

**ENERNOC**

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**Institute for Regulatory Policy Studies: The Potential  
for Implementing Demand Response Programs in Illinois**

*May 12, 2006*

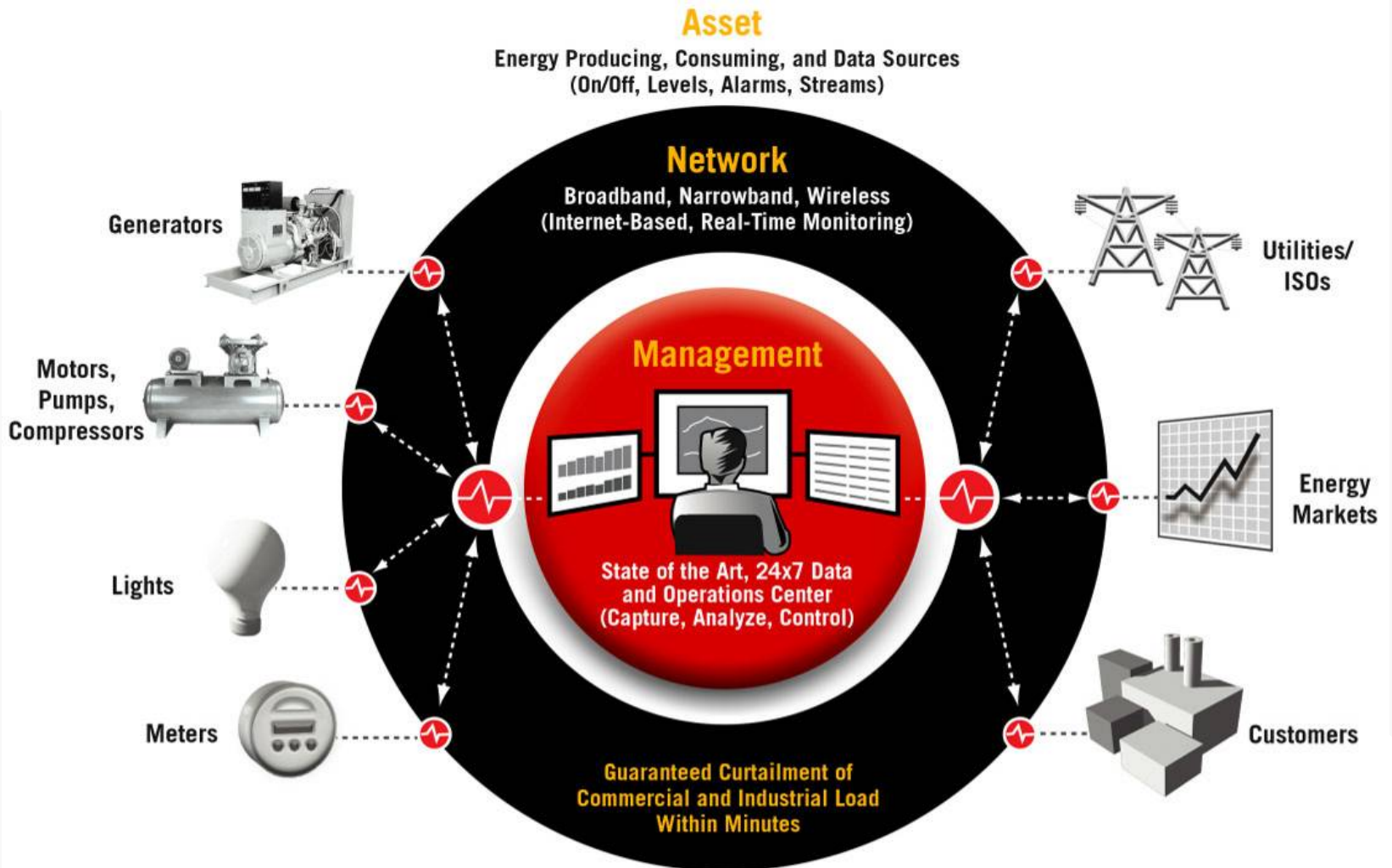
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# EnerNOC Overview

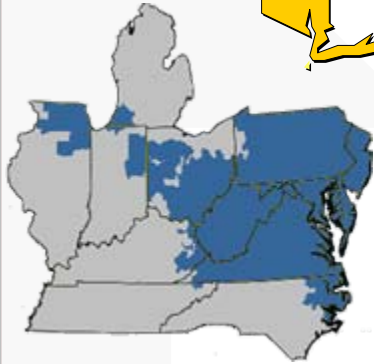
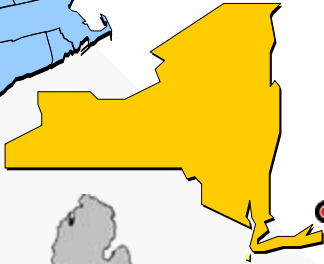
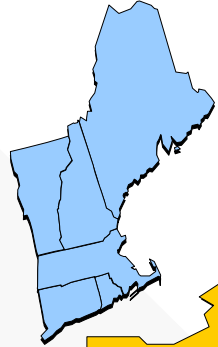
The “NOC” in EnerNOC stands for Network Operations Center. EnerNOC enables existing assets with inexpensive, scalable technology to accomplish significant and guaranteed reductions in demand.



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# EnerNOC Overview

EnerNOC is the leading technology-enabled, C&I-focused total energy management solutions provider



- **Proven and growing track record** - Over 250 MW's of demand response capacity managed at more than 500 customer sites. Over 500 MW's of peak demand currently monitored by PowerTrak®
- **Compelling offering** – Total Energy Management Solutions Provider encompassing – Demand Response, Demand Management, Data Management, Research, Education, Permitting, Financing, Metering, Aggregation, Enrollment, Installation, Payment Reconciliation, Maintenance Management, Risk Management
- **Significant and growing market** - Currently serving:
  - ISO New England (Certified IBCS and Demand Response Provider)
  - NYISO (Responsible Interface Party)
  - PJM (Curtailment Services Provider)
  - California ISO markets (Certified Demand Reserves Partnership Provider)
  - SCE, National Grid, NStar
- **Distinguished technology** - Provide 24/7, real-time metering and web-based device monitoring and control through open architecture technology that leverages customers' existing assets
- **Significant resources**
  - Strong balance sheet and impressive financial track record
  - Deep management team experience in energy and technology management – 50 employees with more than 60 engineering and management degrees

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# Notable Customers

## EnerNOC has secured marquee customers in its Demand Response and Total Energy Management program territories

Large Industrial And Utilities	
Commercial Office and High Tech	
Education	
Food Sales and Storage	
Government	
Healthcare	
Light Industrial	
Lodging and Resorts	

## EnerNOC Facts

- ◉ **In every Demand Response event that EnerNOC has managed since its inception in 2001, EnerNOC has performed at or above the capacity it has registered in each market.**
  - EnerNOC has a well-earned reputation for exceeding the expectations it sets for utility and ISO customers and for the markets in which we register and manage our customers' electrical capacity. When we say we'll provide 100 MW's for a demand response event and the event is 2 hours long, we provide 100 MW's or more for 2 hours . . . period!

