

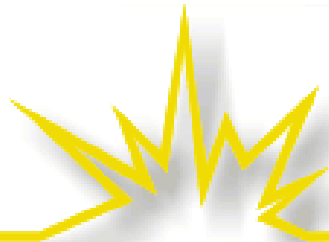
# **Demand-Side Resources and Electricity Markets**

**A Policy Agenda for New England**

Richard Cowart

**Massachusetts Electric Restructuring Roundtable**

March 23, 2001



***The Regulatory Assistance Project***

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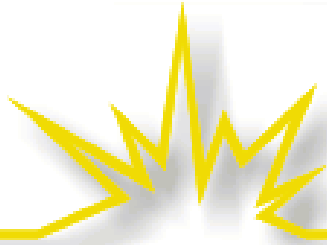
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## 4 Basic Points

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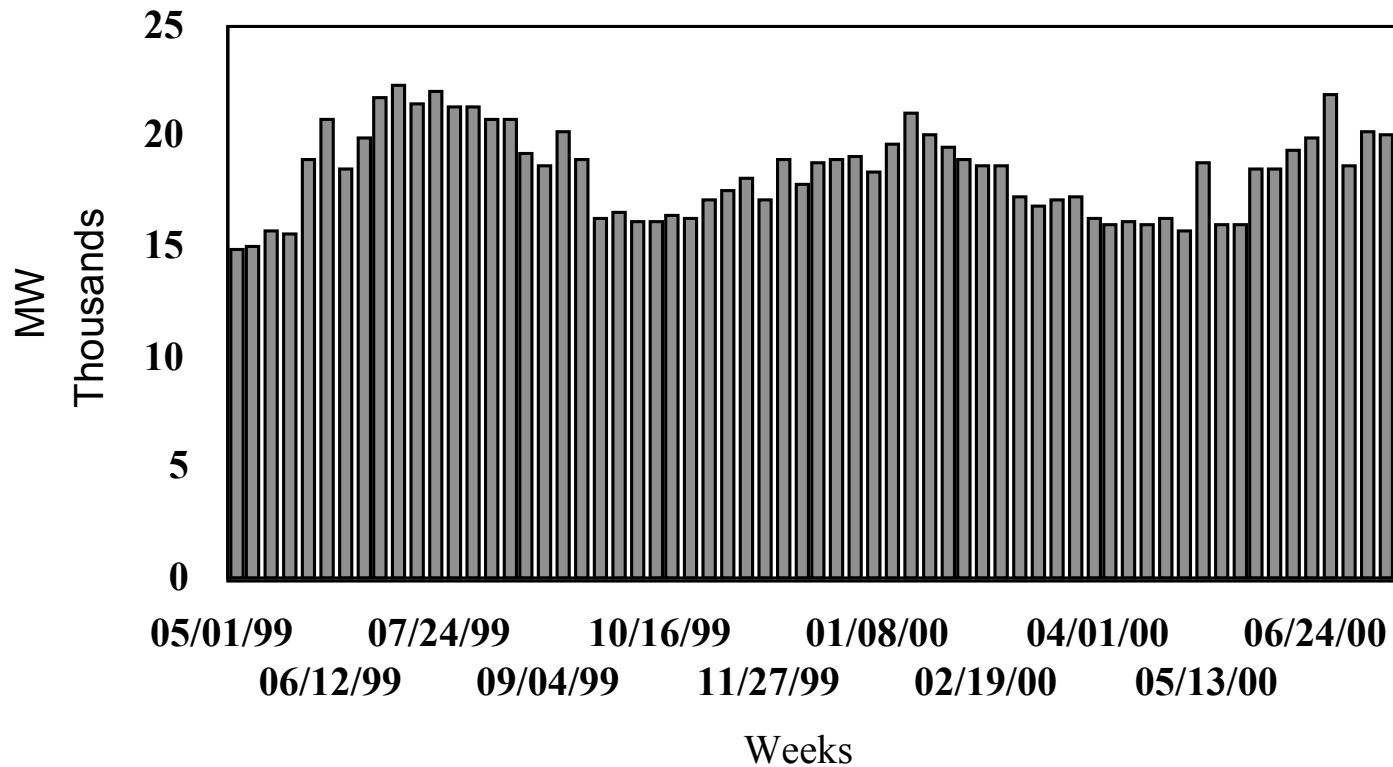
- **(1) Load growth and current market structures are causing serious problems;**
- **(2) The pain is unnecessary: efficiency and load management offer low-cost, cleaner, reliable solutions;**
- **(3) Market reforms will enable demand responses to stabilize power markets;**
- **(4) "Baseload efficiency" is also critical -- market, governmental, and regulatory actions needed here too.**



