

New England Demand Response Initiative

Dimensions of Demand Response

Capturing Customer Based Resources in New England's Power Systems and Markets

Vermont House Commerce Committee
March 30, 2004

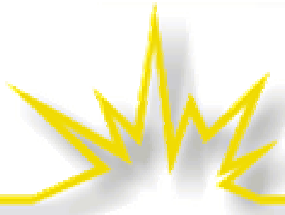
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NEDRI Overview

- **Genesis: 1990s – Electric Restructuring underway in New England**
 - ❖ But Power shortages, price spikes of 1999-2001 – something important is missing !
 - ❖ Regional load growth raises price, reliability and environmental concerns
- **Goal:** balanced energy markets – regional scope
- **Breadth:** Remove market and policy barriers to **all customer-based resources:** load response, energy efficiency, and distributed generation
- **Depth:** Propose coordinated policies and programs for wholesale, retail and wires
- **New England** can lead, provide a model

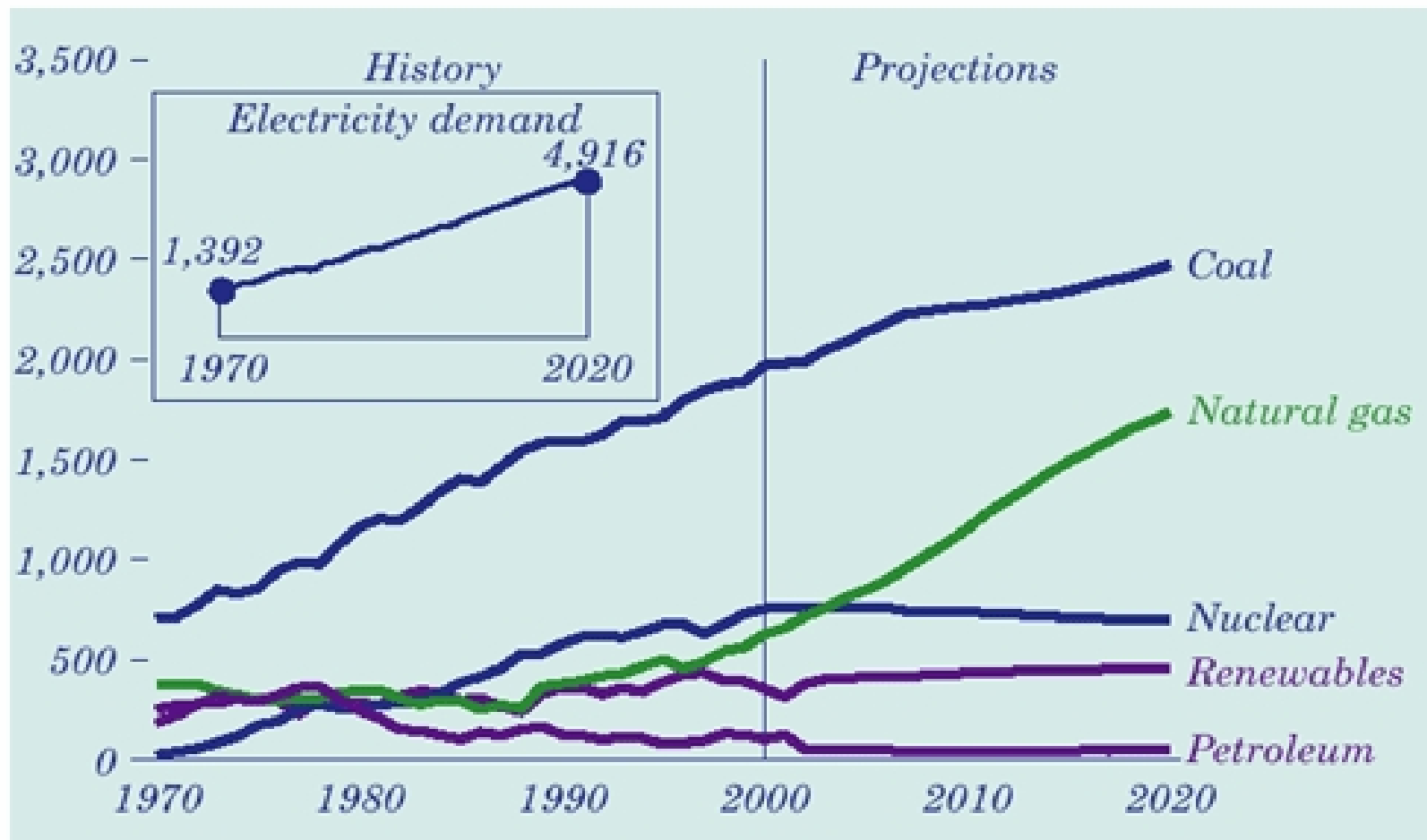


NEDRI Process: Key Points

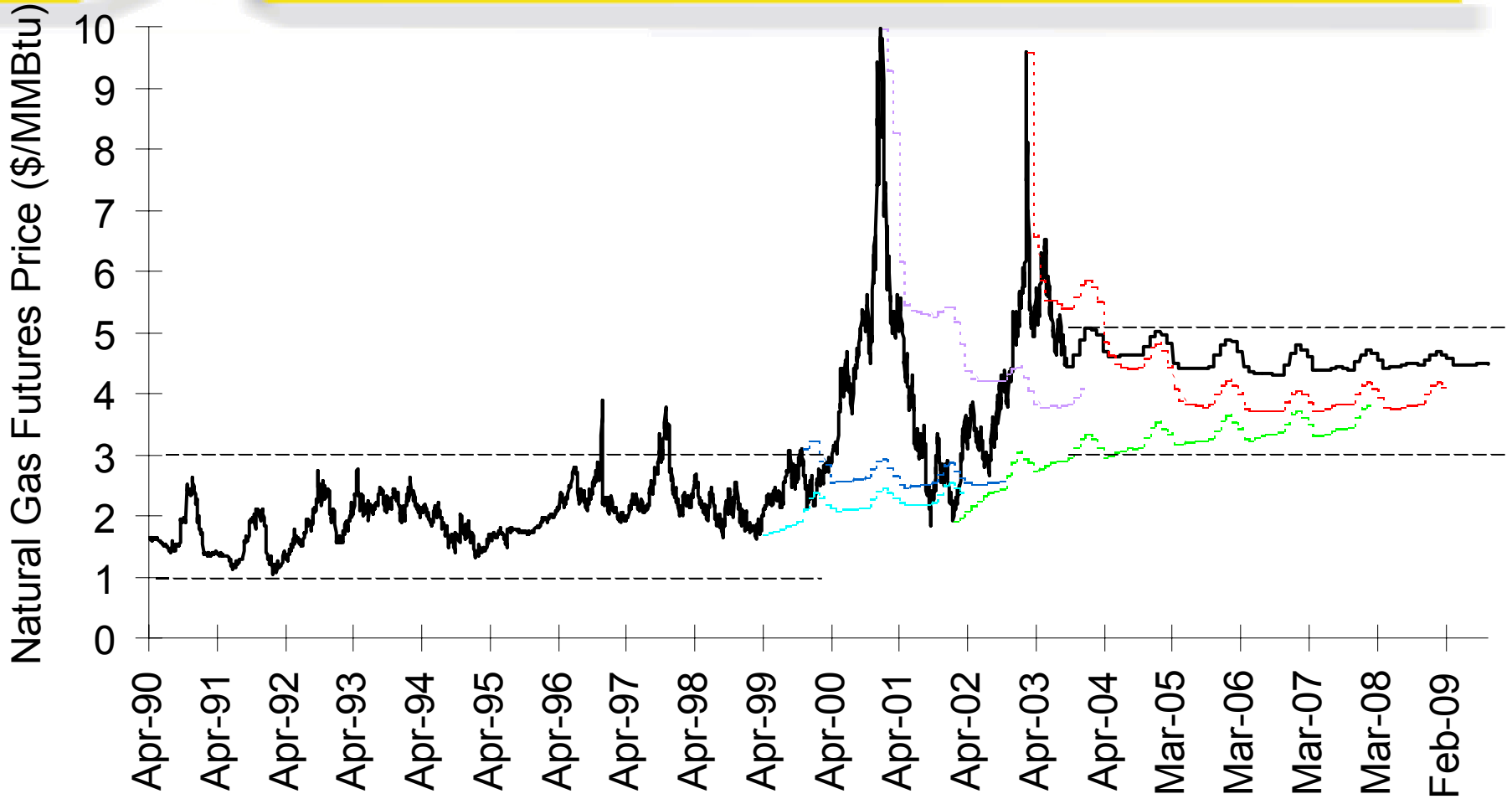
- **Sponsorship:** ISO-NE, NECPUC, NESCAUM, NYISO, DOE, EPA, FERC
 - ❖ State + Regional + Federal agencies
 - ❖ Utility + Environmental regulators
 - ❖ Direct support and participation by FERC
- **Broad, Regional Stakeholder Participation:**
 - ❖ More than 30 stakeholder groups, including 3 ISOs, 6 state PUCs, utilities and DR providers, DOE, EPA, state air directors, market participants, state energy offices, and advocates
 - ❖ Maine PUC and Public Advocate were active participants
 - ❖ Working Groups developed recommendations for plenary review
- **Expert consulting team** provided Framing Papers, technical support – great library of resources
- **Expert facilitation** led to productive dialogue and consensus on almost all issues