## EnerNOC Facts

- ◉ EnerNOC manages more remote-controlled demand response capacity than any other demand response service provider in the United States
- ◉ EnerNOC is the only Demand Response Provider who has managed concurrent demand response events in two ISO territories
- ◉ EnerNOC has more experience performing and supporting customers during demand response events than any other provider in the United States and EnerNOC's performance during events is unrivaled
- ◉ EnerNOC manages nearly as much direct load curtailment (lighting, HVAC, other) as backup generation
- ◉ EnerNOC's experience with government customers is unrivaled: EnerNOC manages 52,000 kW's of demand response capacity across 31 government customers

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# Demand Response Event Summary – New England, February 27, 2006

## Background

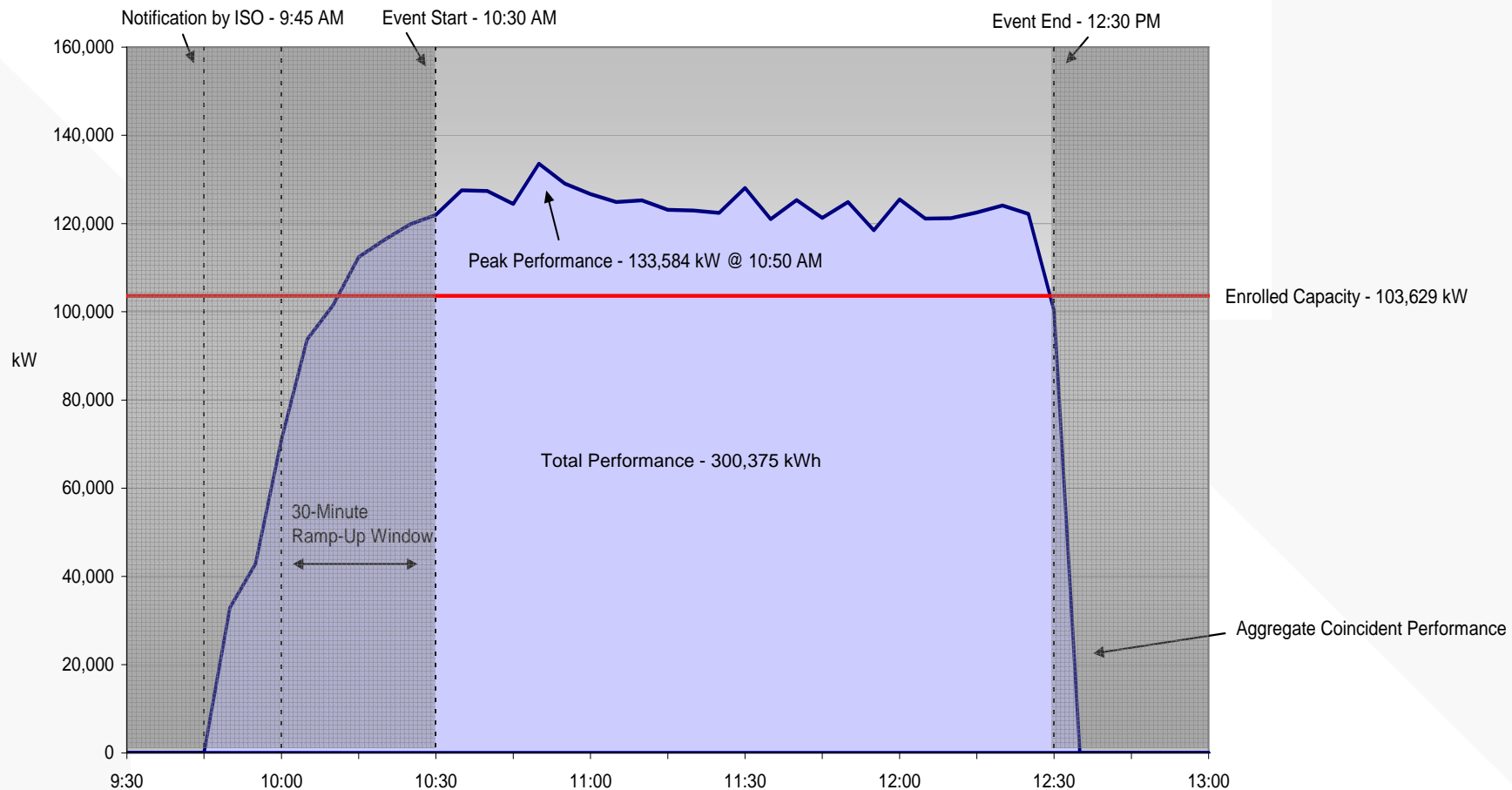
Program	ISO New England Winter Supplemental Program
Event Date	2/27/2006
Event Hours	10:30 AM – 12:30 PM
First ISO Notification	9:45 AM
Capacity Enrolled	103,629 kW
Non-Coincident Peak Performance	133, 584 kW
Number of Assets Enrolled	115

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# Demand Response Event Summary – New England, February 27, 2006

