
- Regulators oversee progress and direction
Paying for Energy Efficiency, Compensating the Utility

➢ Cost Recovery
  ➢ Expense
  ➢ Rate base (capitalize)
  ➢ Timeliness and certainty

➢ Incentives
  ➢ Neutralize throughput incentive
  ➢ Provide performance based financial incentives
1989 NARUC Resolution

“Reform regulation so that successful implementation of a utility’s least-cost plan is its most profitable course of action”
Demand Reductions Save Society Big $$

Price of Electricity
Supply

\[ P \]

\[ P_{DR} \]

Price reduction

Demand

Demand_{DR}

Supply

demand reduction

\[ Q_{DR} \]

\[ Q \]

Quantity of
Energy Efficiency and Demand Response, Pricing

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Combined Commercial Cooling and Lighting Loadshape
Baseline, Load Management (STDR), and Energy Efficiency

Watts per Square Foot

Hour

Baseline
Load Management
Efficient
Combined Commercial Cooling and Lighting Loadshape
Baseline, Load Management (STDR), and Energy Efficiency

Watts per Square Foot

Hour

Baseline
Efficient
Efficient and Load Mng
Dynamic Rates

- Charges based on production cost, not averaged
- Complement to energy efficiency
- Opportunity for consumers to self-regulate their usage -- pilots show some “conservation effect”
  - Design is important to anticipate “losers” and maximize system benefit
  - Baby steps and long term vision needed
Advanced Metering Infrastructure (AMI)

➢ Gee Whiz!
   - Prospective benefits are powerful
   - Will states implement dynamic rates?

➢ Cost Benefit analysis is tough
   - Costs for complete coverage: $400/meter
   - Benefits group as
     - System operation savings (insufficient to cover cost)
     - Electric resource savings (harder to measure)
Strategies

- Energy efficiency performance (or portfolio) standard
  - Target savings as % of sales or % of growth
  - Verified credits can be traded among utilities
    - EM&V more rigorous to support trading system
  - Can be rolled into renewable standard (RPS)
- A commitment to zero or negative sales growth
Distributed Generation

- **Net Metering** makes small scale easy
- **Interconnection** simplifies business
- **Utility rates** matter
- **Incentives** help a lot, generally motivated by externalities, like climate change and economic development
Action Agenda to Support Demand Resources

- Priority in Statute
- Clear Delivery Responsibility
- Consistent Incentives
- Performance Expectations
- Assure full value is recognized
- Codes and Standards
- Net metering and interconnection
- Open mind on new rate designs
- Realism on Costs -- Real Least Cost Assessments
Just Released: Publications that Help

- Vision 2025 -- framework for change
- Aligning utility incentives
- Model EE Program EM&V
- Resource Planning Guide
- EE Potential Guide
- Other outreach and education tools
Resources

- Energy Efficiency Tool Box –
  - A compendium of state experiences:
    - [http://www.raponline.org/Pubs/General/EfficiencyPolicyToolkit.pdf](http://www.raponline.org/Pubs/General/EfficiencyPolicyToolkit.pdf)
  - [www.aceee.org](http://www.aceee.org)
  - [http://www.epa.gov/cleanenergy/actionplan/eeactionplan.htm](http://www.epa.gov/cleanenergy/actionplan/eeactionplan.htm)
  - [http://www.raponline.org/Pubs/CAMPUT_Report_1_30_06_Final_Revised.pdf](http://www.raponline.org/Pubs/CAMPUT_Report_1_30_06_Final_Revised.pdf)
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