The national setting: Resurgence of coal?

*Figure 4. Electricity generation by fuel, 1970-2020
(billion kilowatthours)*



Gas Prices Up to Stay

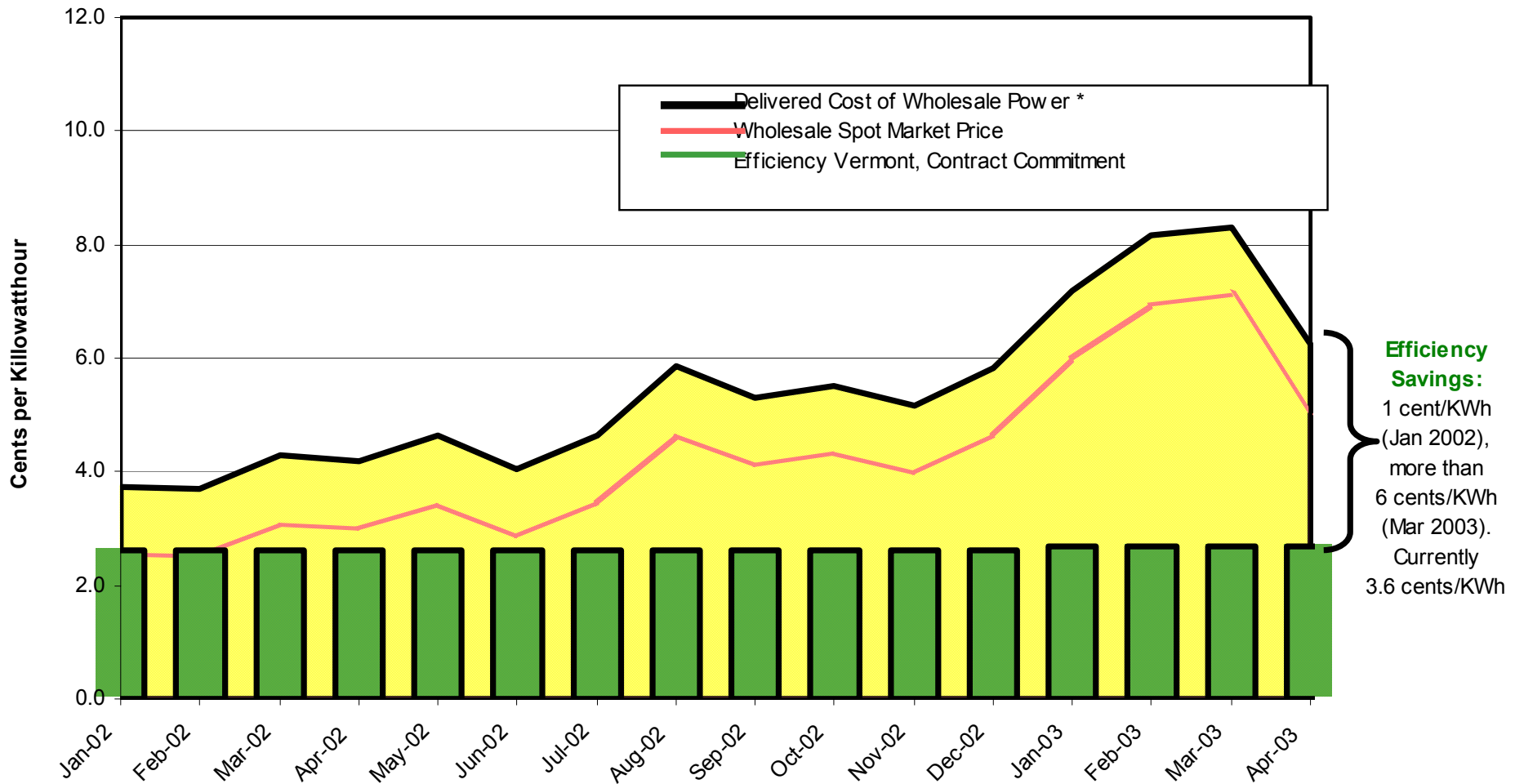


Source: NYMEX

Efficiency is cheaper

Power Costs vs. Efficiency Vermont Costs for 2002 & 2003

NE-ISO Average Monthly Price





NEDRI's Broad View of Demand Response Resources

➤ “DR resources include all ... modifications to the electric consumption patterns of end-use customers that are intended to modify the timing or quantity of customer demand on the power system in total or at specific time periods.” –*NEDRI Report*, p. 6

- ❖ Includes responses to reduce **capacity** and/or **energy** required to serve load