# New Problem #1: Price Spikes

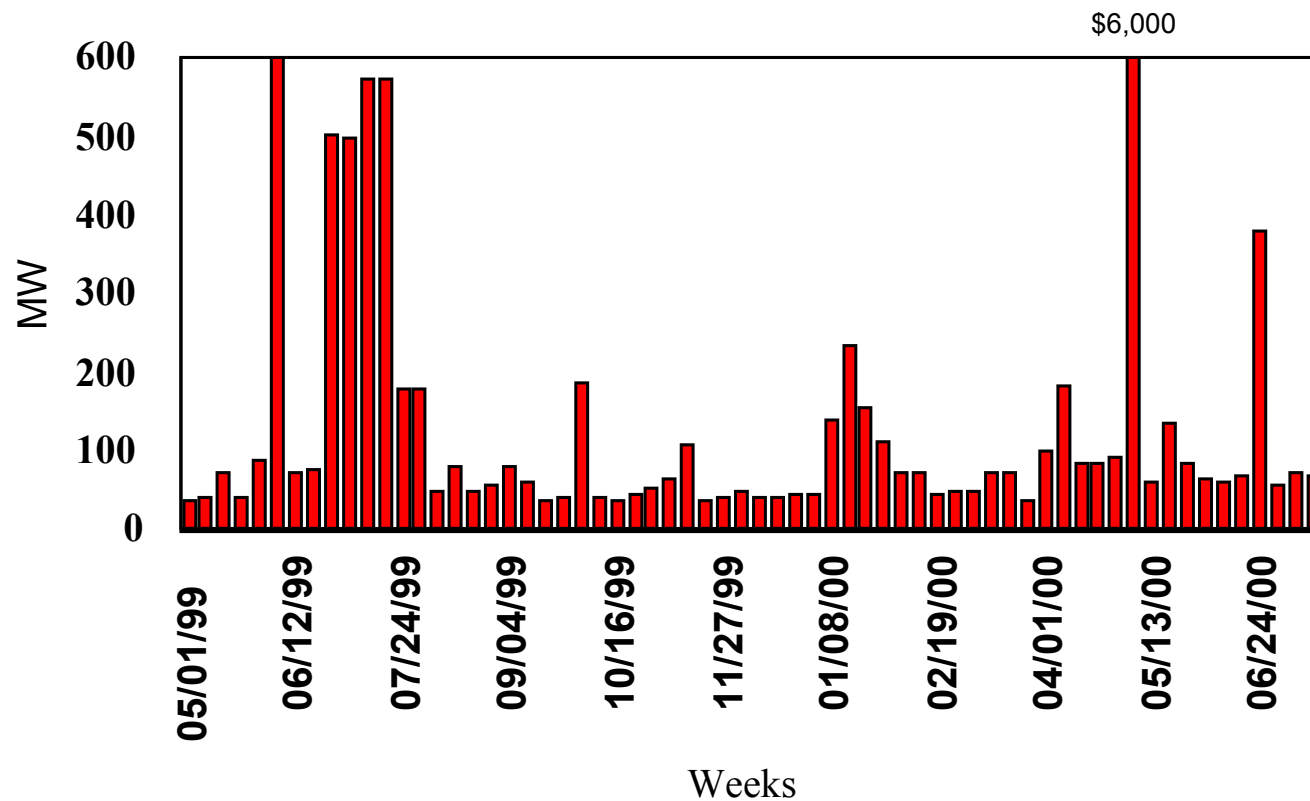
Weekly peaks vary by 50%

## NEPOOL Weekly Peak Loads May 1, 1999 through July 21, 2000



# While weekly peak PRICES vary by 10,000%!

## NEPOOL Weekly High Spot Prices May 1, 1999 through July 21, 2000

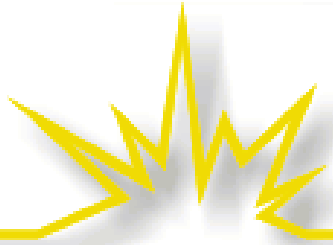




# **New Problem #2: Market Power**

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- **Market Power: "The ability of a producer to affect prices through output or pricing (bidding) decisions"**
- **High prices in thin markets -- higher than effective competition would produce**
- **California: + \$10 Billion and counting**
- **Rising concentration in generating capacity:**
  - **Just 10 companies now control > 50% of IOU generating capacity; The largest 20 companies control more than 72%**
  - **In regional markets, it's even higher**
  - **We're back to 1935**



## **New Problem #3: Reliability**

- **Outages, warnings, close calls in several regions**
- **Symptoms vary:**
  - **Transmission overload (West-wide)**
  - **Generation adequacy (NE, CA 2000)**
  - **Load pocket peak (SF 2000)**
  - **Distribution overload (Chicago, NY 1999)**
- **Causes vary, too -- but all are related to growing loads**



# **New Problem #4: Monopoly without portfolio management**

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- Half of the nation: still in franchise
- The other half: Power supply is 95% default service (a monopoly)
- Everywhere:
  - Wires -- 100% monopoly
  - System operation, reliability rules are centralized, regulated operations
- IRP left behind, but
- Portfolio management still essential



# Strategic Energy Choices

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- A. Supply-side facilities
- B. Reforming energy markets
  - Demand-side bidding, price-responsive load at wholesale
  - Real time pricing at retail
- C. End-use energy efficiency
  - Market transformation, utility, and governmental programs
- D. Portfolio management: all of the above



