

Demand Response Programs: Lessons from the Northeast

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Meeting

Baltimore MD

December 10, 2004



Overview of Talk

- DR strategies and design principles in wholesale markets
- Elements of a “successful” DR program
- Lessons Learned
 - ISO DR programs/markets
 - Related actions needed to support regional DR programs

Wholesale Markets and DR Resources: Objectives, Design Principles, Key Issues

Wholesale Market/ DR Strategy	DR Program Objectives	Design Principles and/or Key Issues
Day-Ahead Energy Market (DADRP)	<ul style="list-style-type: none"> - Increase competition among suppliers - Put downward pressure on day-ahead market clearing price 	<ul style="list-style-type: none"> - Ensure equitable treatment of supply and demand-side resources while recognizing that Customer Loads are not Generators - Degree of Integration into ISO scheduling & settlement processes
“Emergency Resources” (EDRP)	<ul style="list-style-type: none"> - Restore system security to design levels and help avoid load shedding 	<ul style="list-style-type: none"> - Resource value/pricing related to customers’ value of lost load
Real-time Energy Market (RT Price Response Program)	<ul style="list-style-type: none"> - Put downward pressure on real-time market clearing price 	<ul style="list-style-type: none"> - Customers willingness/ability to respond with limited notice - Degree of integration into ISO Scheduling process
Targeted Load Response for Constrained Area	<ul style="list-style-type: none"> - Lower locational market clearing price - Preserve transmission grid reliability 	<ul style="list-style-type: none"> - Consider offering higher incentives to reflect value of congestion relief

Defining “Success” in the DR World

- Improve electric system reliability during system contingencies: Potential & Actual performance
- Improve efficiency of wholesale electricity markets - ↑demand-responsiveness
- Broad portfolio of participating loads & program types
- High Penetration Rates in Target Markets
- Effective coordination between ISO & retail markets (LSE,PUC)

NEDRI Public Meetings: What do customers want in DR programs?

- Timely and certain payments for performance
- Minimal downside risks (e.g. performance penalties)
- Relatively certain stream of benefits in order to make “business case” for investment
- Easy to enroll and participate (Low “hassle factor”)
- Useful “toys”: enabling technology that can be used to manage energy costs
- Customized, tailored service offerings
- Clear program goals that align with their business interests or priorities

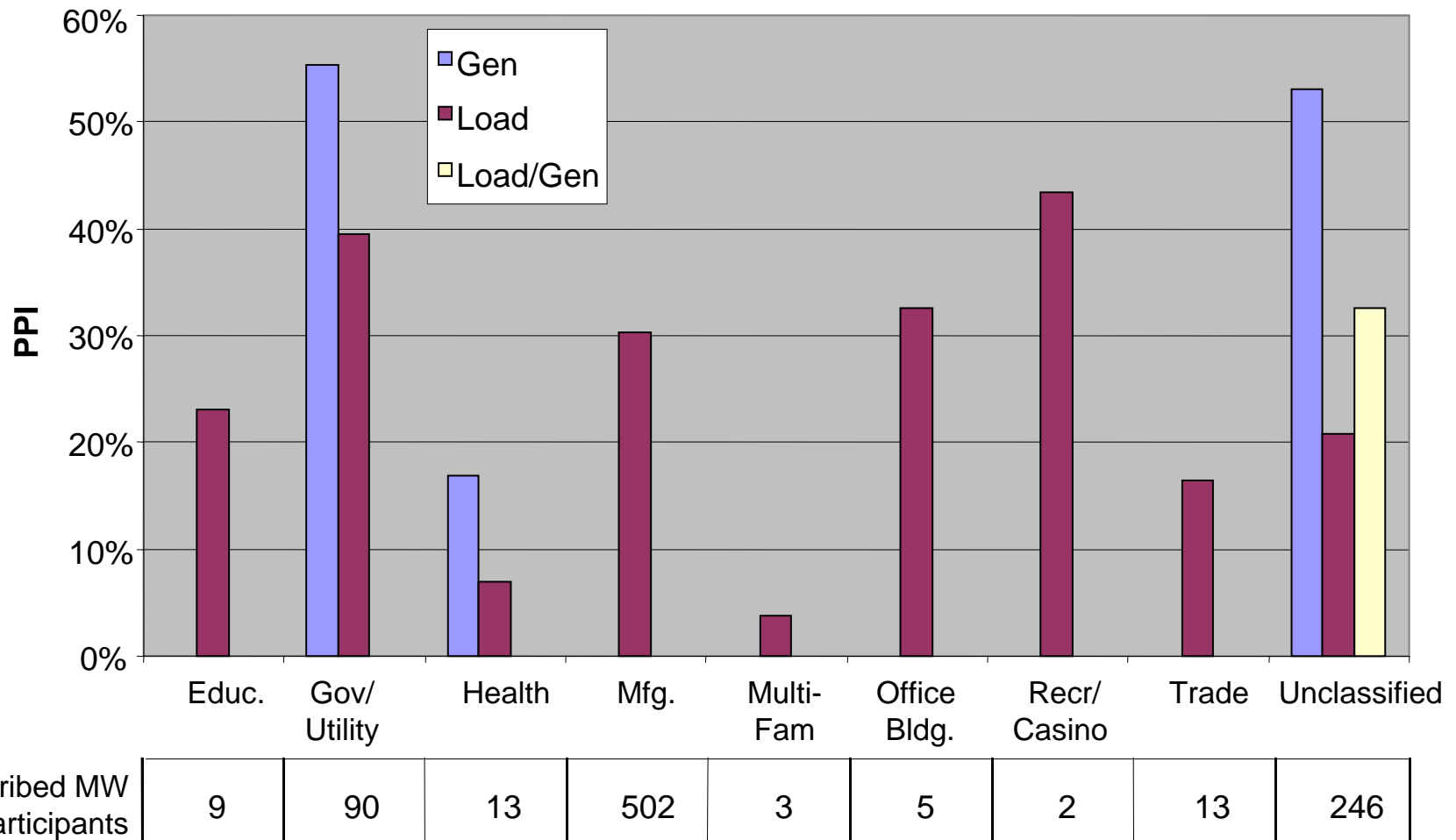
Characteristics of Innovative Utility DR Programs

