

# Efficiency Standards and the Power System: Benefits for Vermont

Senate Natural Resources and Energy Committee

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# New England Demand Response Initiative

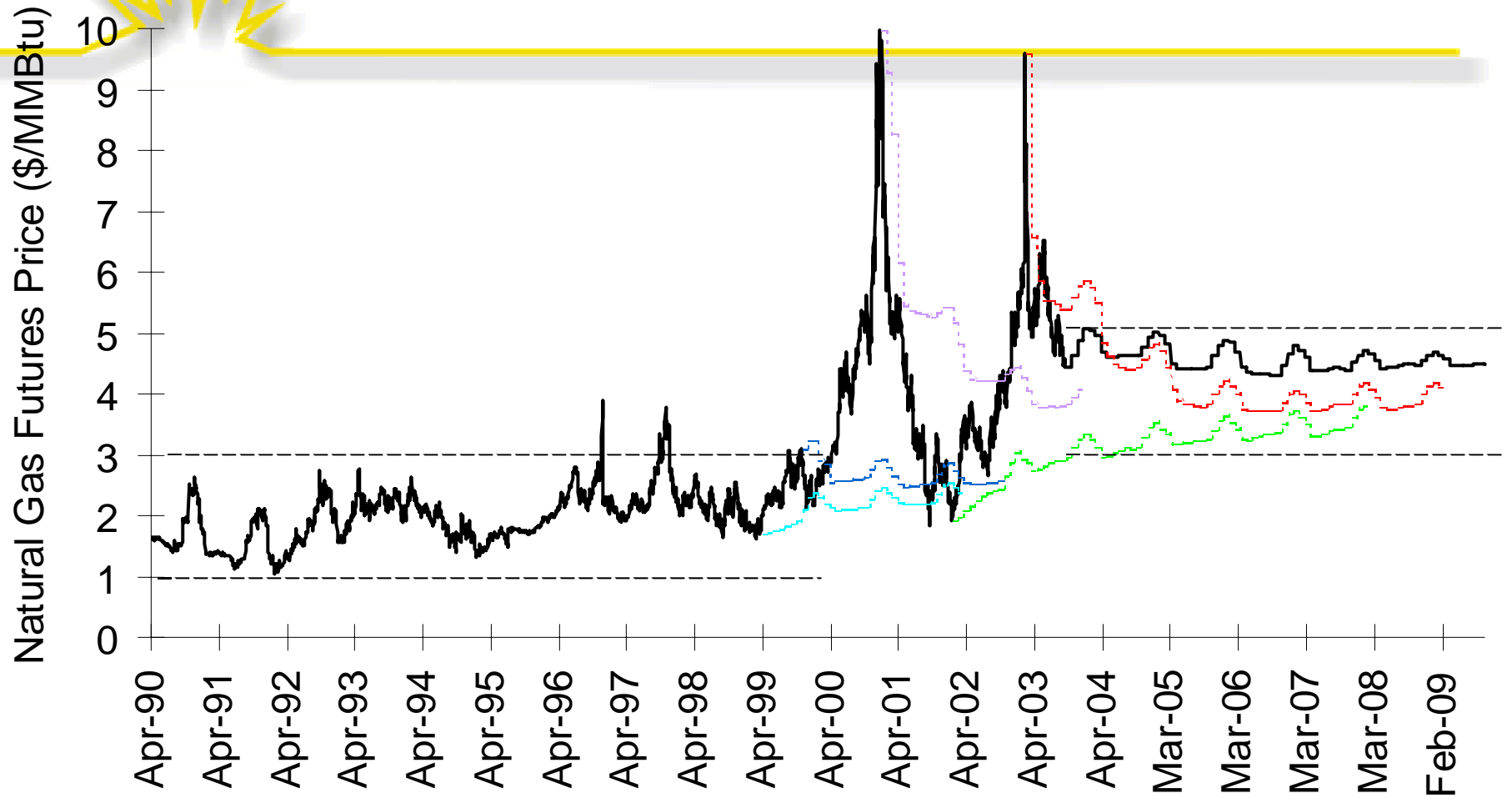
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- **Unprecedented Broad Sponsorship:** ISO-NE, NECPUC, NESCAUM, NYISO, DOE, EPA, FERC
  - ❖ State + Regional + Federal agencies
  - ❖ Utility + Environmental regulators
  - ❖ Direct support and participation by FERC
- **Broad, Regional Stakeholder Participation:**
  - ❖ More than 30 stakeholder groups, including 3 ISOs, 6 state PUCs, utilities and DR providers, DOE , EPA, state air directors, market participants, state energy offices, and advocates
- **Expert consulting team** provided Framing Papers, technical support – great library of resources
- **38 Major recommendations**, almost all by consensus of all stakeholders