# Challenge for NE ISO

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- Wholesale rates and markets are not "just and reasonable" if structural flaws impose unnecessarily high costs on consumers.
- Costs will be unnecessarily high unless the wholesale market is structured to allow LSEs and demand-side managers to realize the wholesale value of their services.
- To realize those values, the wholesale market must:
  - (a) remove cross-subsidies and barriers that undermine cost-effective efficiency and load management;
  - (b) include demand-side bidding; and
  - (c) support cost-effective energy efficiency investments

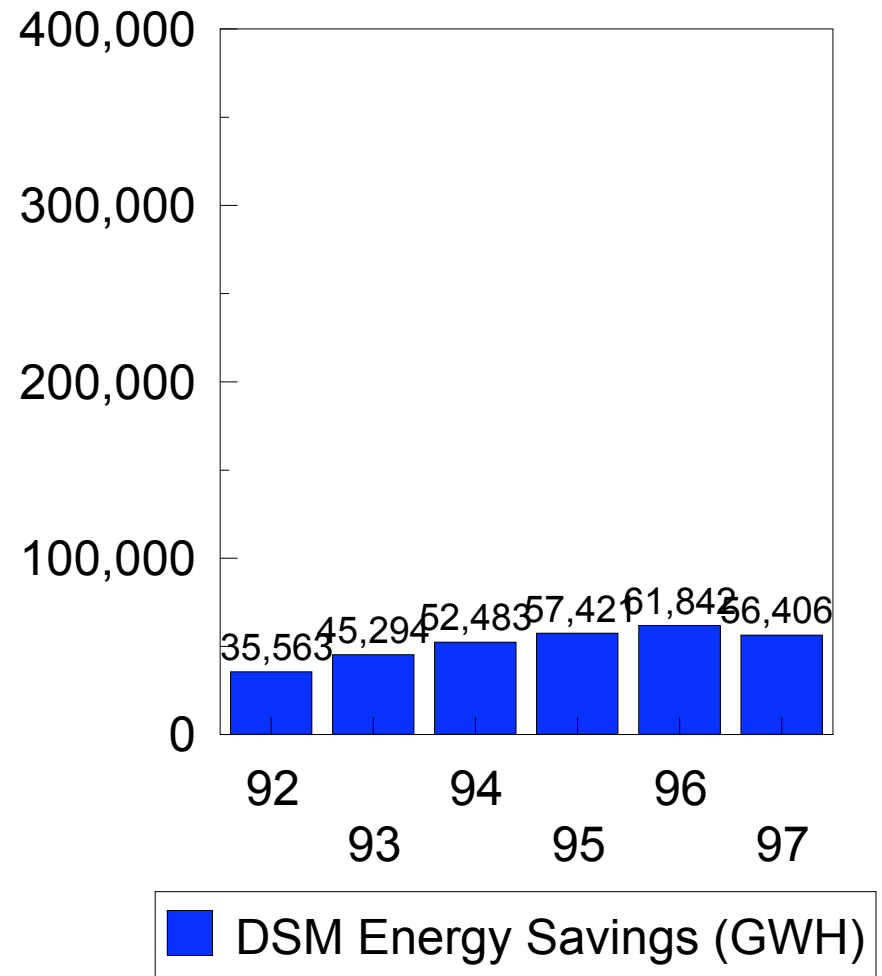
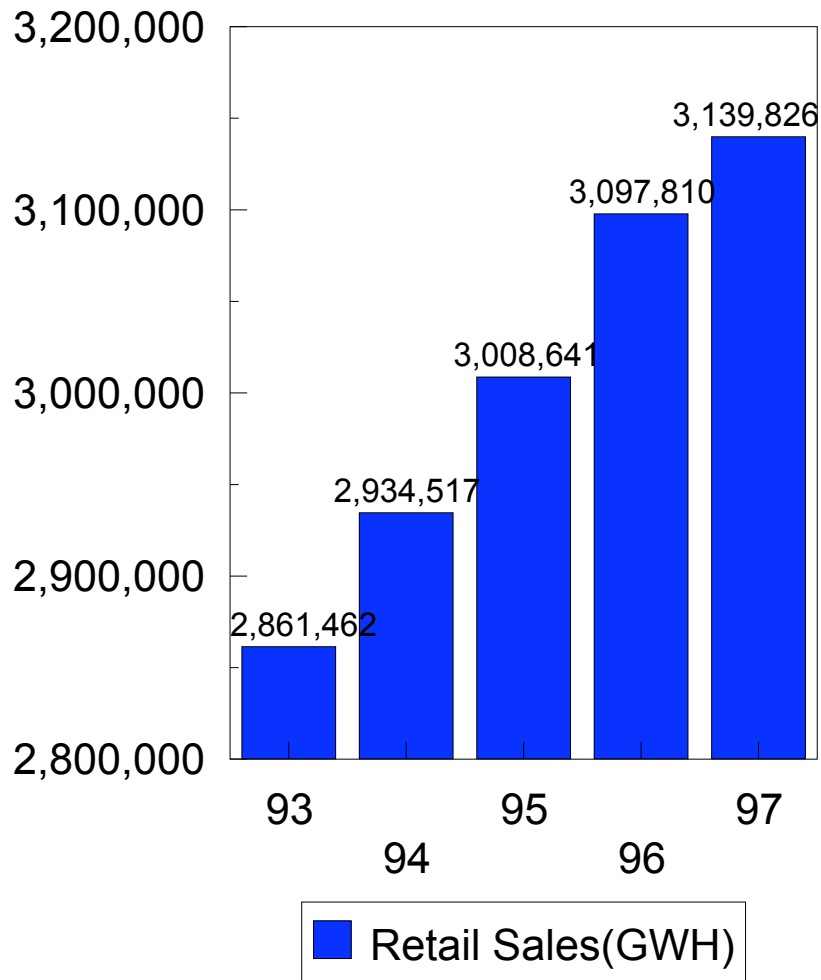