- Substantial customer response at high offer prices
- Multiple program options & features offered under a single “brand”
- LSE/customer share benefits (often not transparent to customer)
- Lots of customer care & education
- Use of customer-specific baselines
- Variety of forward contracting options
- Motivated or “incented” LSEs

Real-Time “Emergency” DR Programs

- NEDRI recommendations on ISO-NE
 - higher minimum floor payments for called resources (higher of RT LMP or \$500/MWh minimum for 30 minute notice or \$350/MWh for 2 hour notice)
 - reduce entry barriers for Demand Response Providers (\$500 annual fee)
 - a longer-term commitment to DR programs (3 years starting with SMD; with option to extend)
- Impact
 - Doubling of MW enrolled in ISO-NE “emergency” DR program from 2002 to 2003 (112 to 260 MW)
 - Aug. 15, 2003: ~75 MW load reduction in SW CT for 10 hours

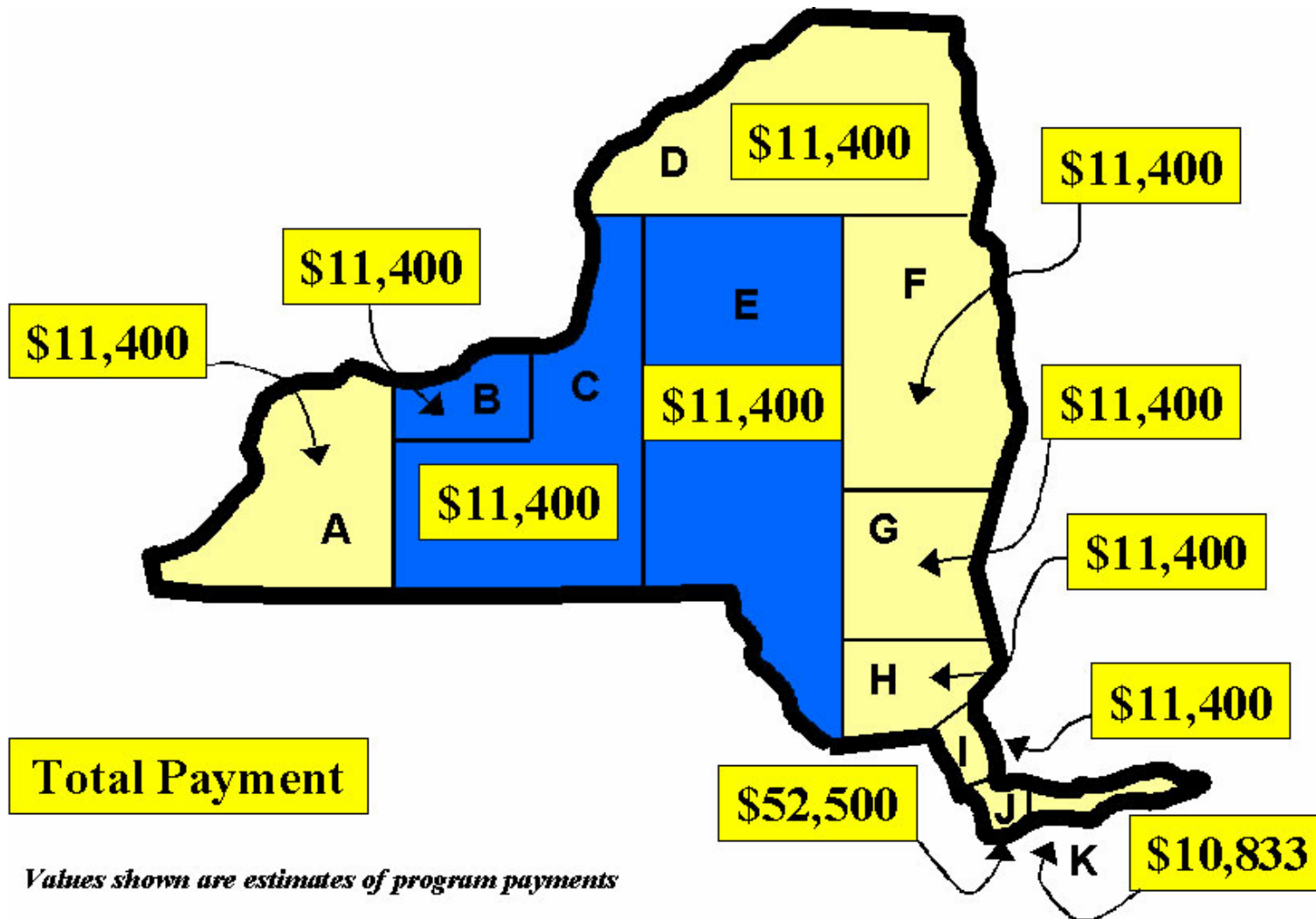
NYISO: Curtailment Potential (PPI) by Business Type and Curtailment Strategy



Capacity Market needed to provide longer-term signals for DR investment

- DR resources provide system capacity and reliability benefits
 - Reflected in current ICAP markets to limited extent
 - Reservation payments help build sustainable DR business model for load aggregators
- NEDRI Recommendation
 - ISO-NE implement an effective, location-based ICAP resource credit ASAP