# Selected NEDRI recommendations— Energy Efficiency

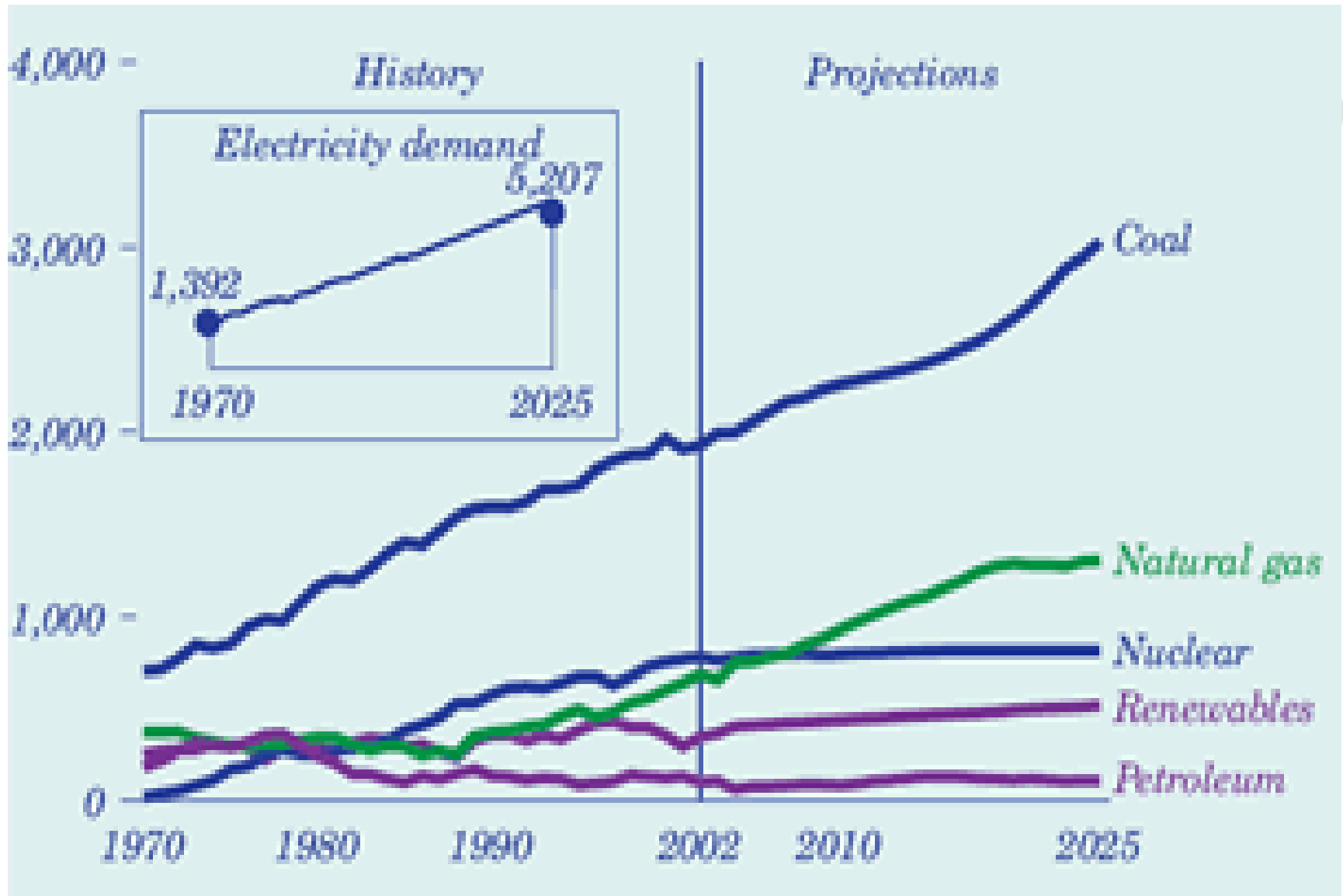
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- EE-1: Ratepayer support for EE should be maintained, and potentially increased “to capture all cost-effective energy efficiency”
  - **EE-3: New England states should adopt common model appliance/equipment standards for ten specific products – could displace 25% of load growth to 2020**
  - EE-4: Update building codes and improve their implementation across the region –could displace 10% of load growth to 2020;
  - EE-6: Create a regional coordinating council for EE program design, cooperation, and assessment.