# Load growth: Can Turbines and Wires Do It?

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- **Sales up 31% last decade;**
  - --another 37% in this decade?
- **Peak loads growing rapidly**
  - summer peak up 56,000 MW in 4 years
  - NERC predicts +160,000 MW, 1999-2010
  - We're adding the electrical equivalent of an entire New England every 14 to 18 months
- **DOE forecast: adding the equivalent of Japan and Germany to the US grid by 2020**
- **Can we build and run over 300,000 MW of new capacity?** What are the transmission, emission and cost consequences?

# Reliability Myth: It's All About Supply





# Lighten the Load

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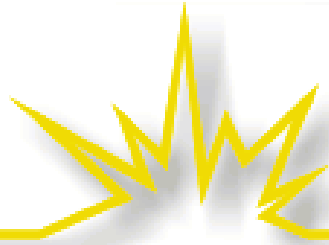
- **Demand-side initiatives will help with all four problems: price spikes, market power, reliability, and portfolio balance**
- **Exclusive supply side focus: the never-ending problem of weakest links**
- **Demand-side resources: can be cheaper, cleaner, faster**
- **Reliability benefits for the entire network -- from local wires to regional fuel supply**
- **Power cost benefits, too**



# **Competition Myth: Load Will Respond to System Costs**

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- **Customers see average prices, and they see them long after consumption**
- **Few customers on interval meters or real-time prices**
- **Many generation and reliability costs are socialized**
- **Low, fixed default service prices blunt customer interest in both EE & LM**
- **Historic market barriers to efficiency remain: first-cost, discount rates, information barriers etc.**



# More Anti-efficiency practices

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## ➤ **Load profiling by pools or RTOs**

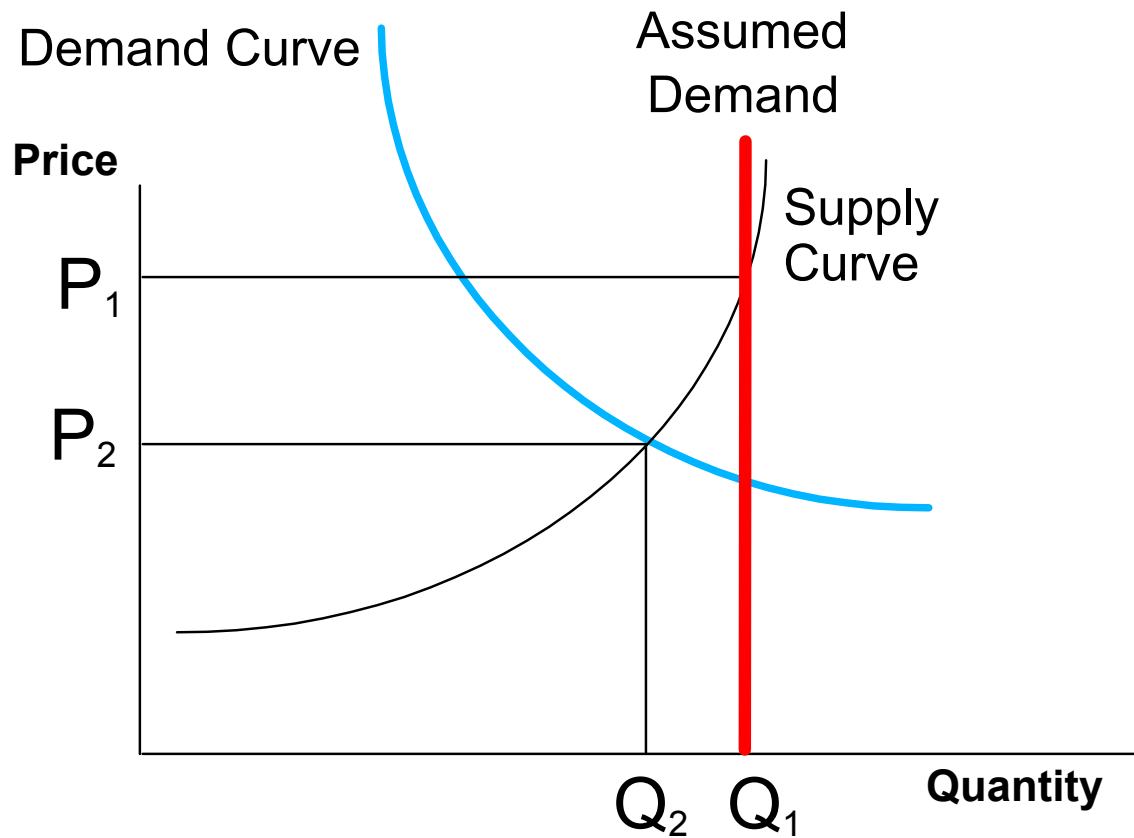
- An LSE charged for usage on a customer profiled basis will not benefit from high-value peak-load reductions unless a new profile is created for those customers

## ➤ **Reliability rules and practices**

### **favor turbines and wires solutions--**

- "Dispatchable load" often cannot compete fairly with generation in ancillary services markets
- Demand-side options not permitted to compete with generation and wires for uplift and other "socialized" support.