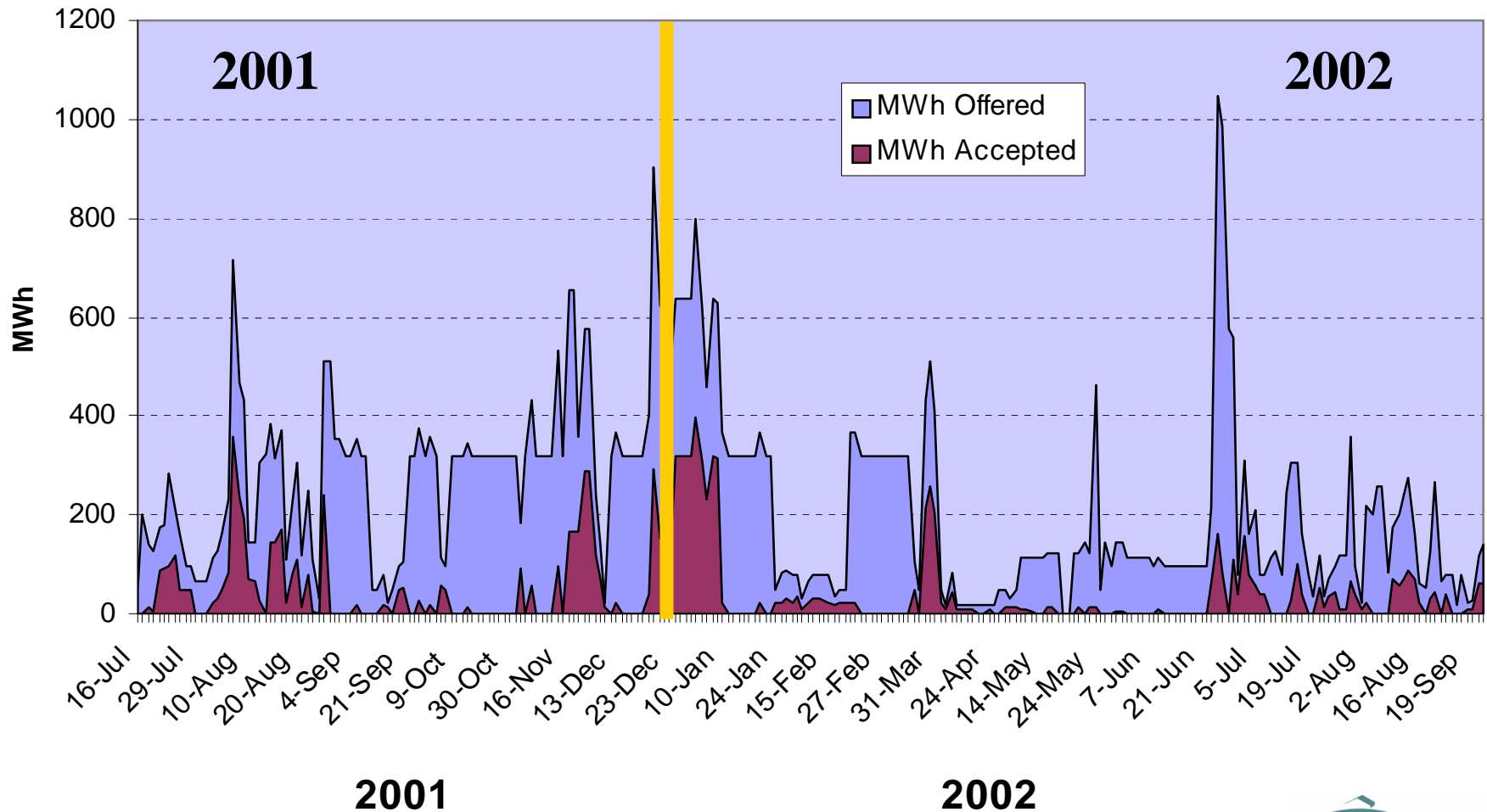
ICAP Payments for 1 MW in Summer 2001



