New England Demand Response Initiative

Dimensions of Demand Response

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

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NEDRI Overview

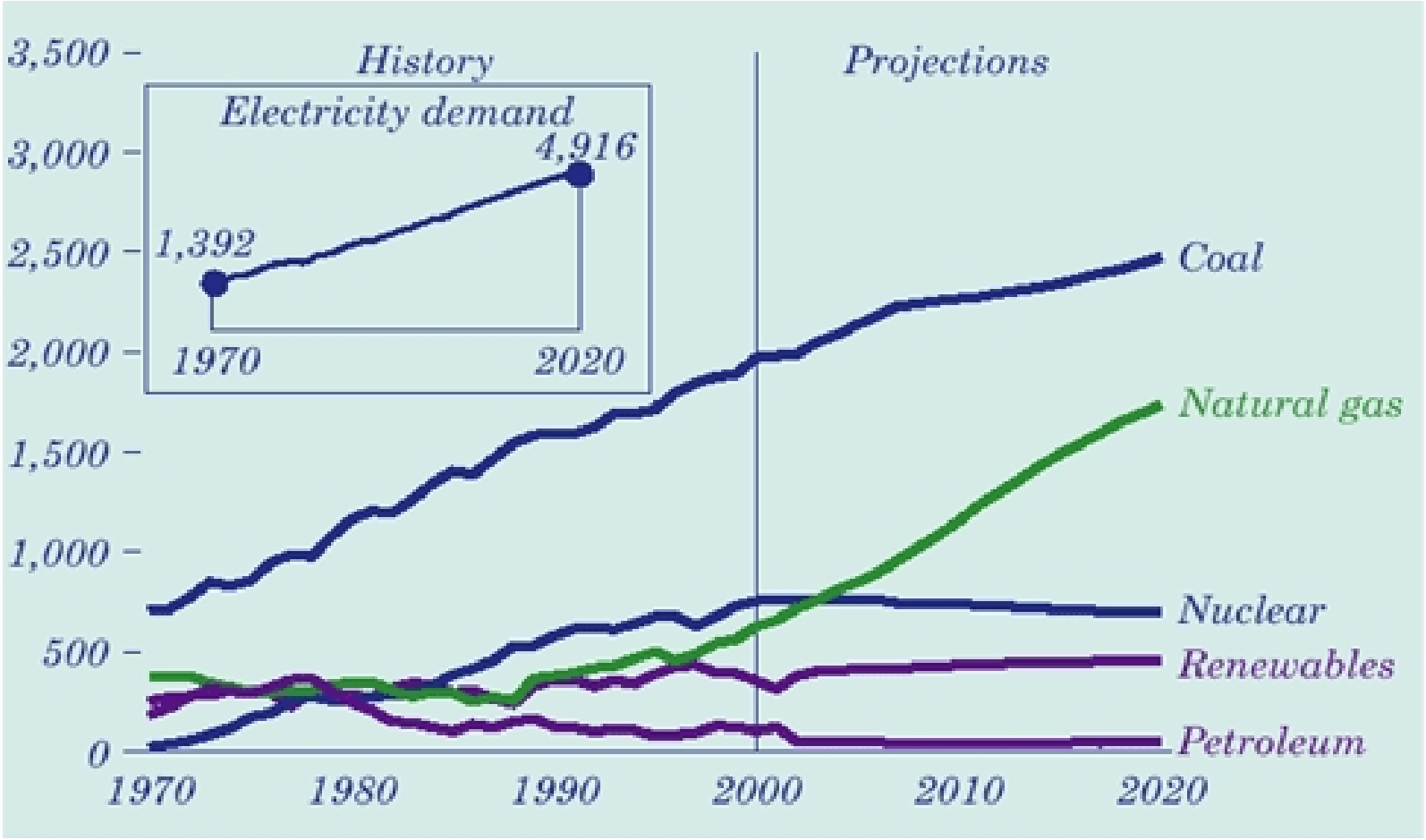
- **Genesis: 1990s – Electric Restructuring underway in New England**
  - But Power shortages, price spikes of 1999-2001 – something important is missing !
  - Regional load growth raises price, reliability and environmental concerns
- **Goal**: balanced energy markets – regional scope
- **Breadth**: 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

