

New England Demand Response Initiative

Dimensions of Demand Response

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

NARUC Electricity Committee
July 12, 2004

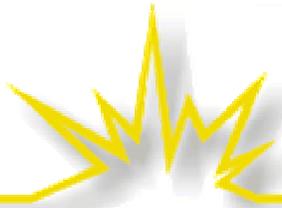
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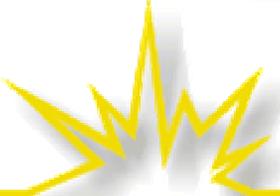
NEDRI Overview

- **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
 - ❖ 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



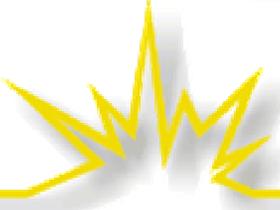
NEDRI Process: Key Points

- **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



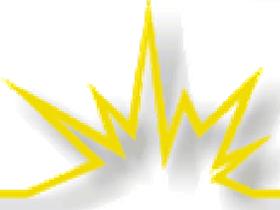
NEDRI Approach: Four Themes

- 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

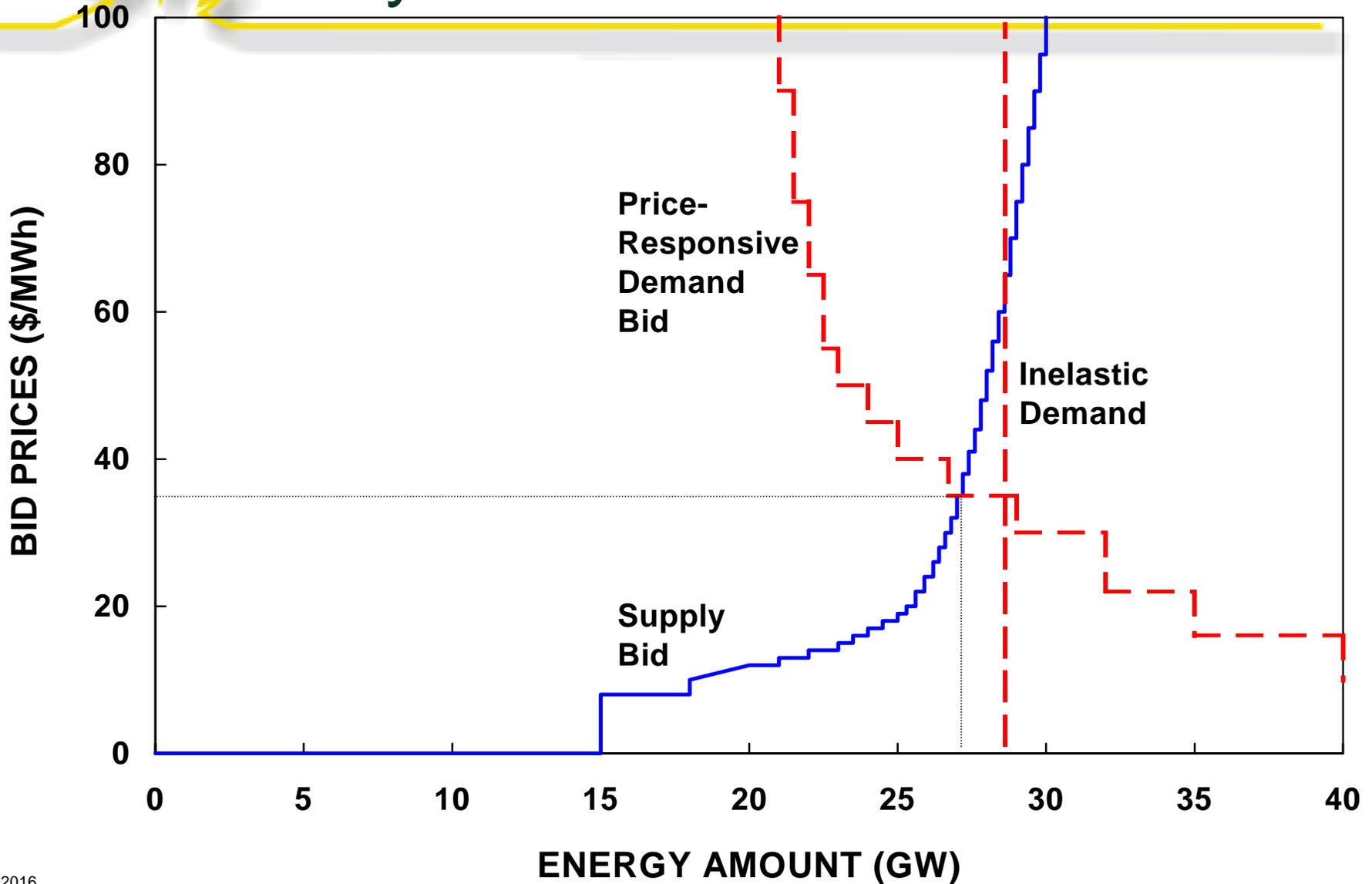
- “DR resources include all ... modifications to the electric consumption patterns of end-use customers that are intended to modify the timing or quantity of customer demand on the power system in total or at specific time periods.” –*NEDRI Report*, p. 6
 - ❖ Includes responses to reduce **capacity**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