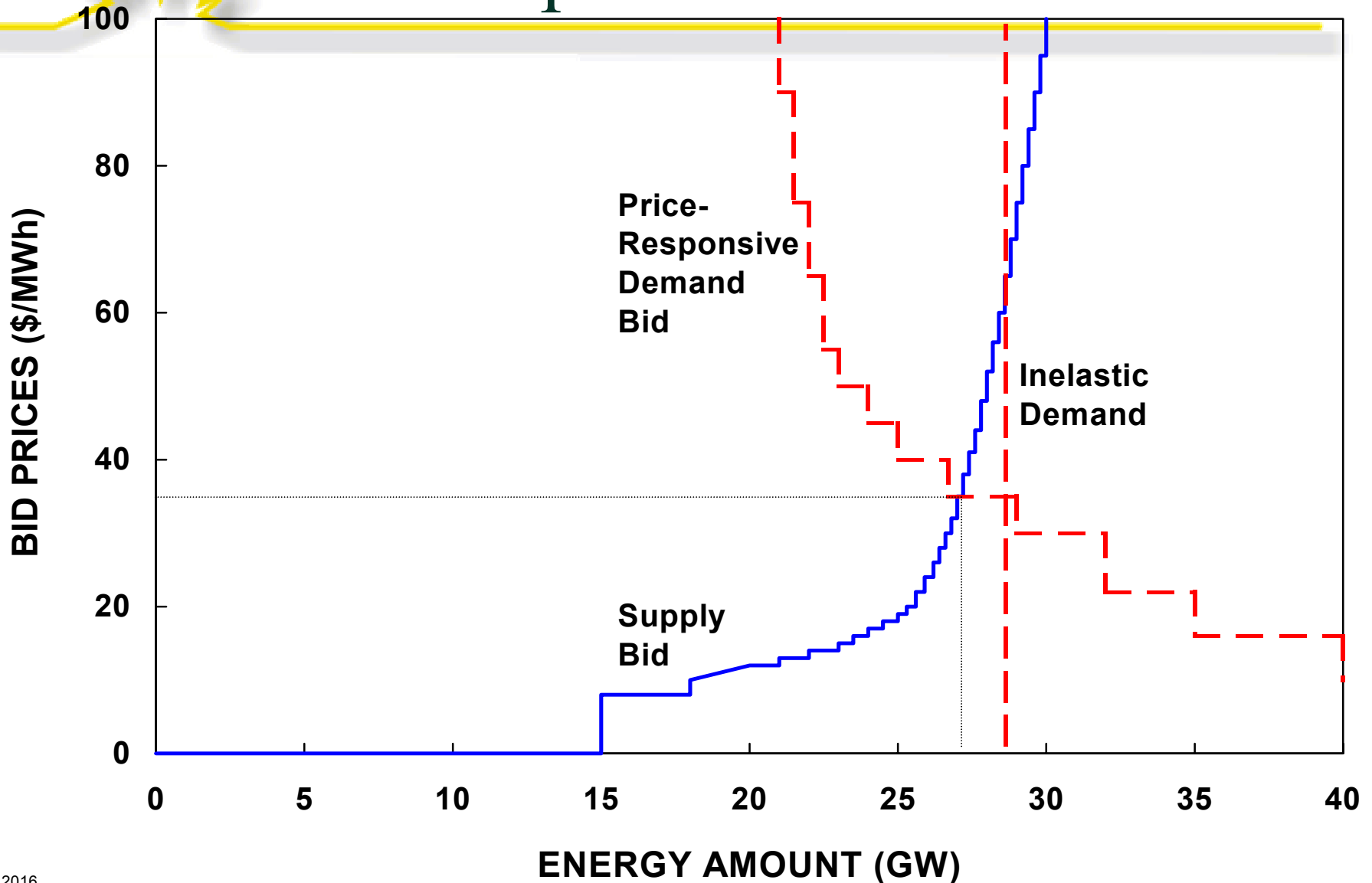
- ❖ Main types: Short-term load response, Long-term energy efficiency, On-site generation and CHP