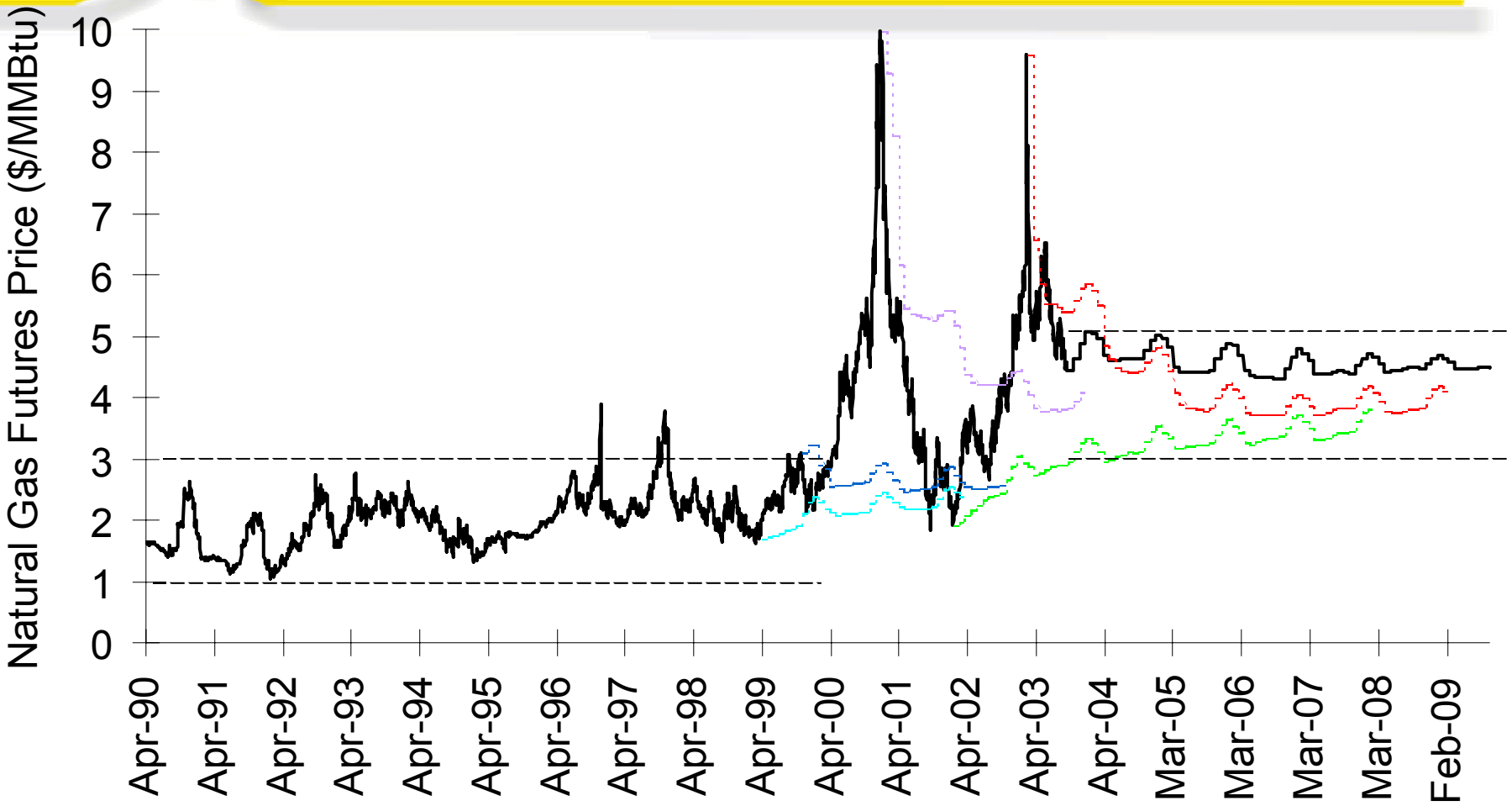
- **Sponsorship:** ISO-NE, NECPUC, NESCAUM, NYISO, DOE, EPA, FERC
  - State + Regional + Federal agencies
  - Utility + Environmental regulators
  - Direct support and participation by FERC
- **Broad, Regional Stakeholder Participation:**
  - More than 30 stakeholder groups, including 3 ISOs, 6 state 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: Coal in our future?