# Discovering the Demand Curve





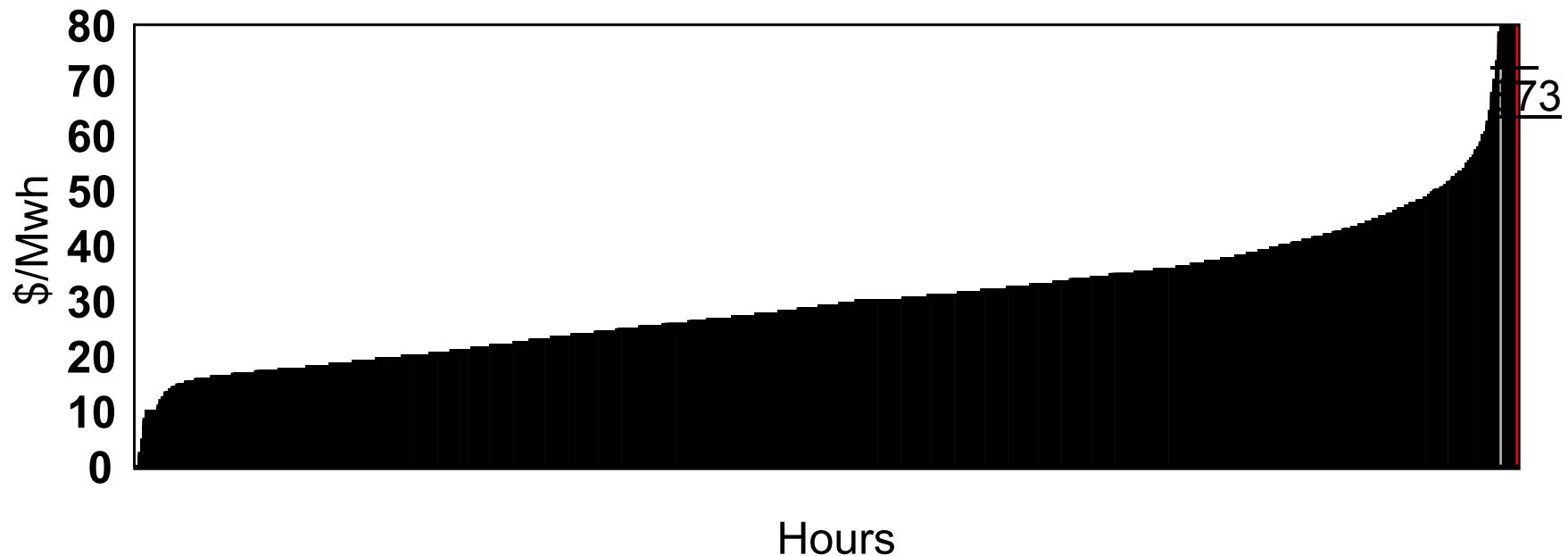
# **Solution Menu (A): Wholesale Market Features**

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- **(1) Demand-Side Bidding:**
  - Price-sensitive load bids reveal a real demand curve
  - Reform load profiles to support demand mgt
- **(2) Multi-Settlement Markets:**
  - Day-ahead settlement permits economic resales of load reductions
- **(3) Demand-Side Reserves:**
  - "Dispatchable load" as an ancillary service
- **(4) Efficient Reliability Standard:**
  - Least-cost approach to reliability charges

# 1% of hours = 16% of annual spot power costs

## New England Spot Energy Prices 12 Months Ending July 21, 2000



Max = \$6000/MWh, May 8, 2000

1% of hours above \$73/MWh

Top 1% of Prices equal 15.8% Wholesale Costs (weighted by load)