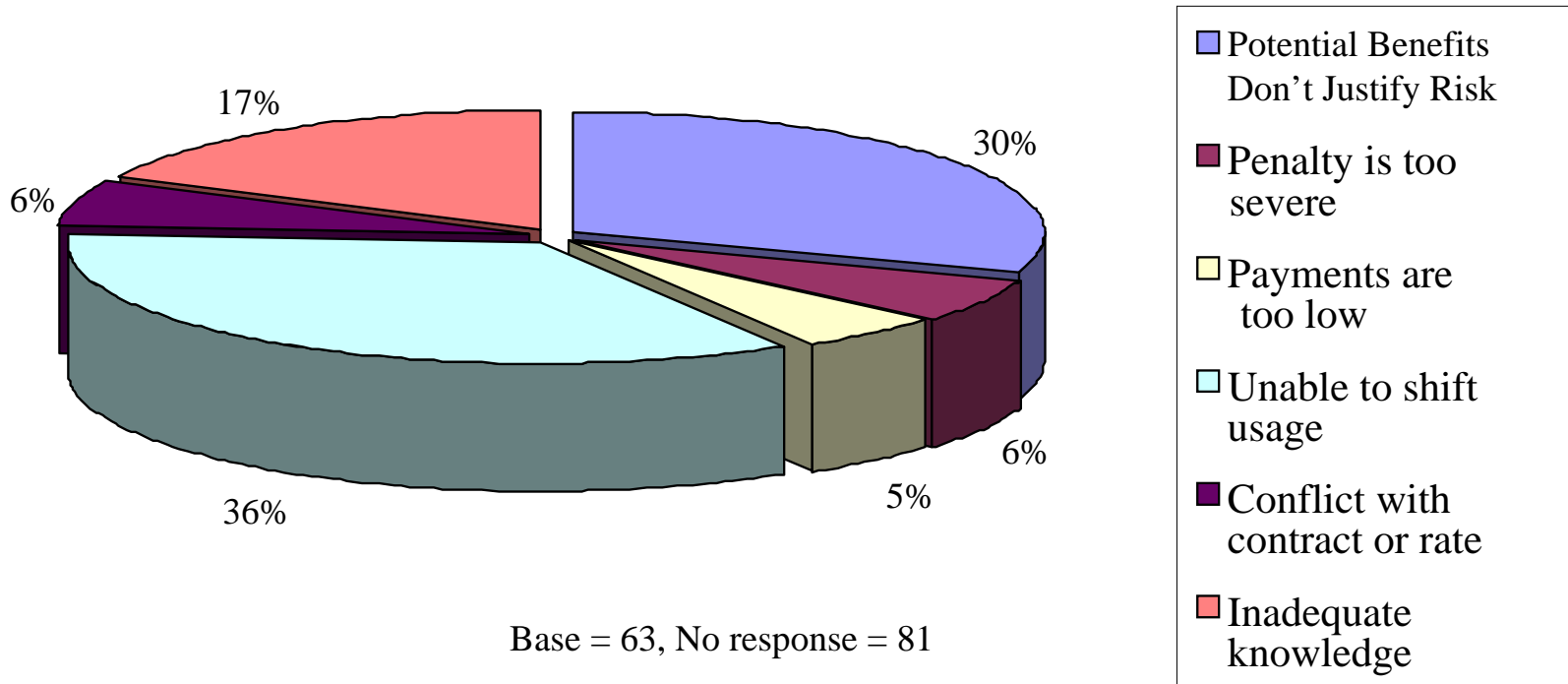
Facilitating Load participation in Day-Ahead Energy Markets: Challenges