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

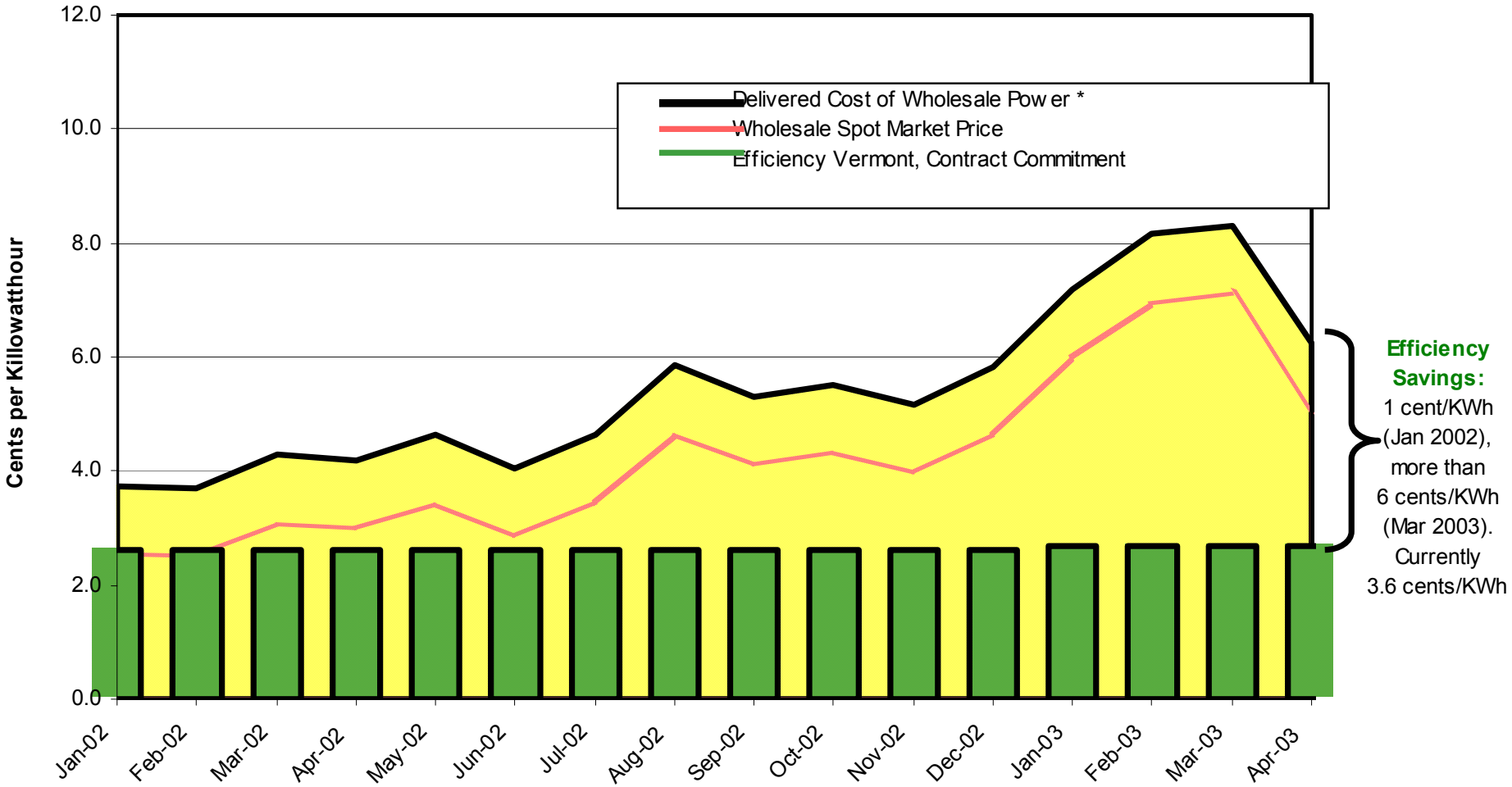


Gas Prices Up to Stay