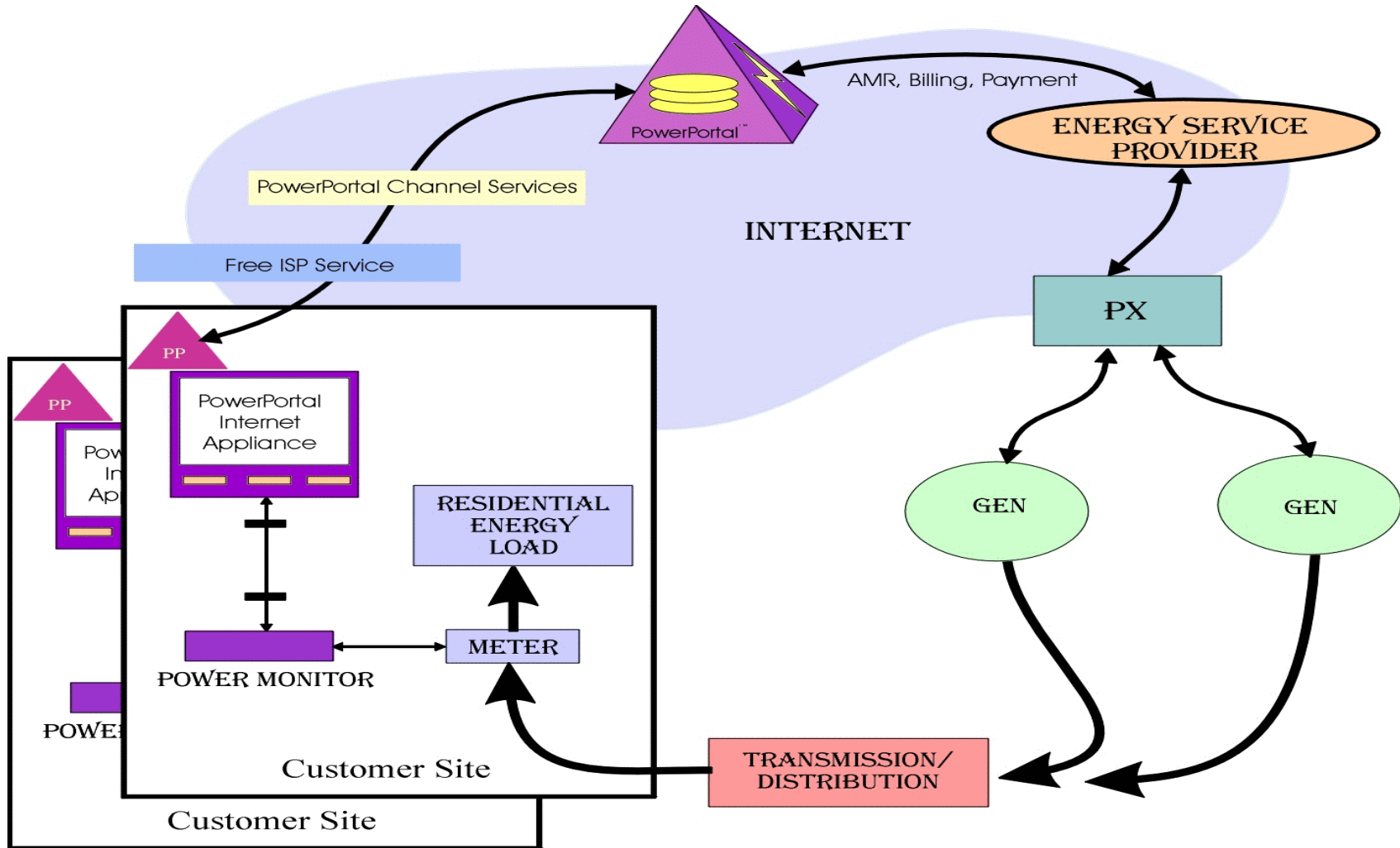


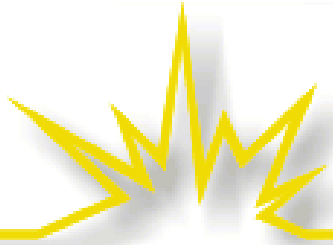
# Load Response Reservoir

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- **SAIC study of responses to real-time prices (1995):**
  - ~17% of peak load is discretionary and could respond to price signals
- **E-Source survey of large firm energy managers (2000):**
  - ~15% of large-firm load could be price-responsive in the short run
- **Key concept:** demand buy-back markets

# New Business Model





# Reforming Load Profiles

- LSEs charged for usage on a customer profile basis
- LSE does not benefit from high-value peak-load reductions unless a new profile is created for those customers
- LSEs don't see real time prices
- LSEs cannot capture benefits of efficiency or LM



# Efficient Reliability Decision Rule

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- **Before "socializing" the costs of a proposed reliability-enhancing investment through uplift or tariff, PUCs and FERC should first require a showing:**
  - that the relevant market is fully open to demand-side as well as supply resources;
  - that the proposed investment is the lowest cost, reasonably-available means to correct a remaining market failure; and
  - that benefits from the investment will be widespread, and thus appropriate for broad-based funding.



## **Solution Menu (B):**

### **Rates and Rules for the Wires**

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- **(5) Transmission Congestion Pricing:**
  - reveals value of DG, EE, and LM
- **(6) Enhancing Reliability Through Retail Rate Design:**
  - Artificial price caps and default plans harm efficiency and reliability
  - Revenue caps, not rate caps, for wires companies



# **Solution Menu (C):**

## **Promoting End-Use Efficiency**

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- **(7) System Benefit funds**
  - Several examples: e.g., NYSERDA
- **(8) Energy Efficiency Utility and other regulated DSM programs**
  - Key example: Vermont Efficiency Utility
  - Utility programs and standards- Texas 10%
- **(9) Codes, standards, and market transformation programs**
  - Regional uplift could enhance reliability, lower power costs



