

New England Demand Response Initiative

Dimensions of Demand Response

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

NARUC Electricity Committee

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Regulatory Assistance Project

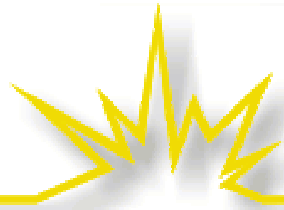
Montpelier, Vermont

www.raponline.org



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
 - ❖ Restructuring did not remove the market barriers to customer-based resources – in some cases, made them worse.
- **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
 - ❖ 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



NEDRI Approach: Four Themes

- Broad view of DR:
 - ❖ includes short-term response (load management) and long-term (energy efficiency), pricing, and distributed generation
- Examine links in the market chain
 - ❖ Wholesale market rules, transmission tariffs, retail rate design
- Identify (and mitigate) barriers -
 - ❖ Reveal value of DR resources to *customers*
 - ❖ Align *utility* profits with cost-effective actions
 - ❖ Support viable business models for *DR providers*
- Challenge to ISO-NE, FERC and the states:
 - ❖ Eliminate barriers to DR at wholesale, transmission, distribution, and retail
 - ❖ Work together to link retail and wholesale incentives, price signals
 - ❖ Be creative – we have unraveled the historic franchise, we need new approaches to efficiency and reliability.



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

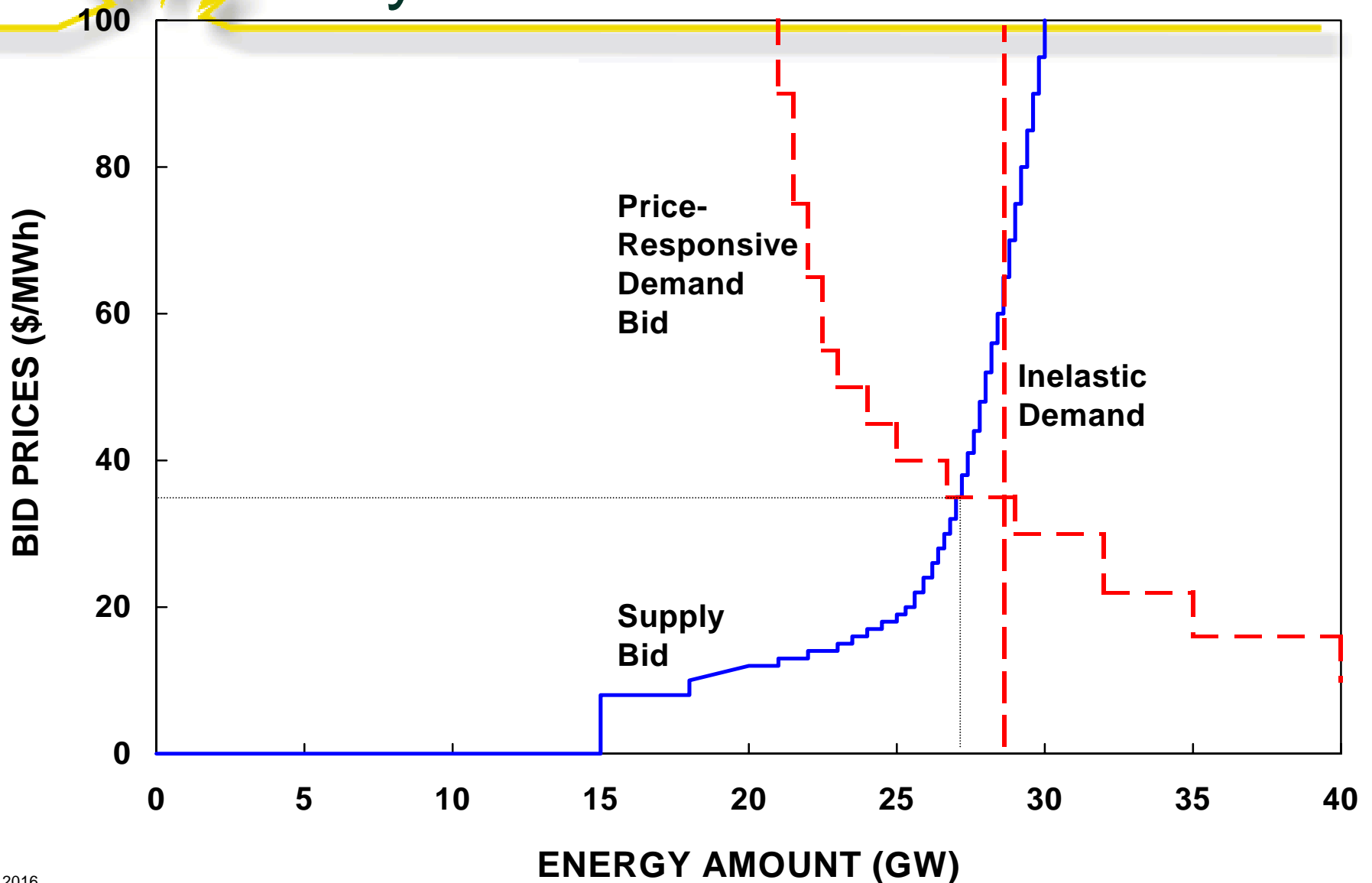
- ❖ Includes responses to reduce **capacity** and/or **energy** required to serve load
- ❖ Main types: Short-term load response, Long-term energy efficiency, On-site generation and CHP