Source: NYMEX

Efficiency is cheaper



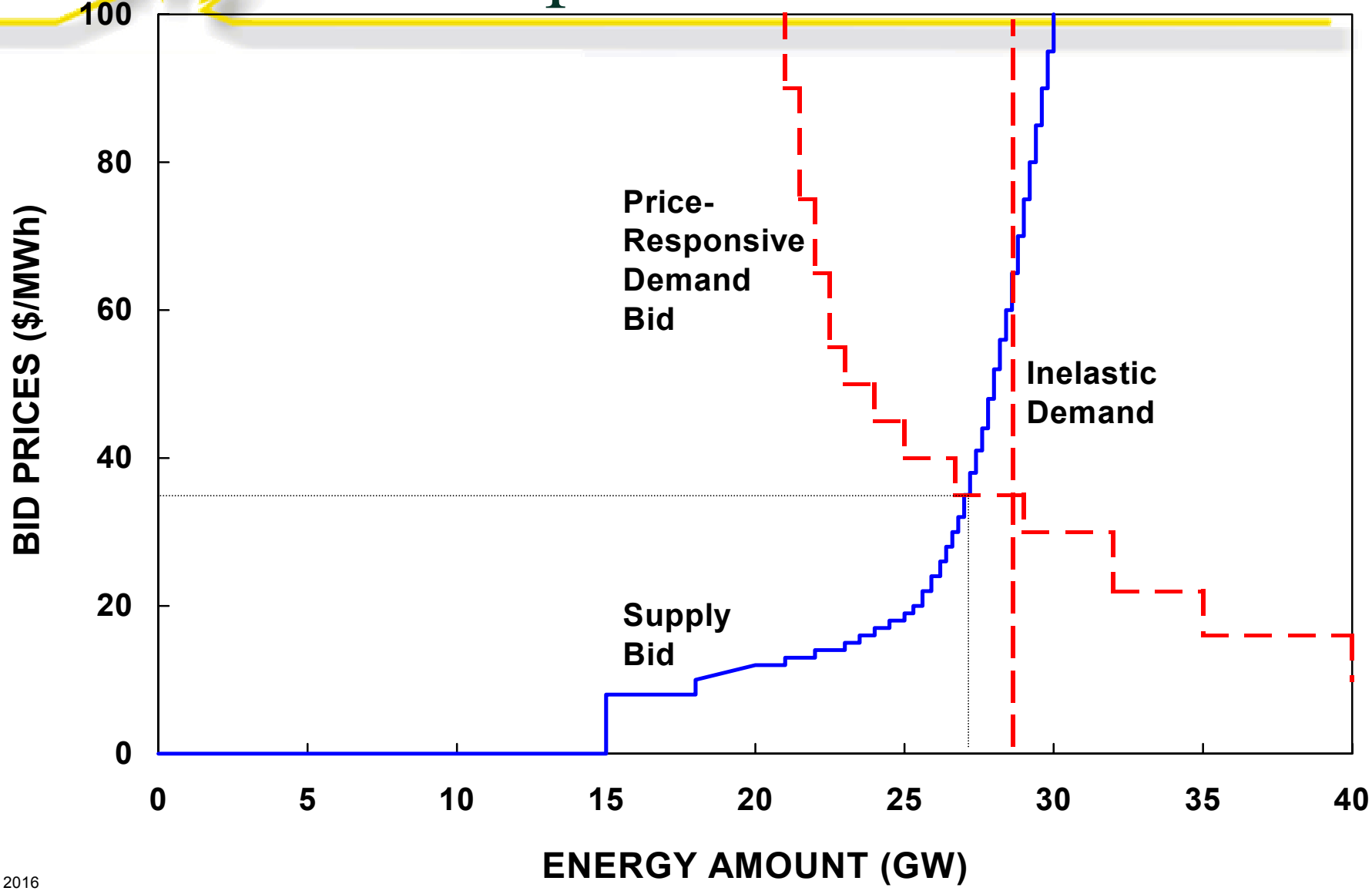
NEDRI's Broad View of Demand Response Resources