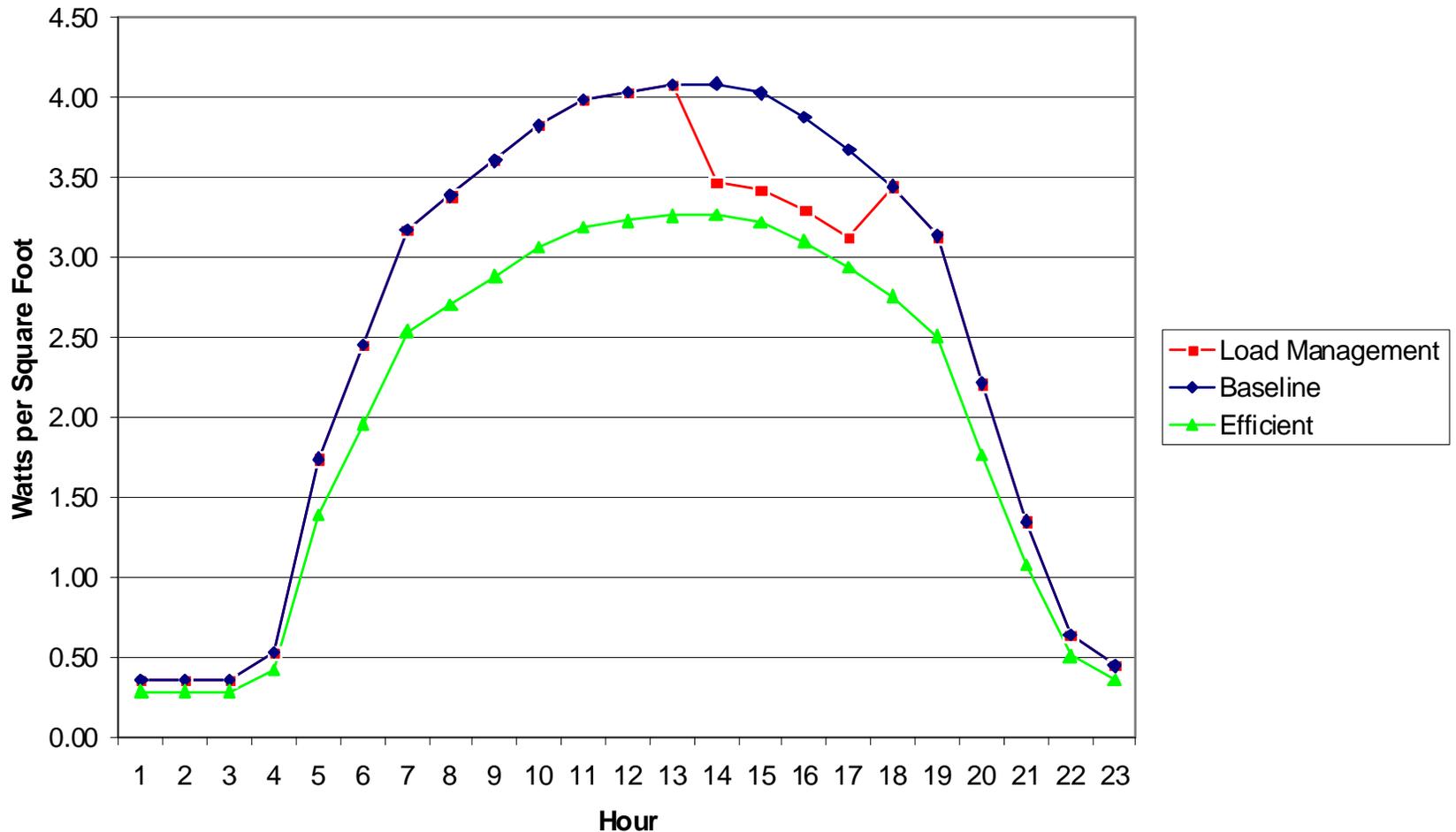
- Breakup of the franchise:
 - ❖ Who is responsible for efficiency and load management?
 - ❖ DR provides several values at once – how can these fragmented values be assembled and recognized in the market, or by regulation?
- Historic market barriers to efficiency did not evaporate (split incentives,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

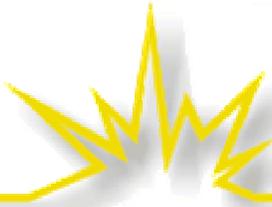
- EE-1: Ratepayer support for EE should be maintained, and potentially increased “to capture all cost-effective energy efficiency”
- EE-3: New England states should adopt common model appliance/equipment standards for ten specific products – Better state and federal standards could displace 25% of load 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;
- NH PUC 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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