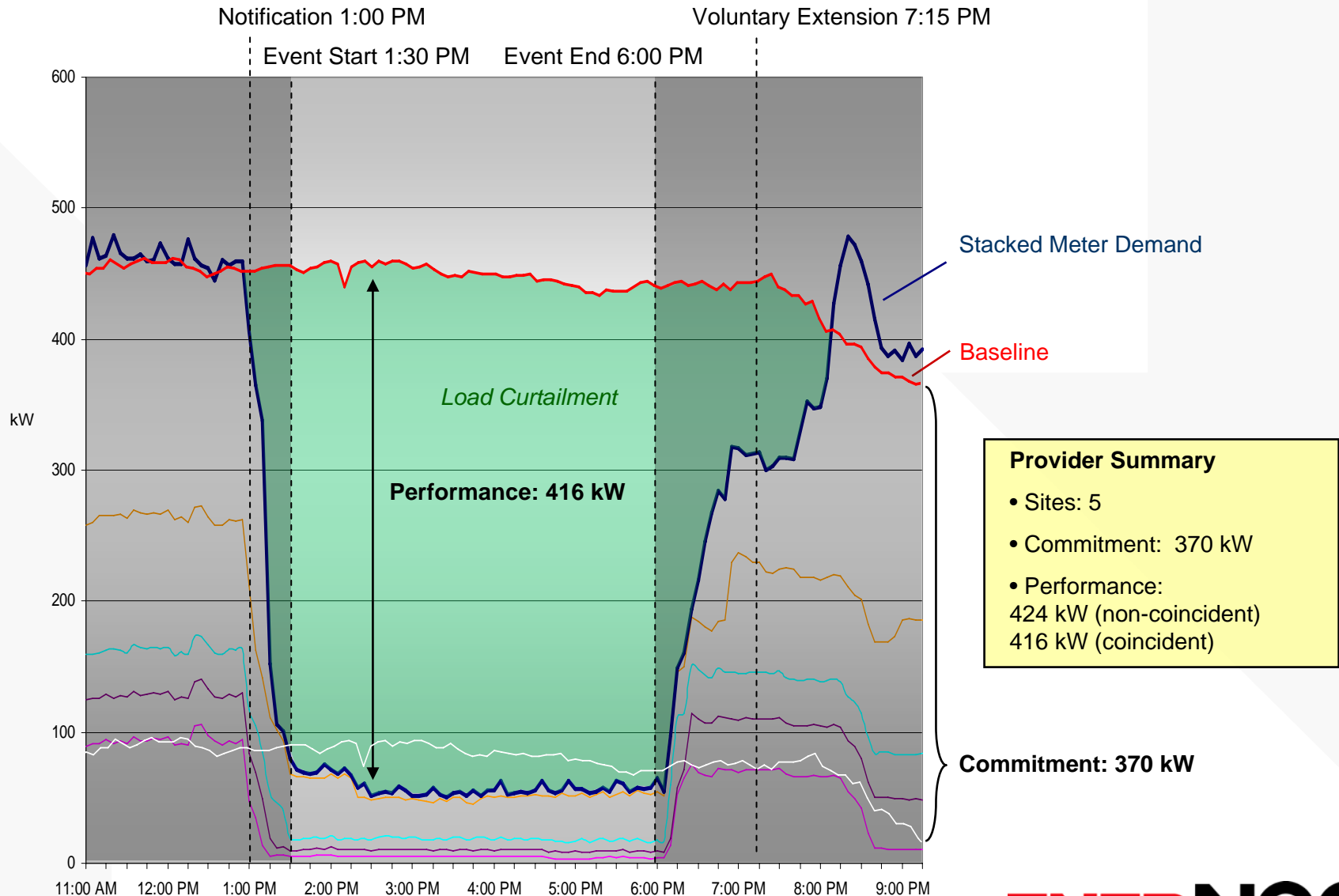
## EnerNOC Managed Aggregate Coincident Performance – Over 100 MW's



# Demand Response Event Summary – NY & New England, July 27, 2005

## Curtailment

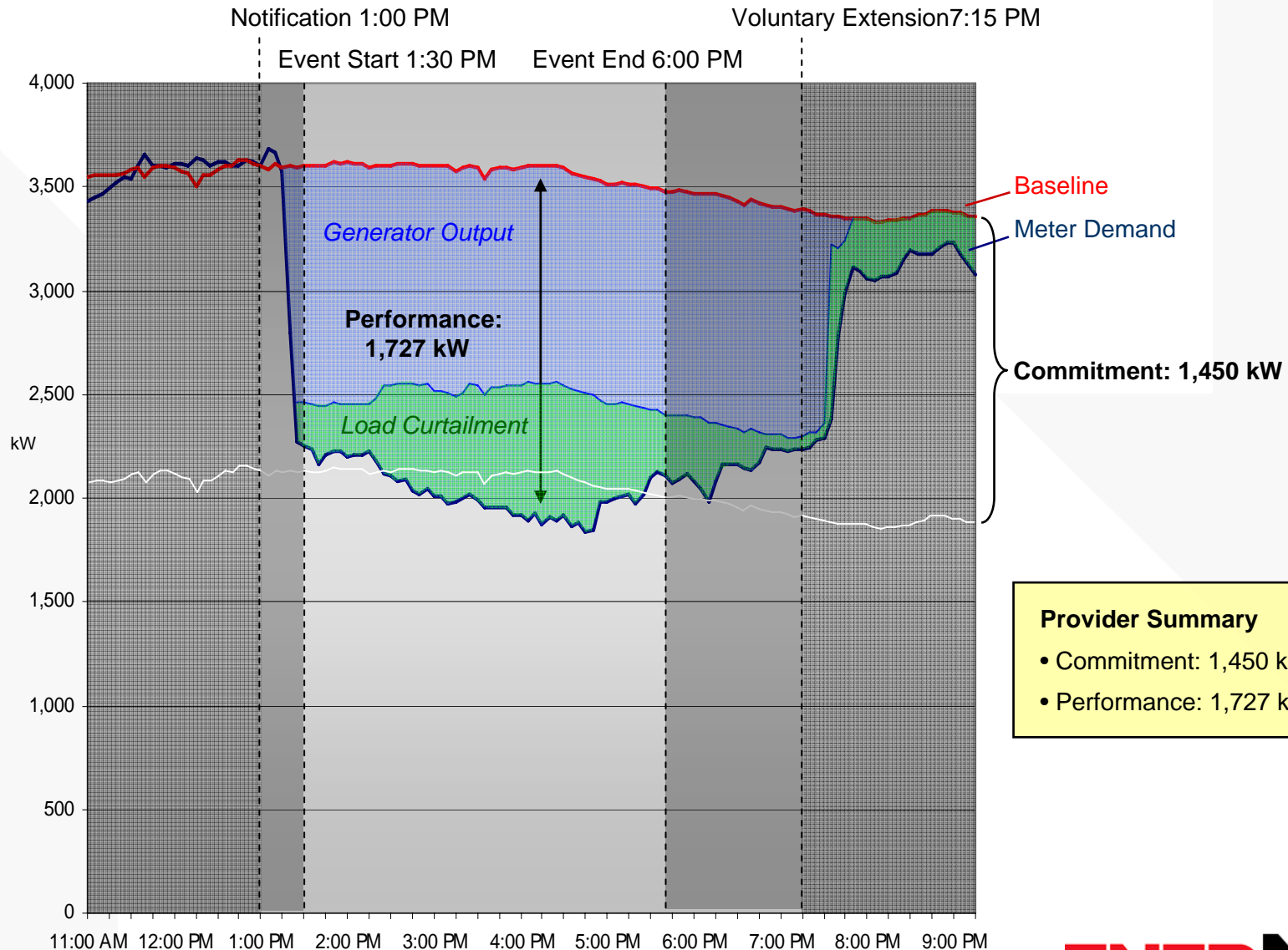
University provider curtails more than 400 kW of load at five individual sites.