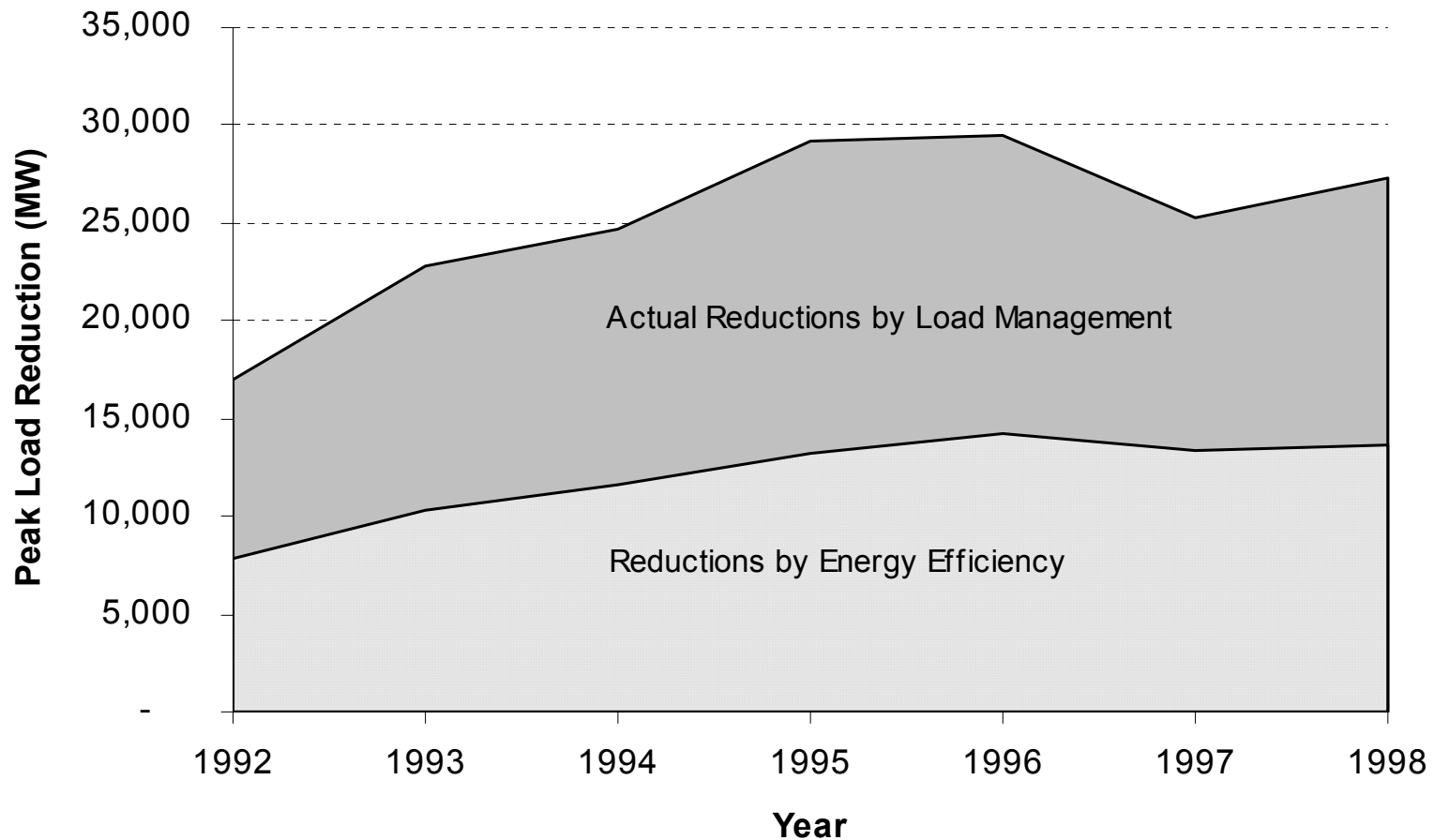
# Old Lessons...Again

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- **Productivity and environmental quality**  
-- still count
- **Market failures**  
--still real
- **Peak response AND "baseload efficiency"**  
-- both still needed
- **Resource Portfolio Management**  
-- IRP in a new light



# DSM: Peak management AND Baseload Efficiency





# Efficiency --

## A Proven Resource

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- Utility DSM programs delivered 29,000 MW savings at a grid cost of 2 to 3 cents per kwh
- Codes and standards have delivered more
- Modular, dispersed, many technologies
- Efficiency lowers customer bills, and lowers the price spikes for everyone
- Lowest in pollution
- Efficiency relieves stressed distribution, generation and transmission constraints
- Programs can be tailored for each market



# Who will promote efficiency in today's electric industry?

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- **Generators profit from high loads and thin markets**
- **Peakers REQUIRE high prices**
- **Franchises: getting lean for the future**
- **Wires companies with rate caps or freezes can be addicted to throughput**
  - **Lost profits math:** a 5% increase in sales can increase profits by more than 50%!
- **RTOs, Transcos, FERC: No tradition of support for efficiency**