# Gas Prices Up to Stay



Source: NYMEX

**Figure 4. Electricity generation by fuel, 1970-2025 (billion kilowatthours)**



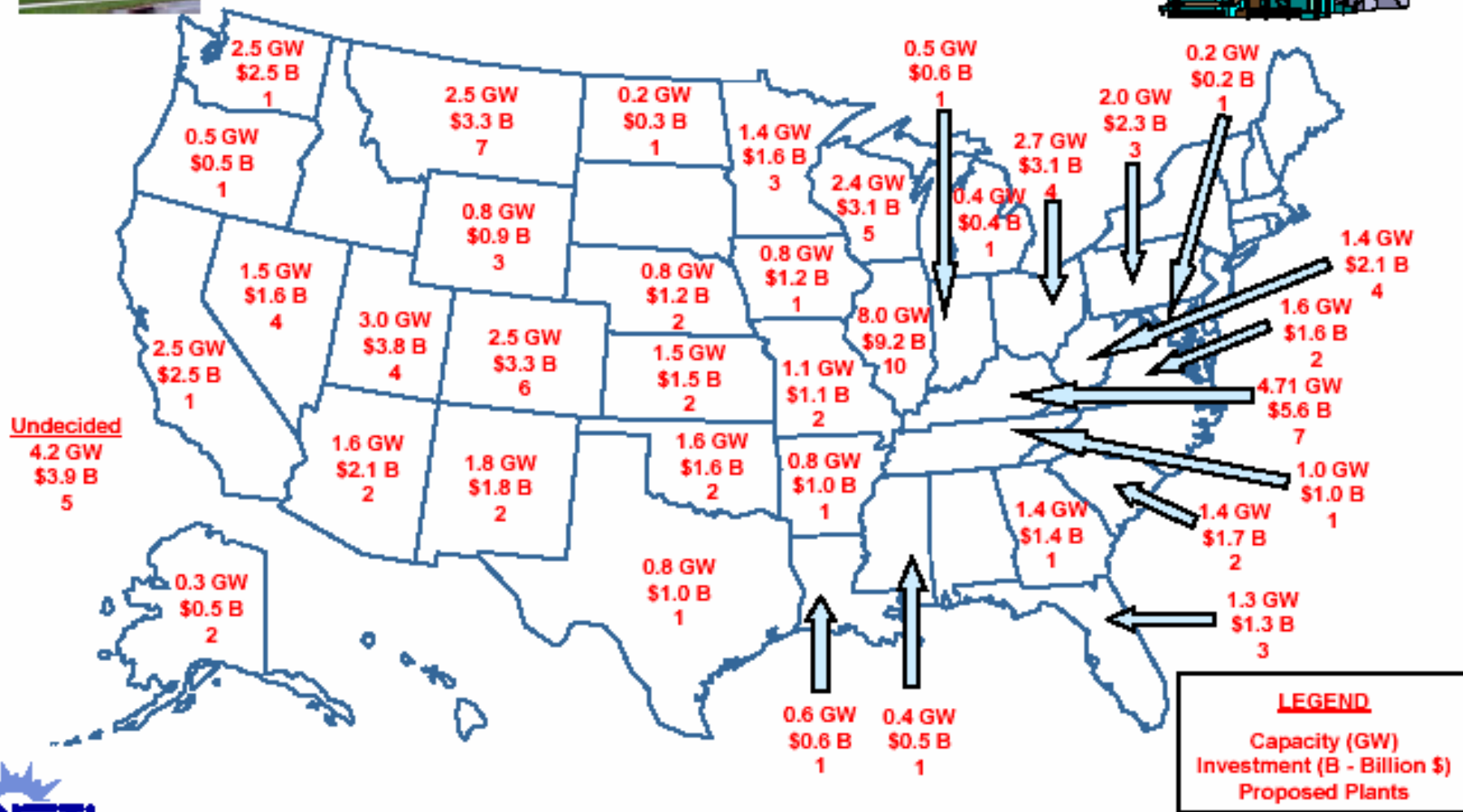
# Coal's Resurgence in Electric Power Generation