# Demand Response Event Summary – NY & New England, July 27, 2005

## Generation and Curtailment

University provider combines generation with load curtailment to reduce more than 1.7 MW from the electrical grid.



# DR as a Capacity Alternative

Demand response with EnerNOC delivers numerous benefits.

- Strengthens a PUC's and a utility's leadership role in addressing the peak electricity capacity shortfalls and in reducing emissions
- Demonstrates the economic and operational viability of demand response as a reliable, verifiable, and economic resource for meeting peak load needs
- Compliments existing energy efficiency programs, and serves as a catalyst for further energy management and efficiency measures
- Enables effective engagement of C&I customers in real-time market participation and taps into a sizeable capacity resource
- Strengthens a PUC's and a utility's brand and identity as innovators

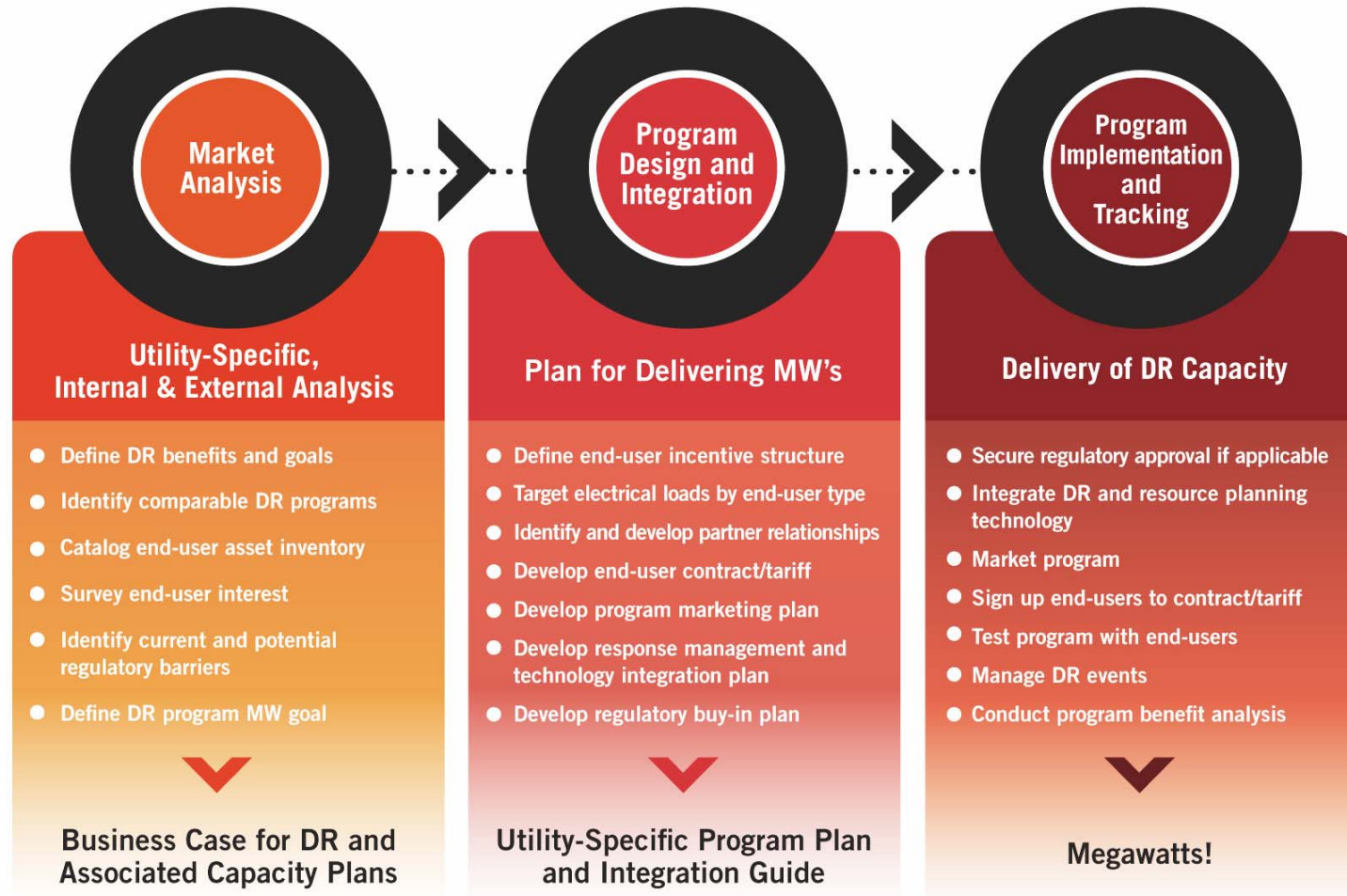
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## Knocking Down Old Barriers to Demand Response

- Obstacle: DR is only about system protection
  - Realities:
    - DR provides a link between wholesale and retail prices, helping to decrease price volatility
    - DR provides clean and reliable capacity
    - DR provides customers with choices and keeps companies competitive
- Obstacle: Metering technology is too expensive
  - Reality: Paybacks of less than 1 year
- Obstacle: Consumers don't understand DR
  - Realities: C&I consumers jump onboard when given 3 E's:
    - Economics: Have to be compelling
    - Execution: Totally automated process – starting with a professional DR audit
      - allows us to understand customer's facilities and nominate appropriate load
    - Energy Efficiency Enhancements: DR and EE are complementary -- not competitive -- forces