Restructuring does not resolve barriers to DR resources

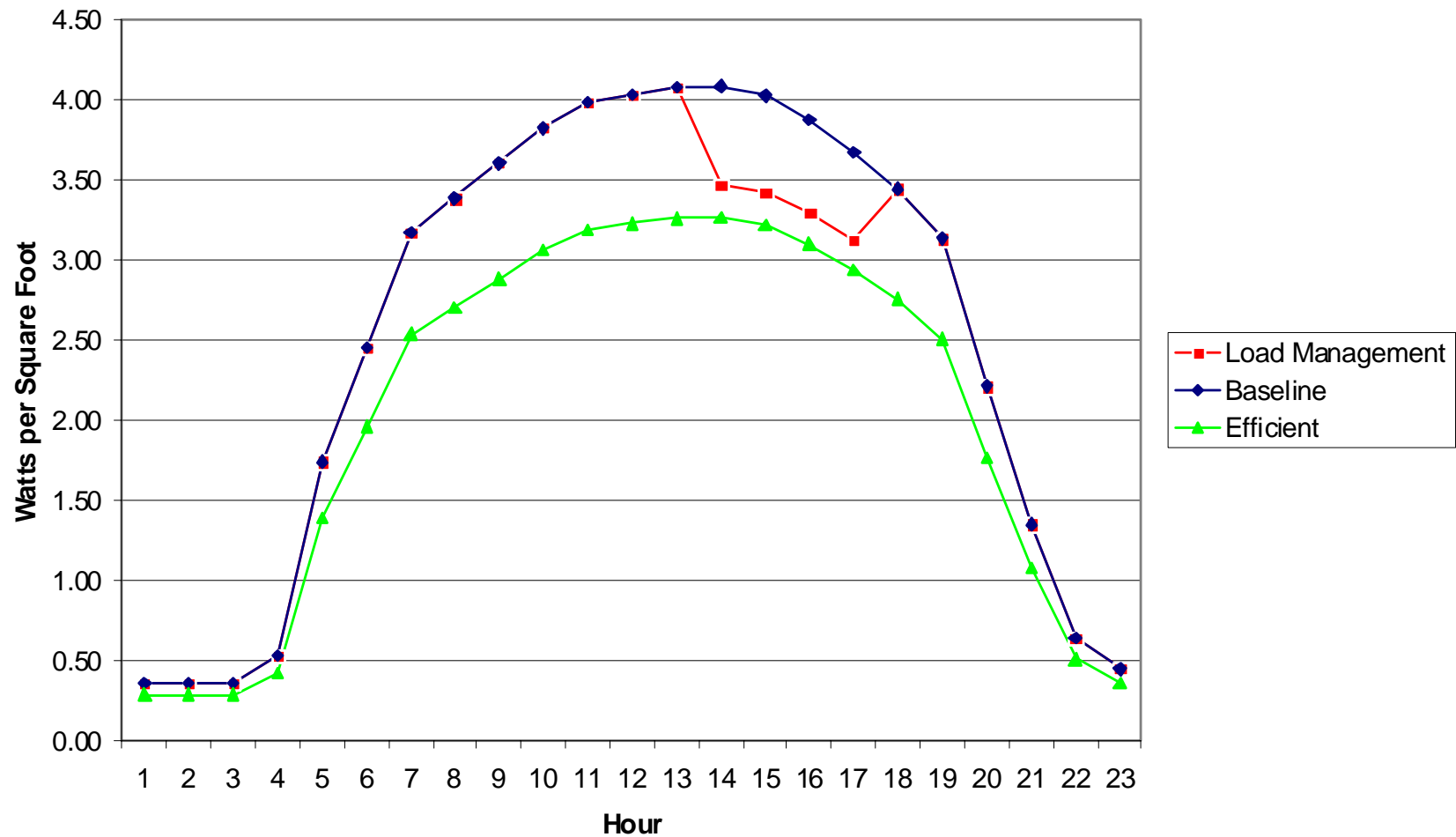
- Breakup of the franchise:
 - ❖ Who is responsible for efficiency and load management?
 - ❖ DR provides several values at once – how can these fragmented values be assembled and recognized in the market, or by regulation?
- Historic market barriers to efficiency did not evaporate (split incentives, first costs, access to information, etc.)
- 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...

If DR is so valuable, why is there so little of it?



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 – Better state and federal standards 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



Progress to date

- ISO-NE creates Demand Response Department, hires highly-qualified director;
- FERC orders adoption of NEDRI DR program designs – enrollment doubles;
- NHPUC begins investigation of pricing and metering options; CT PUC opens broad investigation into rate design;
- National Grid pursues Brockton Pilot, other cases to study value of DR in deferring distribution upgrades;
- Appliance standards legislation moving in several states: MD, CT, (adopted) VT (Senate), RI (considering);
- States adopting output-based emissions standards for DG;
- ISO-NE (on CT's urging) issues all-resources RFP for SW Connecticut reliability "gap" – (LM and EE resources are selected in the mix);
- FERC orders NE RTO to create a new governance sector for alternative resources, including DR;
- DOE, ISO-NE, national labs studying use of DR for contingency resources;
- Certain NEDRI policy recommendations now under deliberation in NYISO, PJM, and MISO



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.



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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