Equivalent Power  
for  
63 Million Homes

## Proposed New Plants

100 Plants  
63 GW  
\$ 73 Billion



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OCES 09/03/2004



# Why efficiency? A regulator's view

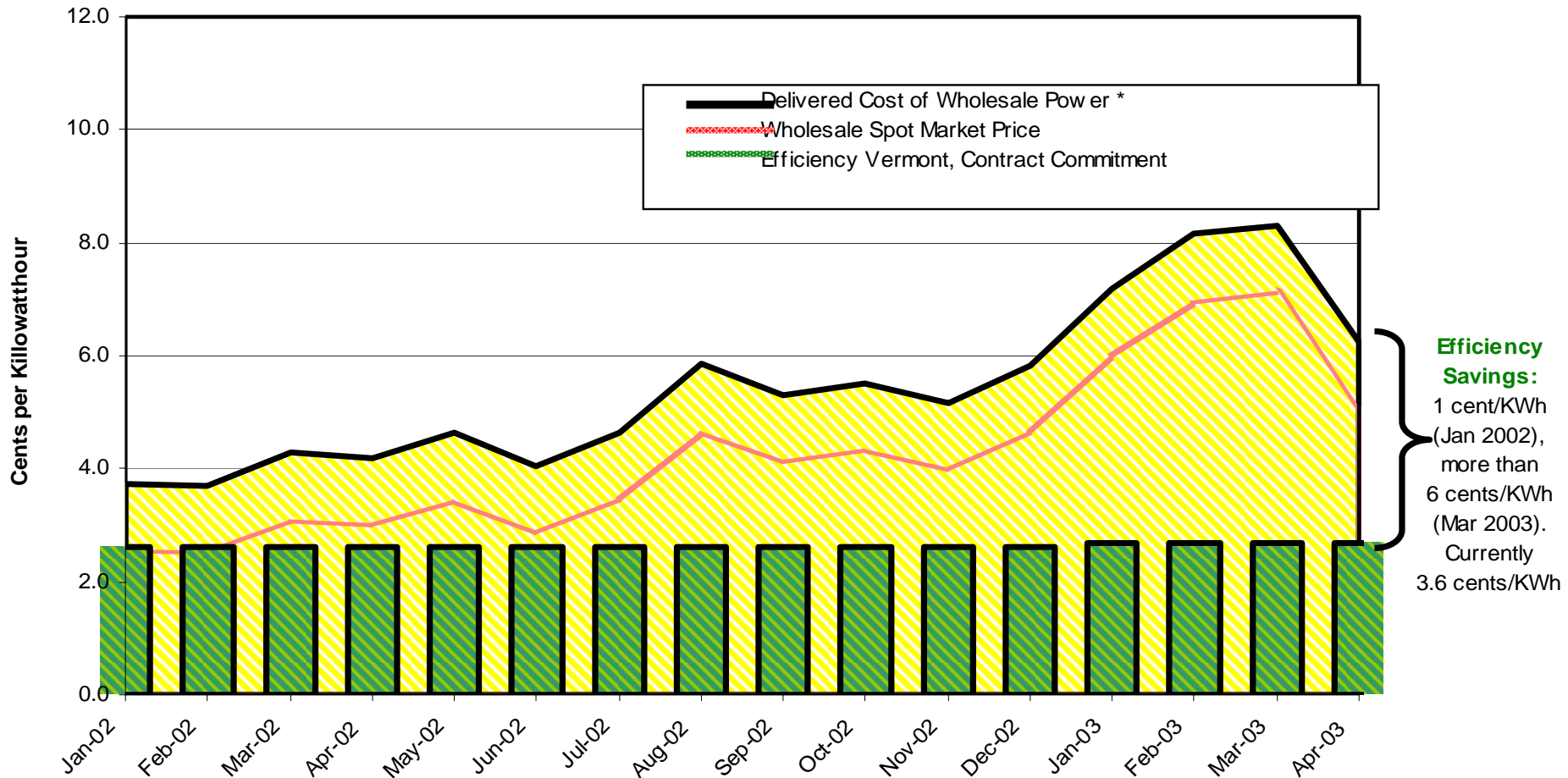
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- New power plants & fuel *more expensive*
- Rapid load growth causes *reliability* problems
- Generation is a major source of *pollution*
- *Productivity* is the engine of growth – becoming more efficient improves the economy
- Lots of low-cost efficiency is *available*
- *Key point: the power system includes generation, wires, AND end use consumption*

# Efficiency is cheaper

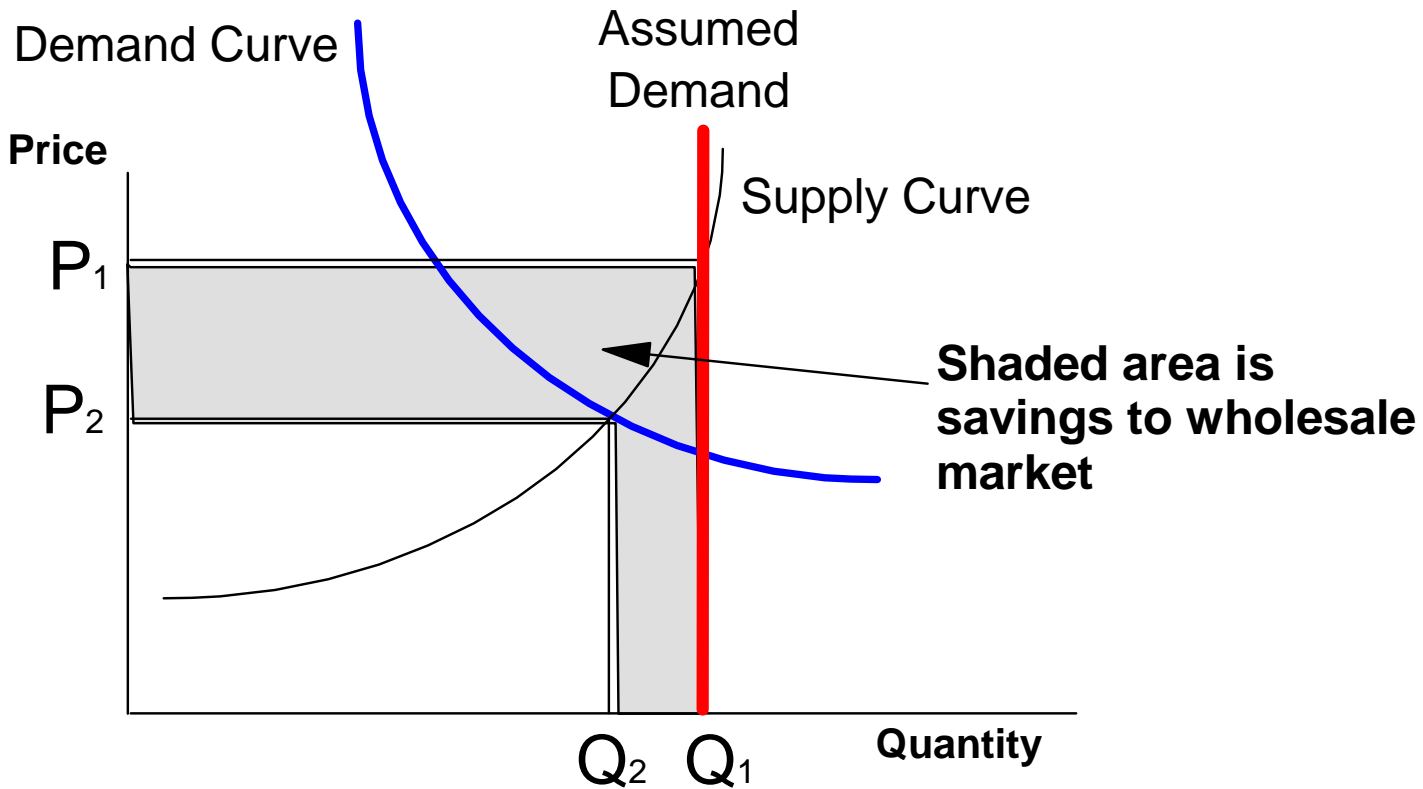
## Power Costs vs. Efficiency Vermont Costs for 2002 & 2003