# DR as a Capacity Alternative: Capacity on Demand (COD)

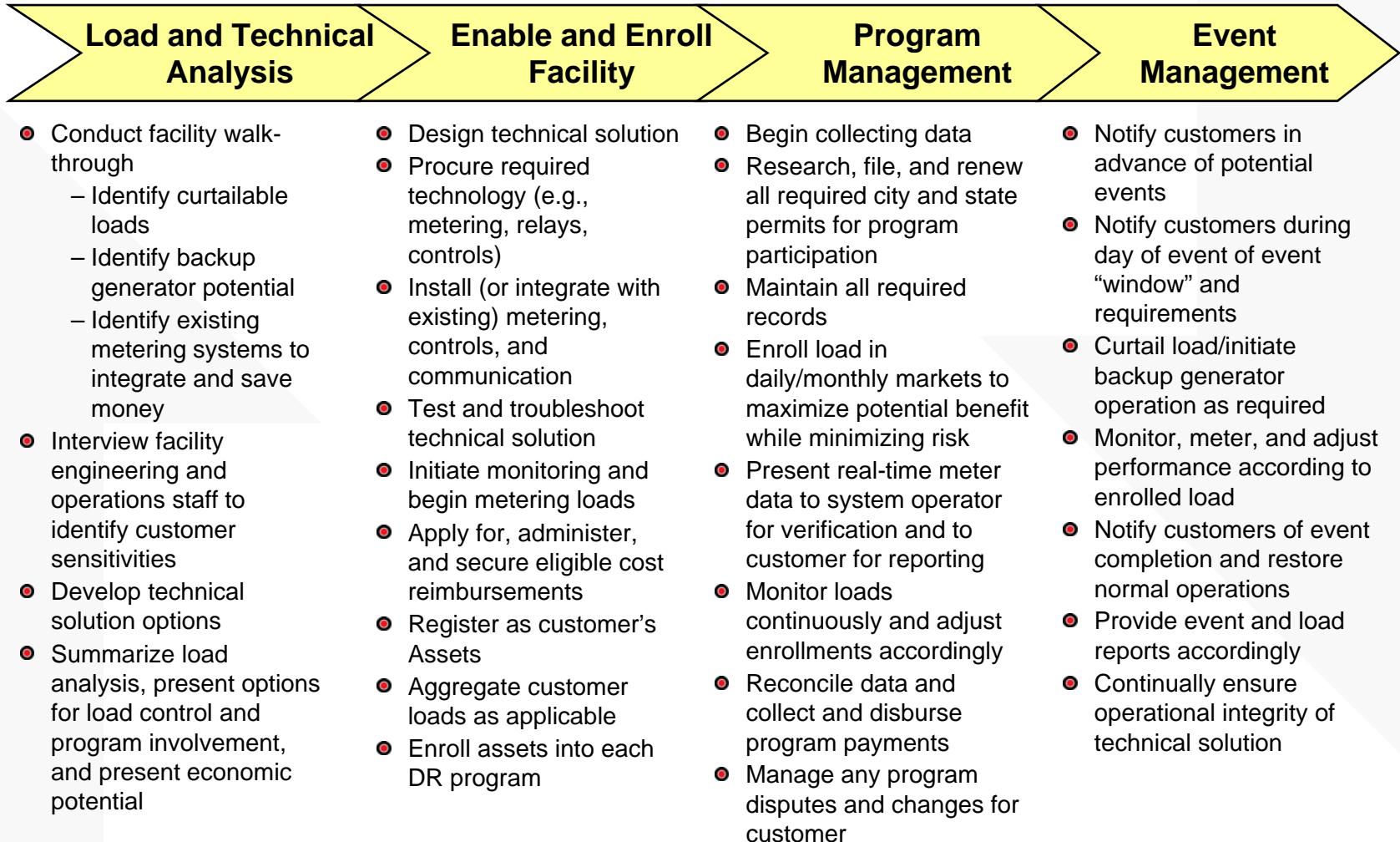
EnerNOC offers a completely outsourced solution. The complexities of administering and participating in a demand response program are entirely simplified for utilities and end-use customers. Our approach has three key characteristics:



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# DR as a Capacity Solution: COD Overview

EnerNOC's offering is a complete solution.



# DR as a Capacity Alternative: COD Overview

The following table summarizes key aspects of a program concept

ASPECT	VALUE	COMMENTS
Size	100 MW	Large enough to retire a large peaker
Price	~ \$100 per kW per year	Will enable customer adoption, and provide a guaranteed product at a cost equivalent to or less than a new peaking plant
Term	3 to 5 years	Long enough to attract end-user participation
In Service Date	Within 3 months of contract signature	Firm ramp-up schedules, with goal of bringing as much capacity online in year one and all capacity online by 18-24 months
End User Assets	EnerNOC directly controls customers' HVAC systems, lighting systems, process equipment, pumps, other energy consuming devices, and backup generators when permitted and appropriate	EnerNOC's technology optimizes asset performance and gives customers immediate access to their energy consumption patterns. EnerNOC's customers typically initiate further energy efficiency initiatives once they recognize the benefits of demand response
Event Window	12:00 pm to 6:00 pm on non-holiday weekdays, to be defined by utility, system operator, and EnerNOC	Window parallels system peak
Event Trigger	Reliability events and/or peak demand hours, TBD by the utility, system operator, and EnerNOC	DR resources will provide capacity during reliability events and allow retirement of dirty, out of favor peak plants or obviate need for new peak plant build outs

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# Demand Response Public Policy Objectives

- ◉ **Capacity valued on par with new peakers** – particularly new capacity; locationally-specific pricing
- ◉ **Three- to five-year capacity contracts** (e.g. SWCT Gap RFP) or market pricing within predictable bands (e.g. NY ISO Zone J and K)
- ◉ **Appropriate baseline methodology** – not last year's load; with appropriate weather and recent experience adjustment (e.g. declining weighted average of previous days load adjusted with weather adjustment)
- ◉ **Direct real-time performance monitoring** (e.g. ISO-NE's ICBS-type system) enabling system operators to see performance during events
- ◉ **Environmental regulations that recognize impact of BUG DR** as better than running baseload/intermediate plants on Eco-min
- ◉ **Reasonable and clear event trigger mechanisms** – not a random process
- ◉ **Response opportunities differentiated on basis of real system needs**
  - capacity during peaks vs. reliability contingency response
  - Time of response; Time of Day; Days per year

# DR as a Capacity Alternative

Demand response with EnerNOC delivers numerous benefits.