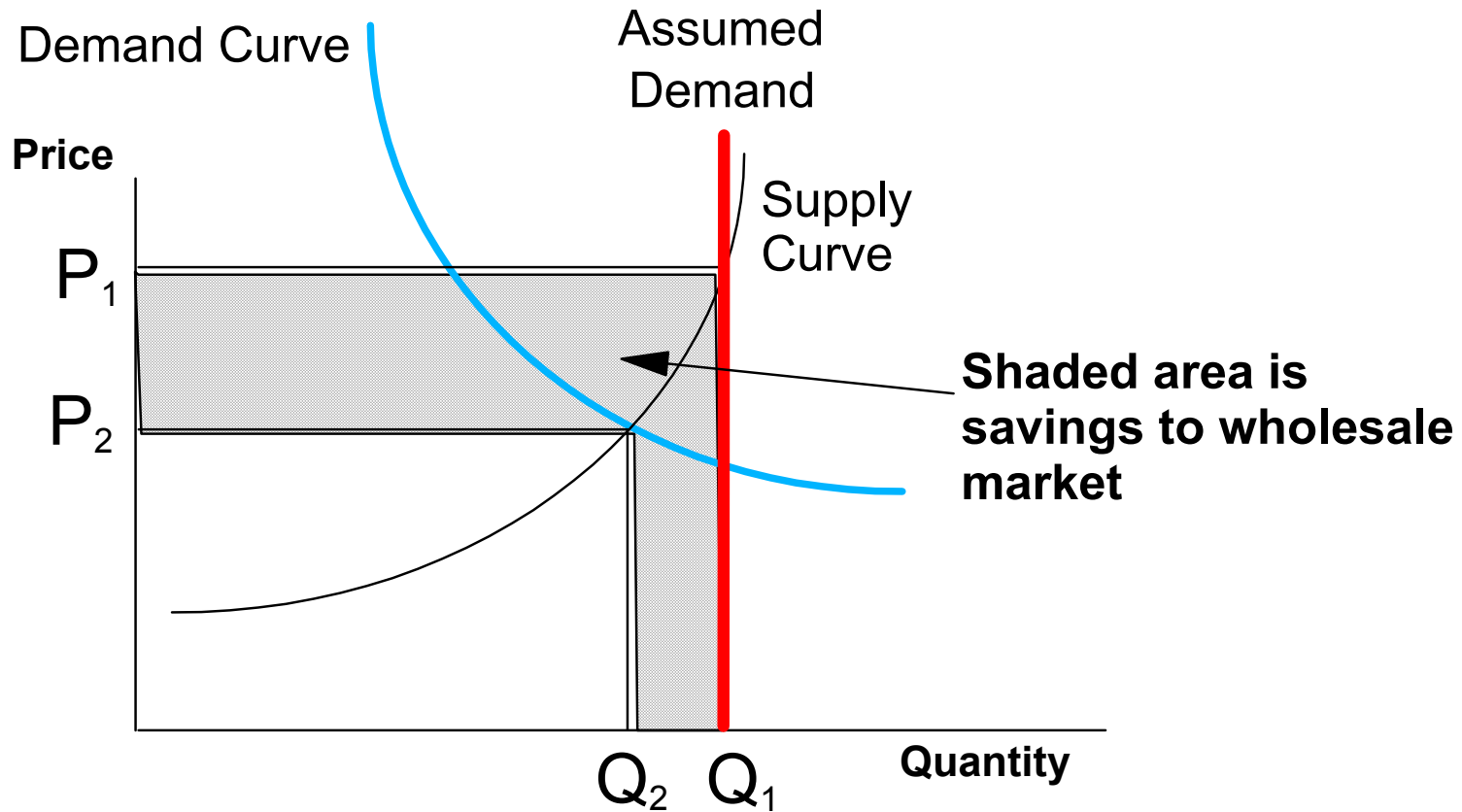


# The Efficiency Reservoir

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- **DOE "Five Labs" Study (1997):**
  - cost-effective DSM potential is 15% of total load by the end of this decade
- **Utility filings in current NJ docket --**
  - available, cost-effective savings potential is as much as 30% of total load
- **ACEEE studies, summer 2000:**
  - At least 64,000 MW available cost-effectively by 2010 from just three program areas:
    - Residential A/C upgrades, repairs
    - Commercial HVAC equipment and tuneups
    - Commercial lighting design and upgrades

# The Public Value of Efficiency





# The Public Value of Efficiency

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- **Tracking CA PX Prices ('98-'99)**
- 1 MW baseload reduction saves participating customers \$219,000
- AND it also saves non-participating customers \$658,000 by lowering market clearing prices in the PX for everyone
- "Public savings" \$.075/kwh, or three times the direct savings
  - (Rich Ferguson, CEERT 2000)



# Uplift Charges

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- **Uplift charges are a common element in pool rules and new markets**
- **Examples: spreading out the costs of congestion; paying for reliability measures that have widespread value**
- **Question: If the new RTO/ISO/Pool has power to assess "uplift" for imports, reserves or transmission to enhance reliability, why not for efficiency, load management, or DG?**



# And finally...

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- Two bags of savings:
  - Market efficiency and
  - Energy efficiency
- Why trade in one to get the other when we can get both?