NE-ISO Average Monthly Price



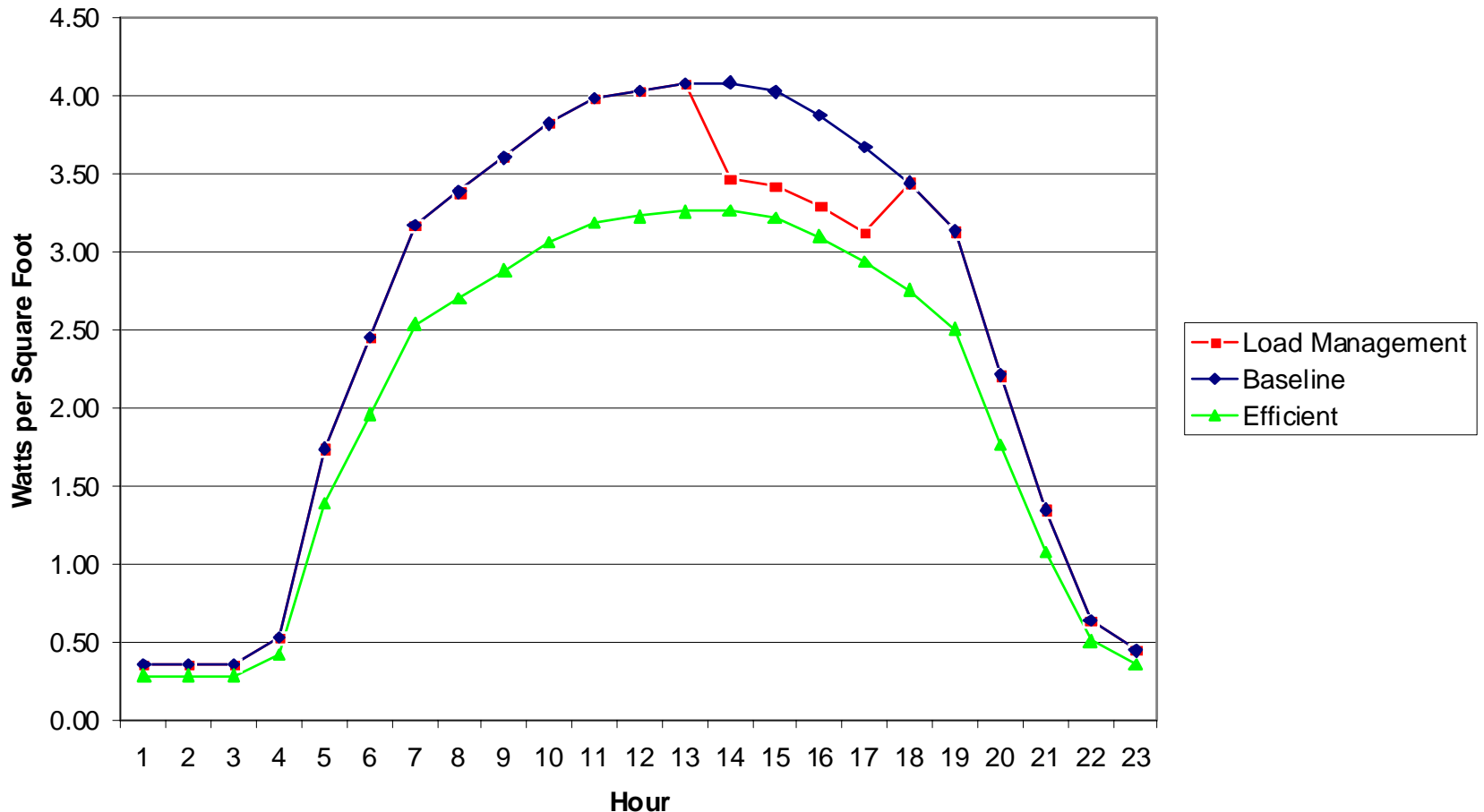


# The Public Value of Efficiency



# Efficiency lowers peak loads, improves reliability

Combined Commercial Cooling and Lighting Loadshape  
Baseline and Load Management Compared to Energy Efficiency