Substantial market barriers to efficiency and load management

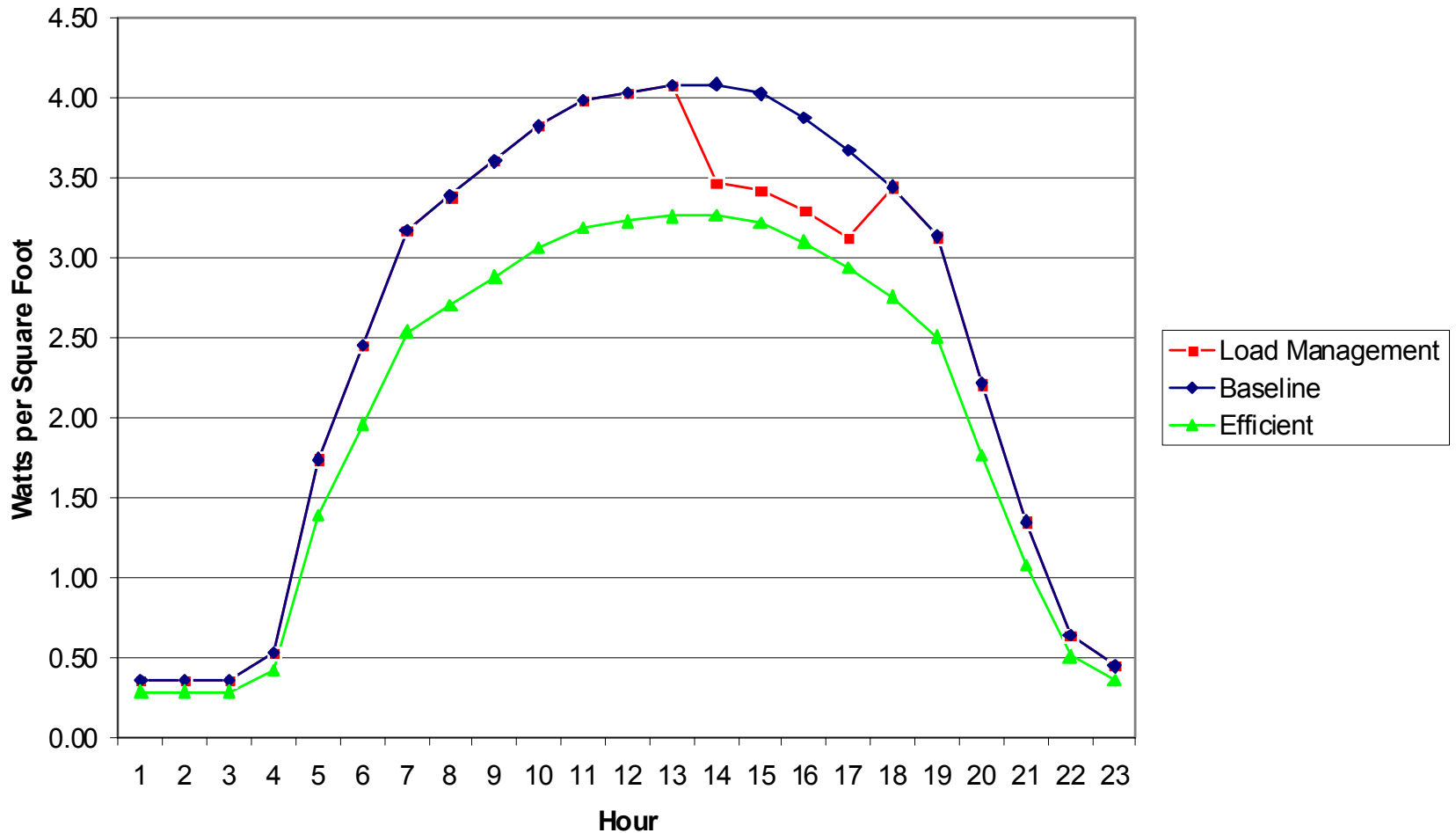
- Historic market barriers to efficiency are still with us
- Customers lack information, technical expertise
- First cost problem
- Split incentives -- Builders won't be paying the electric bill
- Fluid market for supply, not for demand-side services
- Tariffs don't reflect the time and locational value of electricity
- Reliability rules discriminate against demand-side resources
- Distribution companies – retain throughput incentive
- It's a *network* – reliability is a common resource
- And so on...this is why we have utility-sector efficiency programs

The Market Value of Price-Responsive Load



Demand Response includes embedded efficiency

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





NEDRI Conclusions and Recommendations

- NEDRI Stakeholders adopted 38 recommendations;
- Almost all by consensus –
 - ❖ limited exceptions on options for transmission expansion and non-transmission alternatives
- Organized into 5 substantive areas:
 - ❖ Regional Demand Response Programs
 - ❖ Energy Efficiency as a DR Resource
 - ❖ Pricing, Metering, and Default Service Reform
 - ❖ DR for Contingency Reserves
 - ❖ DR and Power Delivery (Transmission and Distribution)

What if the NEDRI Recommendations were implemented actively?

One post-NEDRI estimate:

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

- ❖ 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.