- NYISO
 - Decent enrollment (~400 MW); few accepted bids (~10 MW)
 - Location, location, location – most enrolled participants upstate; highest need in NYC
- NEDRI Recommendations for ISO-NE:
 - ISO-NE commit to developing an “economic, price-driven” day-ahead market DR program by summer 2004, which draws upon “best practices”

NYISO Day-Ahead Market DR Program: Low Participation and Bidding Activity



Primary Stated Reason for Not Participating in NYISO DADRP



- Potential benefits don't justify risks (30%),
- Operational constraints (36%)
- Inadequate knowledge of program requirements (17%)
- Other factors
 - Low program awareness levels (~35%)
 - High bid price thresholds (~median value is \$0.50/kWh)

Role of regulated utilities in delivering ISO DR Programs

- Policy and market implications to how ISO payments are shared between providers and customers
- NEDRI Recommendation
 - State PUCs adopt retail tariffs that support delivery of ISO-NE DR Programs
 - 70% of ISO incentive payment for load curtailment show flow to customer; 30% to be retained by regulated service provider
- NY
 - 90% of payment passed on to customer

Public benefit/ratepayer funding to overcome DR market barriers

- Significant market and institutional barriers limit customer load participation in wholesale markets
- Experience in selected states (NY, CT, CA) suggests that small amount of SBC funds (\$1-3M/yr or $\sim < 5\%$) can increase DR infrastructure deployment significantly
- NEDRI Recommendation
 - Additional funds to support DR enabling infrastructure, technical assistance, and customer education/information. Funds should preferably be incremental to existing SBC funds, come from regional or state sources and be relatively small in amount
 - Enabling infrastructure includes: web-enabled EIS; advanced Metering, communication and notification tech.; load control devices

Public Benefits Programs Support DR Enabling Technology

State	Program	Budget (2001)	Eligible Enabling Technologies
CA	CEC Demand Responsive Building Systems & Real-time Metering Program	\$44 M \$35M	<ul style="list-style-type: none"> •EMCS •Web-enabled Communication •Load Control Devices •Interval Meters
NY	NYSERDA Peak Load Reduction Program (PON 577)	\$11 M	<ul style="list-style-type: none"> •Short Duration Load Curtailment •Permanent Demand Reduction •Dispatchable Emergency Generators •Interval Meters
NY	NYSERDA Enabling Technologies for Price Sensitive Load Management (PON 585)	\$1 M	<ul style="list-style-type: none"> •Real-time communications and metering (mandatory) •Real-time price forecasting •Automated load curtailment and/or generator operation •Web-enabled technology

Monitor and Limit Environmental Impacts of DR Programs

- Issue: more frequent use of high-polluting back-up generation
- NEDRI Recommendations
 - Adopt output-based technology-neutral standards for new onsite generators
 - Update state regulations for existing generators
 - Provide information base for envr. Analysis of DR program impacts
 - 2003 ISO-NE Programs
 - ♦ Air regulators work with Demand Response providers to develop user-friendly interface and process to expedite processing of permits and waivers
 - ♦ ISO-NE make info on actual load response events available to air regulators to evaluate envr. impacts

Conduct independent DR evaluation and market assessment

- NEDRI Recommendation for 2003 DR Program
 - establish DR program targets and a timetable to achieve them
 - barriers to participation by customers and market participants,
 - assessment magnitude of price-responsive loads
 - impact on market prices and system reliability
 - recommendations on proposed DR program changes