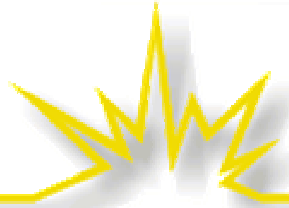


# Efficiency lowers pollution costs

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- No single industry has a larger environmental "footprint" than the electric industry
- In America, the electric industry contributes
- 67% of the SO<sub>x</sub> emissions
- 28% of the NO<sub>x</sub> emissions
- 36% of the CO<sub>2</sub> emissions
- 33% of the mercury emissions
- but only 2.5% of the gross national product

# The Large Efficiency Reservoir



- **DOE “Five Labs” Study (1997)**
  - ❖ cost-effective DSM potential is 15% of total load by the end of this decade
- **ACEEE studies, summer 2000:**
  - ❖ At least 64,000 MW available cost-effectively by 2010 from just three programs:
    - ◆ Residential AC upgrades & repairs
    - ◆ Commercial HVAC equipment and tuneups
    - ◆ Commercial lighting design and upgrades
- **California, Summer 2001: 12% reduction**
  - ❖ “Crash” effort, many programs
- **New England 2003: EE and LM can meet 80% of load growth over next 15 years**

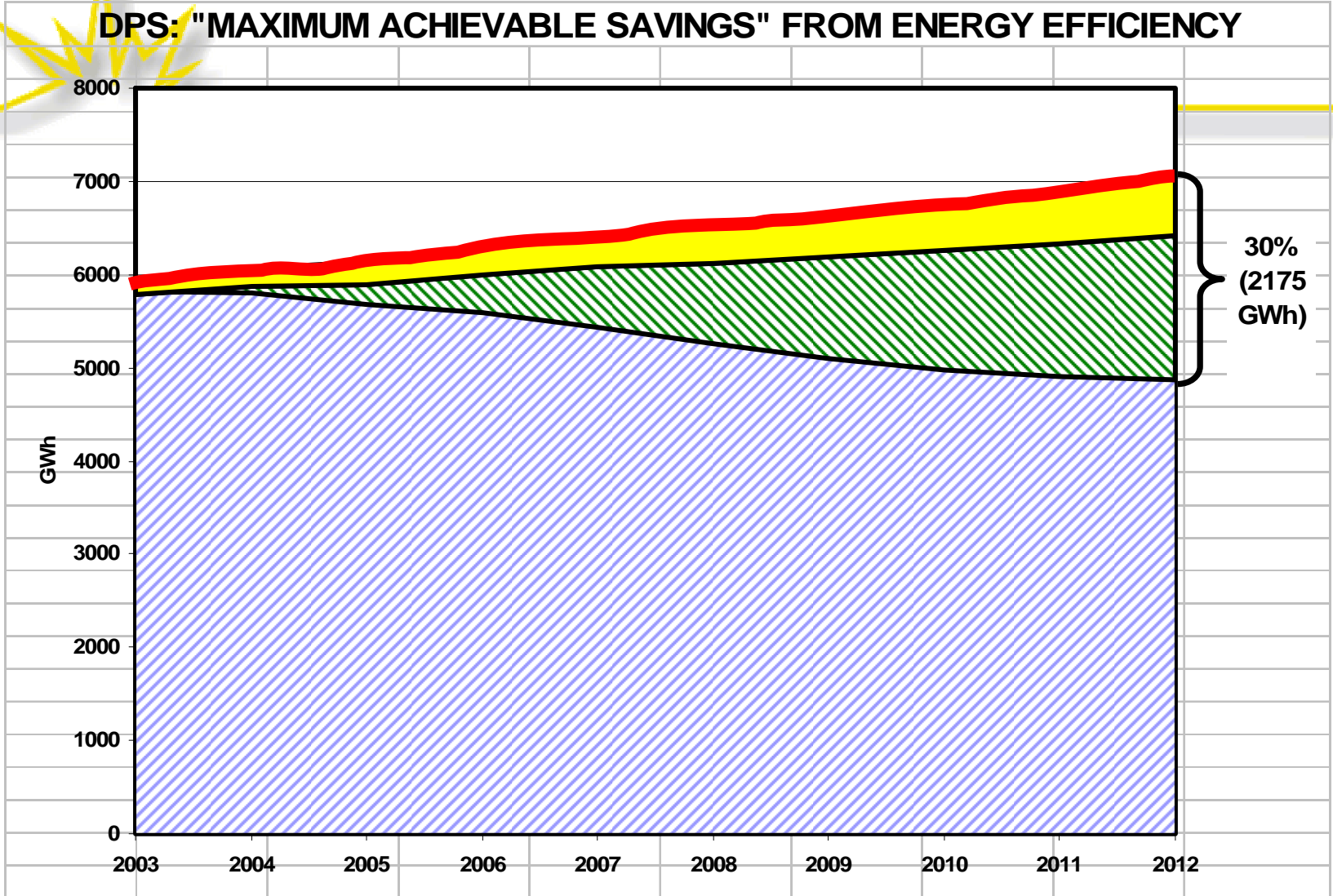
# What if the NEDRI Recommendations were implemented actively?