Selected NEDRI recommendations— ISO's Regional DR programs

- NEDRI adopted numerous detailed recommendations for ISO Emergency and Day-Ahead/Price-based DR programs
 - ❖ Higher minimum payments; capacity payments to enrolled resources
 - ❖ Lower entry barriers, greater bid flexibility
 - ❖ Longer term commitments (up to 3 years)
- Many adopted by ISO-NE, ordered by FERC
 - ❖ Demand Response Working Group established
- Enrollment more than doubled, 2002 to 2003 (400MW+)
- *Programs proved valuable restoring power after the August blackout: up to 130 MW load reduction, 90 MW average over 10-hour period*
- *DR lowers the market clearing price – so does efficiency*



Selected NEDRI recommendations

– Pricing and Metering

- PM-1: PUCs should investigate time-sensitive pricing for franchise and default service customers
 - ❖ PUCs should bite the bullet and take a hard look at this.
 - ❖ Pricing may vary by customer size and by availability of metering
 - ❖ Options to consider include:
 - ◆ Real-time pricing
 - ◆ Critical peak pricing
 - ◆ Inverted block rates
- PM-2C: Target efficiency to peak load uses
- PM-3C: Remove distribution company disincentives to deliver aggressive DR programs.
 - ❖ Mechanisms could include incentives, lost revenue adjustments, revenue capped PBR



Selected NEDRI recommendations— Energy Efficiency

- 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.



Selected NEDRI recommendations

– Power Delivery

- Key point: Strategic investments in DR can improve reliability, defer T and D upgrades
- PD-4: (Planning process) Evaluate “on an even-handed basis” all reasonable solutions to grid needs: transmission, generation, and demand-response options (NEDRI consensus)
- PD-6: (Regional investment policy)
 - ❖ Majority view: “Efficient Reliability Rule” – only the least-cost, reliable solution, (including demand response) is eligible for regional funding support;
 - ❖ Minority view: Regional funding should be available for transmission upgrades, but only for those upgrades;
 - ❖ Recent news: ISO announced “all-resources” bid for 5 years’ reliability solutions in SW Connecticut – including DR options
- PD-7: **Distribution companies** should invest in DR resources that would improve reliability & defer more costly upgrades



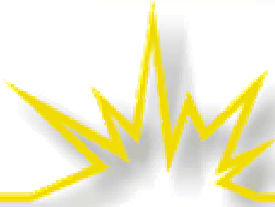
NEDRI Conclusions

- NEDRI effort successfully studied and addressed a broad range of DR resources and policy issues;
- 38 recommendations call for utility, ISO, legislative and regulatory actions in 6 states;
- There are some immediate opportunities:
 - ❖ Improve regional DR programs;
 - ❖ Support/expand state funding for energy efficiency;
 - ❖ Adopt common appliance efficiency standards;
 - ❖ Improve rate designs for wires companies and for end-use customers on default service plans;
 - ❖ Reform regional transmission/expansion policy.
- If NEDRI's recommendations were adopted, up to 80% of NE's expected load growth to 2012 (~4000 MW) could be met by customer-based resources reliably, and at low cost.



Issues for Vermont

- Critical value of energy efficiency funding
- Appliance standards – Vermont should act
- Reform utility incentives – PBR to remove the throughput incentive
- End ISO-NE's discrimination against Vermont-based reliability resources



What we don't need

- Energy costs are high in the Northeast –
 - ◆ The answer is improved productivity (doing more with less) – through efficiency and load management;
 - ◆ *not* higher bills through inefficient load-building.

- Don't repeal consumer protections
 - ◆ Creating a fuel adjustment clause would transfer fuel risk from utilities to customers;
 - ◆ Repealing “used and useful” standard would weaken consumer protection with no likely consumer benefit.
 - ◆ Vermont's historic balance has worked well over time for utilities and for customers.



For more information...

New England Demand Response Initiative

web link at 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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