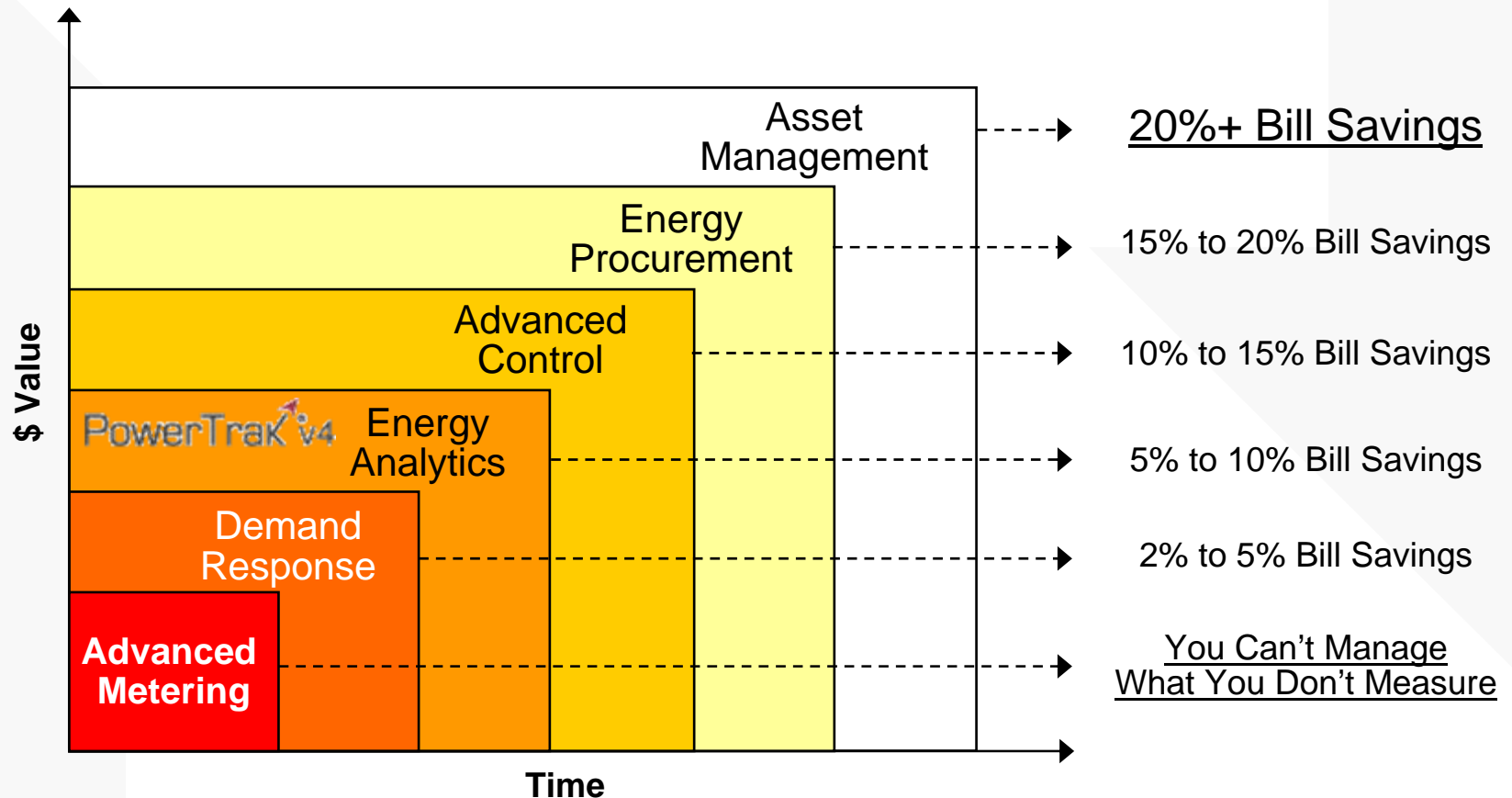
- Strengthens a PUC's and a utility's leadership role in addressing the peak electricity capacity shortfalls and in reducing emissions
- Demonstrates the economic and operational viability of demand response as a reliable, verifiable, and economic resource for meeting peak load needs
- **Complements existing energy efficiency programs, and serves as a catalyst for further energy management and efficiency measures**
- Enables effective engagement of C&I customers in real-time market participation and taps into a sizeable capacity resource
- Strengthens a PUC's and a utility's brand and identity as innovators

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# Total Energy Management

EnerNOC's strategy is to serve customers with a technology-enabled, total energy management solution that optimizes energy usage and minimizes energy costs.

## Total Energy Management with EnerNOC



# Total Energy Management

EnerNOC's PowerTrak platform allows for real-time monitoring of electric, gas, and water consumption

Users are able to see each of their metered assets, in aggregate, in user-defined groups, or individually.



# Appendix



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# EnerNOC Examples and Experience: Demand Response Audit

EnerNOC's four-part evaluation of a facility's energy use and operating flexibility identifies opportunities for how demand response can be implemented, energy usage can be reduced or rescheduled, and peak demand limited.

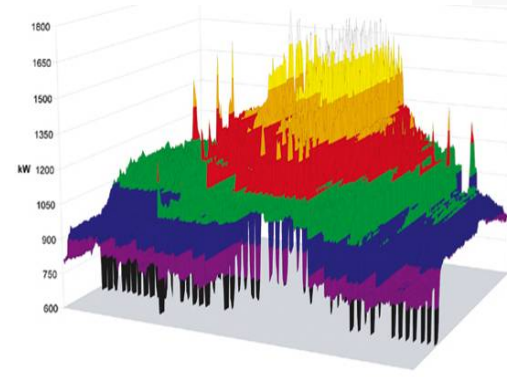
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Interview



3

Technical and Financial Analysis



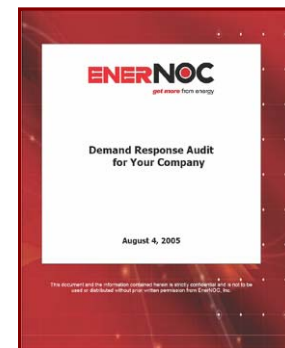
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Site Survey