## One post-NEDRI estimate:

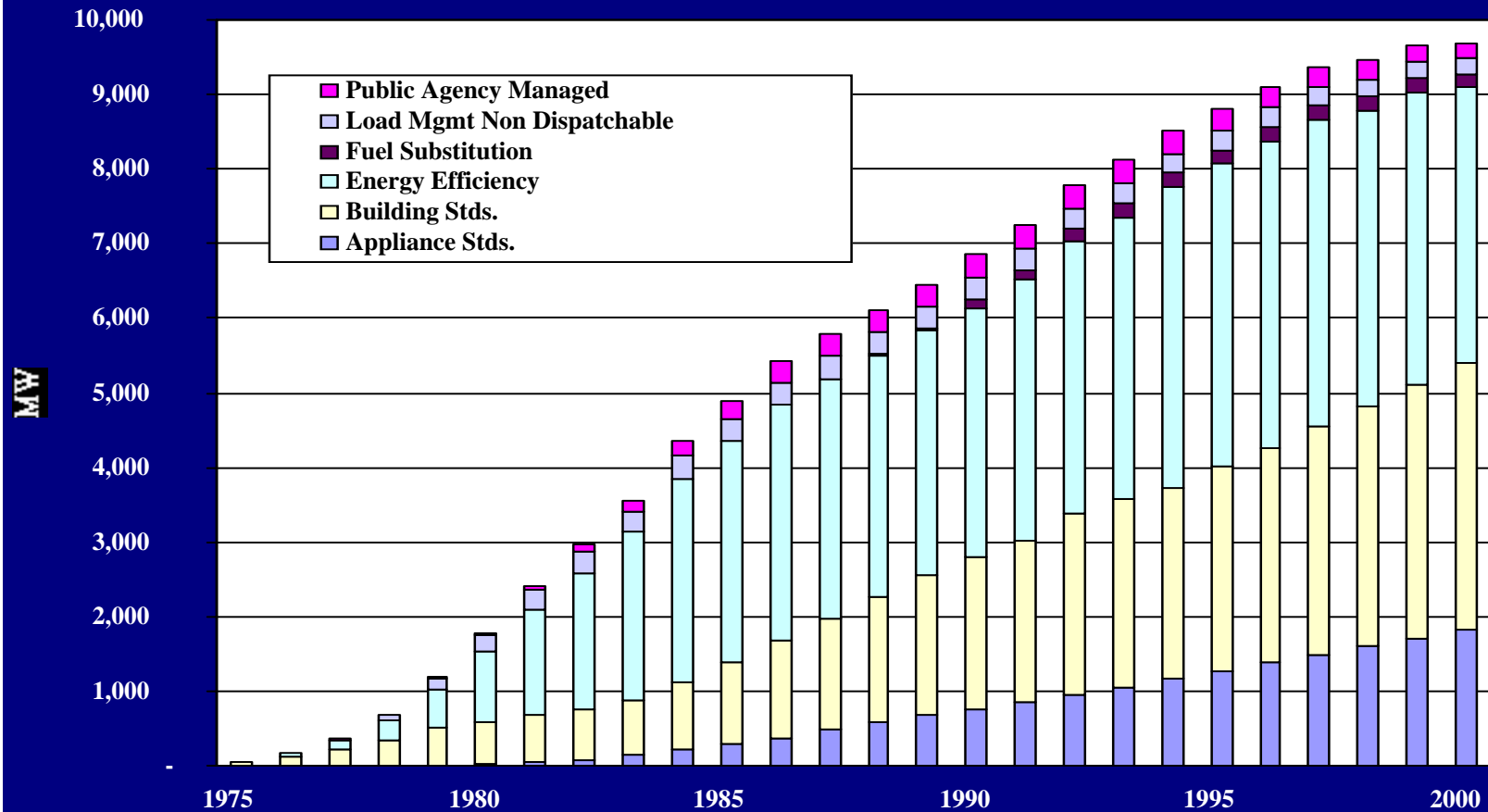
	Mid-Term (2007)	Long-Term (2015)
<b>ISO-NE Peak Demand Forecast (MW)</b>	<b>26,258</b>	<b>29,768</b>
<b>Energy Efficiency Total</b>	<b>500</b>	<b>2,450</b>
<i>Building Codes</i>	0	700
<i>Appliance Standards</i>	500	1,750
<i>Enhanced SBC Funding</i>	?	?
<b>Short-Term DR Total</b>	<b>220-440</b>	<b>440-1,100</b>
<i>Emergency Programs</i>	200-400	400-900
<i>Market Programs</i>	20-40	40-200
<b>Load as Contingency Reserve</b>	<b>10-25</b>	<b>60-300</b>
<b>Dynamic Pricing</b>	<b>50-200</b>	<b>200-750</b>