- "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

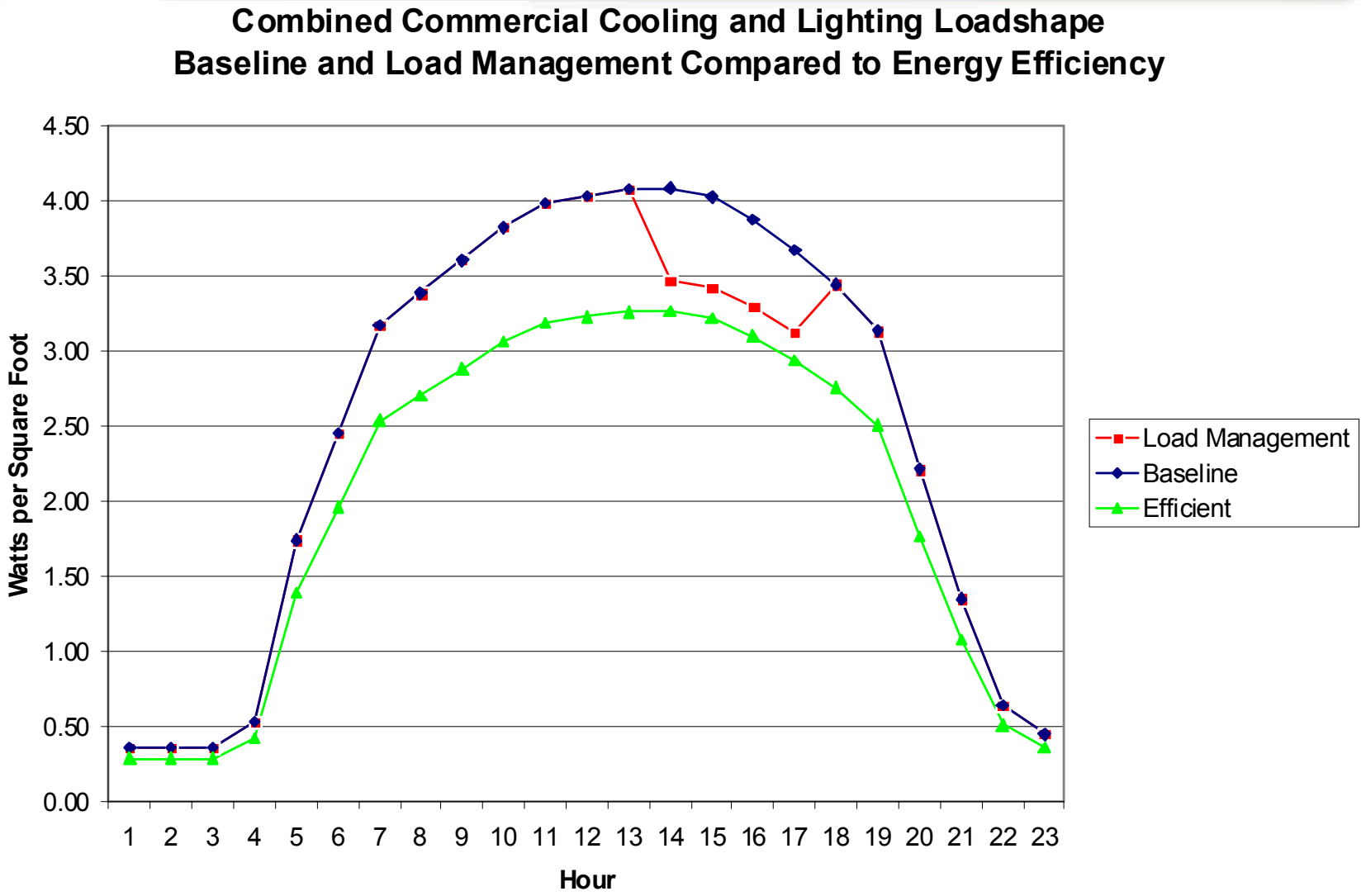
Restructuring does not resolve barriers to DR resources

- Breakup of the franchise:
  - Who is responsible for efficiency and load management?
  - DR provides several values at once – how can these fragmented values be assembled and recognized in the market, or by regulation?
- Historic market barriers to efficiency did not evaporate
- Supply-only bidding at wholesale
- Default service plans blunt cost and value signals to end-use customers
- Load profiling blunts incentives to retailers
- Reliability rules not open to DR
- Distribution companies – retain throughput incentive, barred from delivering efficiency and load mgt.
- And so on…

The Market Value of Price-Responsive Load



Demand Response includes embedded 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**
Building Codes	*0*	*700*
Appliance Standards	*500*	*1,750*
Enhanced SBC Funding	*?*	*?*
Short-Term DR Total	**220-440**	**440-1,100**
Emergency Programs	*200-400*	*400-900*
Market Programs	*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.

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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*

Selected NEDRI recommendations – Pricing and Metering

- PM-1: PUCs should investigate time-sensitive pricing for 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

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 with high reliability and at low cost.

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)

Email questions to *RAPCowart@aol.com*