4

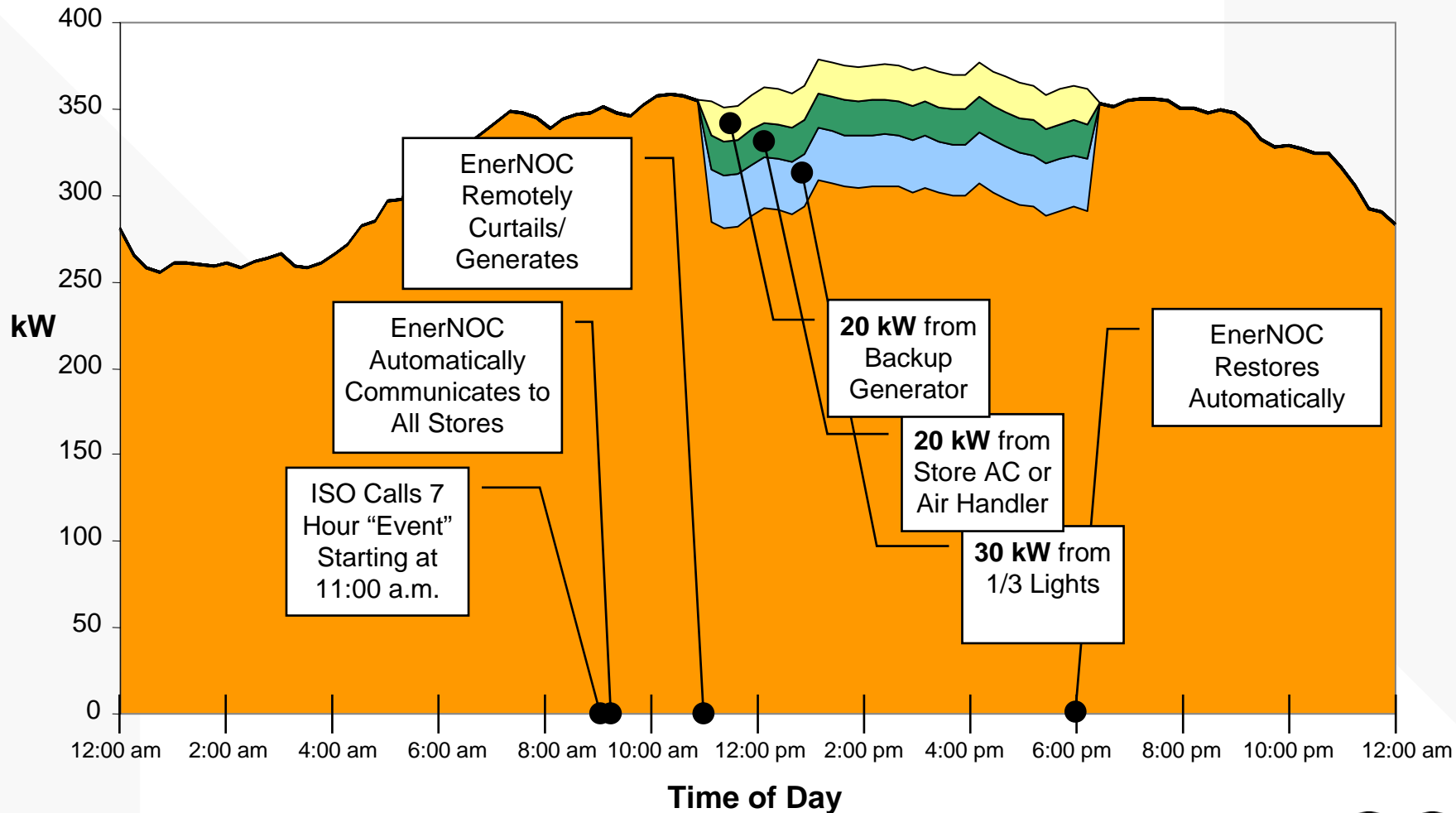
Report and Presentation



# EnerNOC Examples and Experience

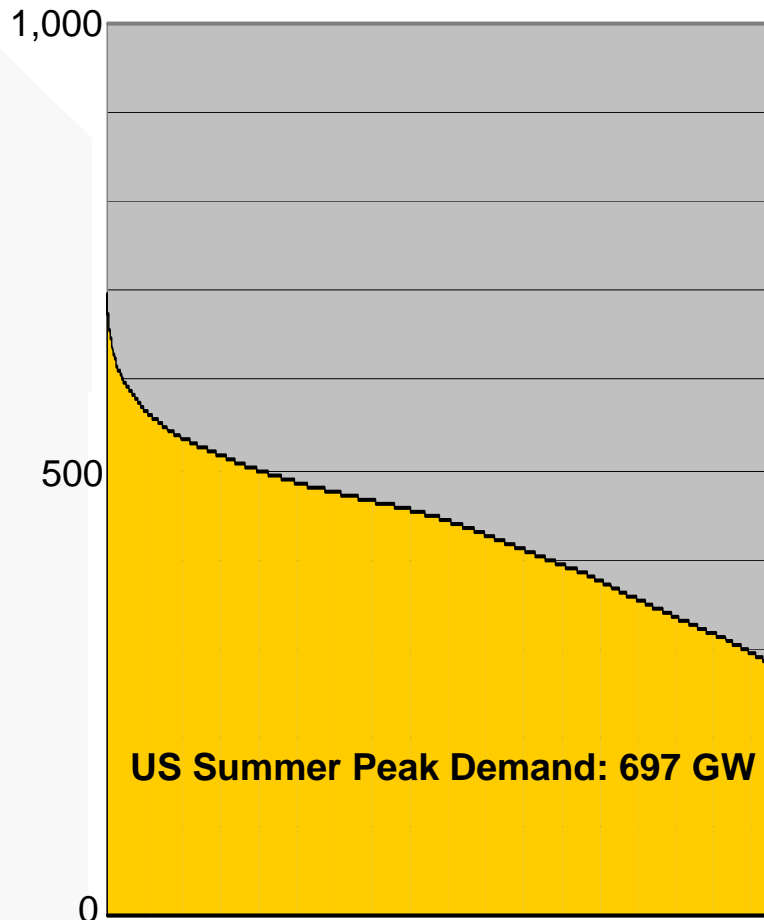
EnerNOC's deploys industry-specific solutions that maximize the customer's contribution and return without risk to business continuity.