- ❖ Thus: Energy efficiency could offset 30-50% of incremental load growth
  - ❖ And: DR and Pricing could provide an additional ~300 – 1800 MW of resources –
- Source: Lawrence Berkeley National Lab estimates (C. Goldman and G. Barbose), based on 2003 NEDRI Report after adoption, thus not reviewed or endorsed by NEDRI participants.*

# DPS: "MAXIMUM ACHIEVABLE SAVINGS" FROM ENERGY EFFICIENCY

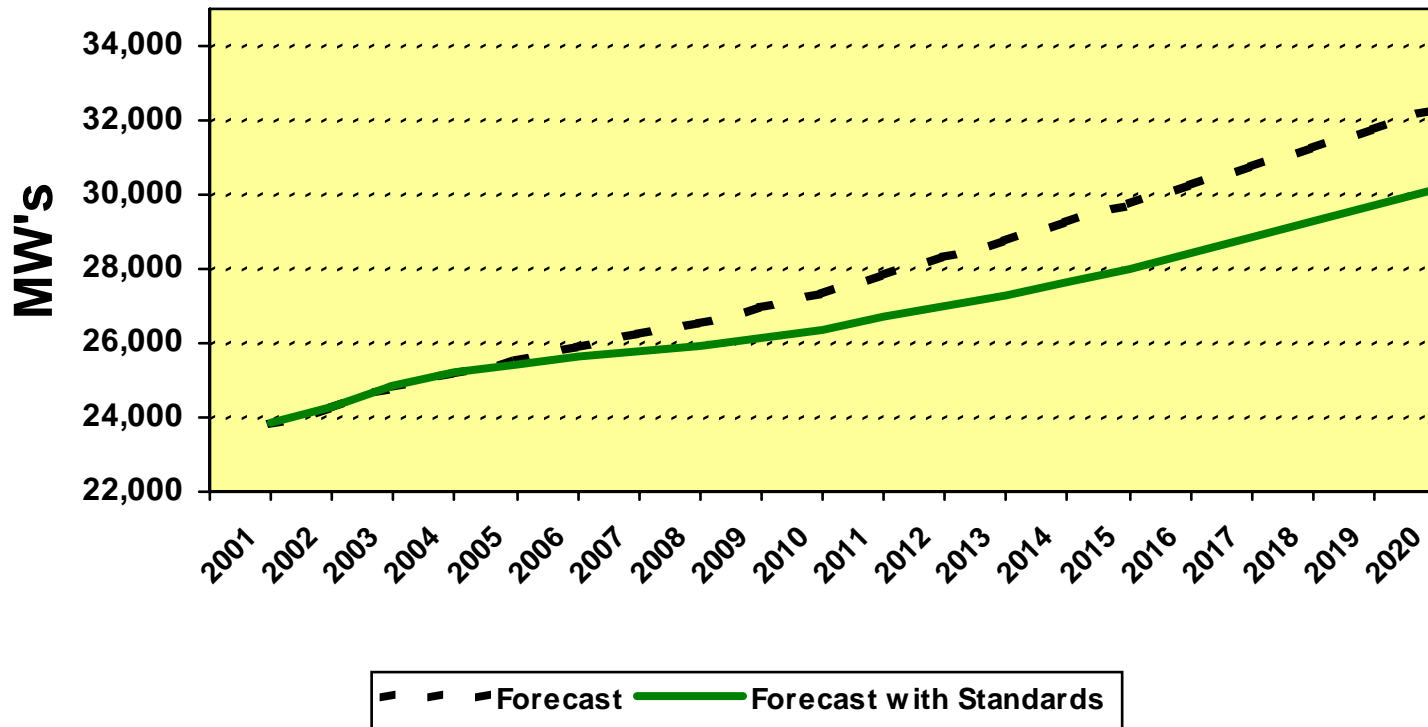


# Efficiency benefits grow over time (California example)



# Efficiency Standards

**Projected New England Regional Electric Demand  
With and Without New/Updated Efficiency Standards**







# Efficiency as a power system resource

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- Generation Benefits:
  - ❖ Both capacity and energy savings
  - ❖ Lowers fuel supply and fuel costs
  - ❖ Reduces required reserves
  - ❖ Avoids pollution costs
- Transmission & Distribution Benefits:
  - ❖ Defers new T & D upgrades
  - ❖ Reduces line losses
  - ❖ Improves reliability
- Financial Benefits:
  - ❖ Lowers total power system costs
  - ❖ Lowers customer bills
  - ❖ Mitigates or avoids expensive price spikes



# Make Efficiency Profitable for Utilities

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- Utilities have many fixed costs, and rates often exceed marginal production costs:
- Extra sales are profitable to utility
- In Vermont: each *saved kWh* can save customer \$.10, but cut \$.04 from utility profits
- Efficiency programs cutting sales by 5% can cut *profits* by 23%
- Needed: rate policies to make efficiency profitable to utilities



# For more information...

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## **New England Demand Response Initiative**

web link at [www.raponline.org](http://www.raponline.org)

Posted: NEDRI Report and Recommendations; Framing Papers and Memos on Demand Response and policy options;

***“Efficient Reliability: The Critical Role of Demand-Side Resources in Power Systems and Markets”***

(R. Cowart, NARUC June 2001)

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