Supermarket 24 Hour Load Profile and EnerNOC Demand Response Application

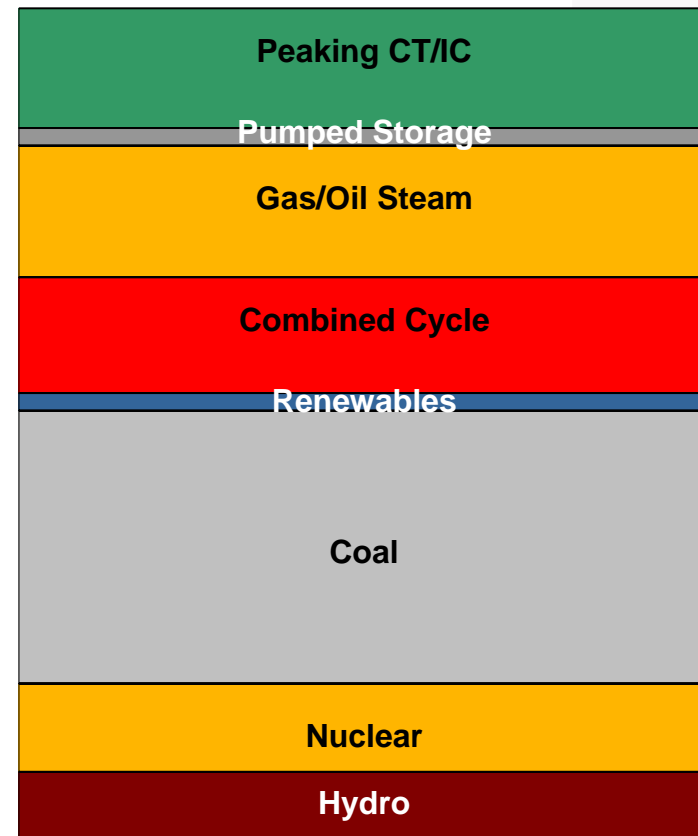


# Demand Response Impact Potential

Demand Response provides a better solution to meeting peak demand than the traditional solution of over-building generation.



US Generating Capacity: 948 GW



Source: EIA Electric Power Annual 2003

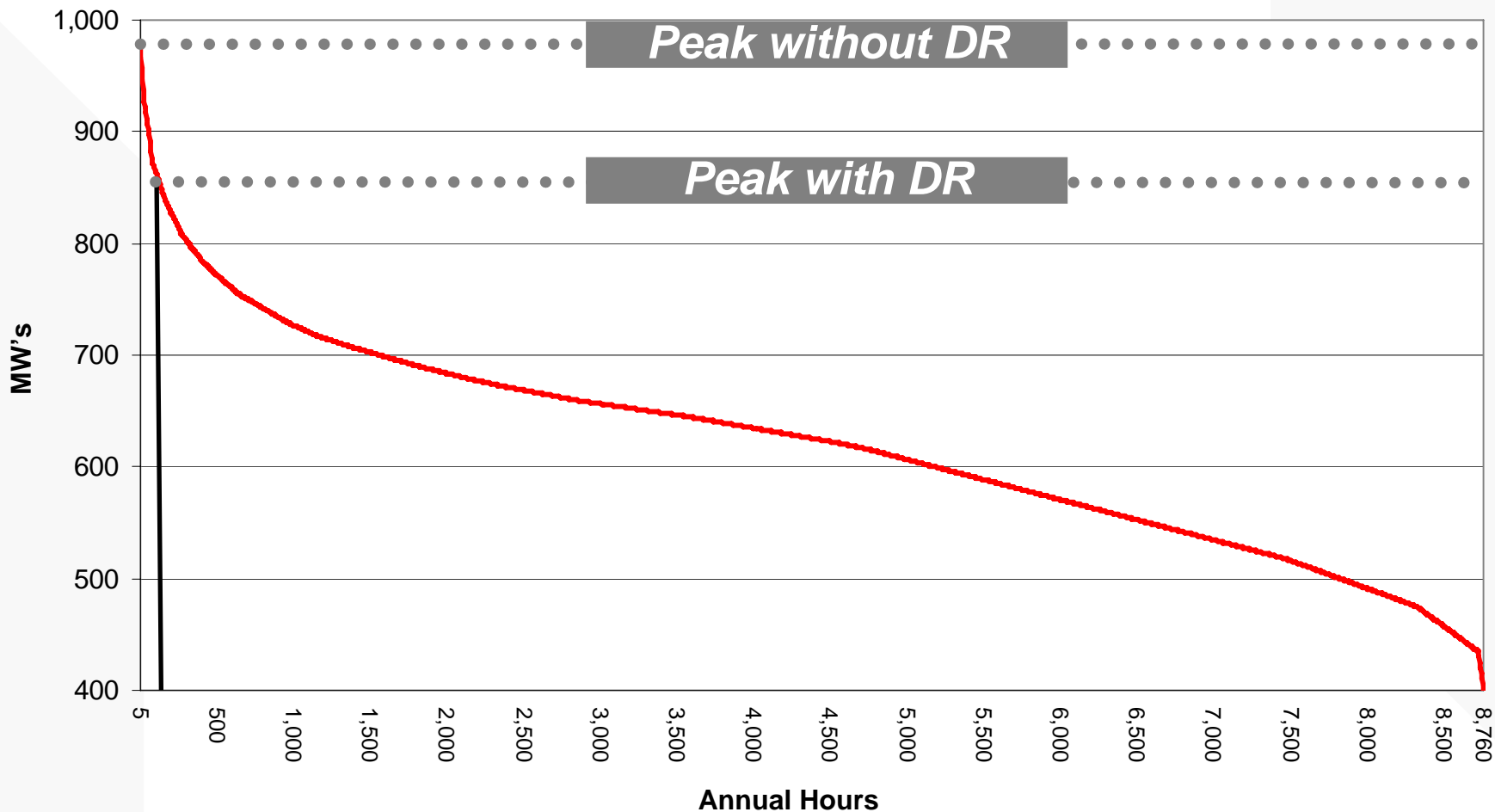
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# Demand Response Impact Potential

EnerNOC reduces peak demand associated with ~1% of annual electricity consumption. Nationwide, DR could provide 95 GW with a replacement value of ~\$28 billion.

Illustrative Load Duration Curve for 1,000 MW's of Electricity in the US

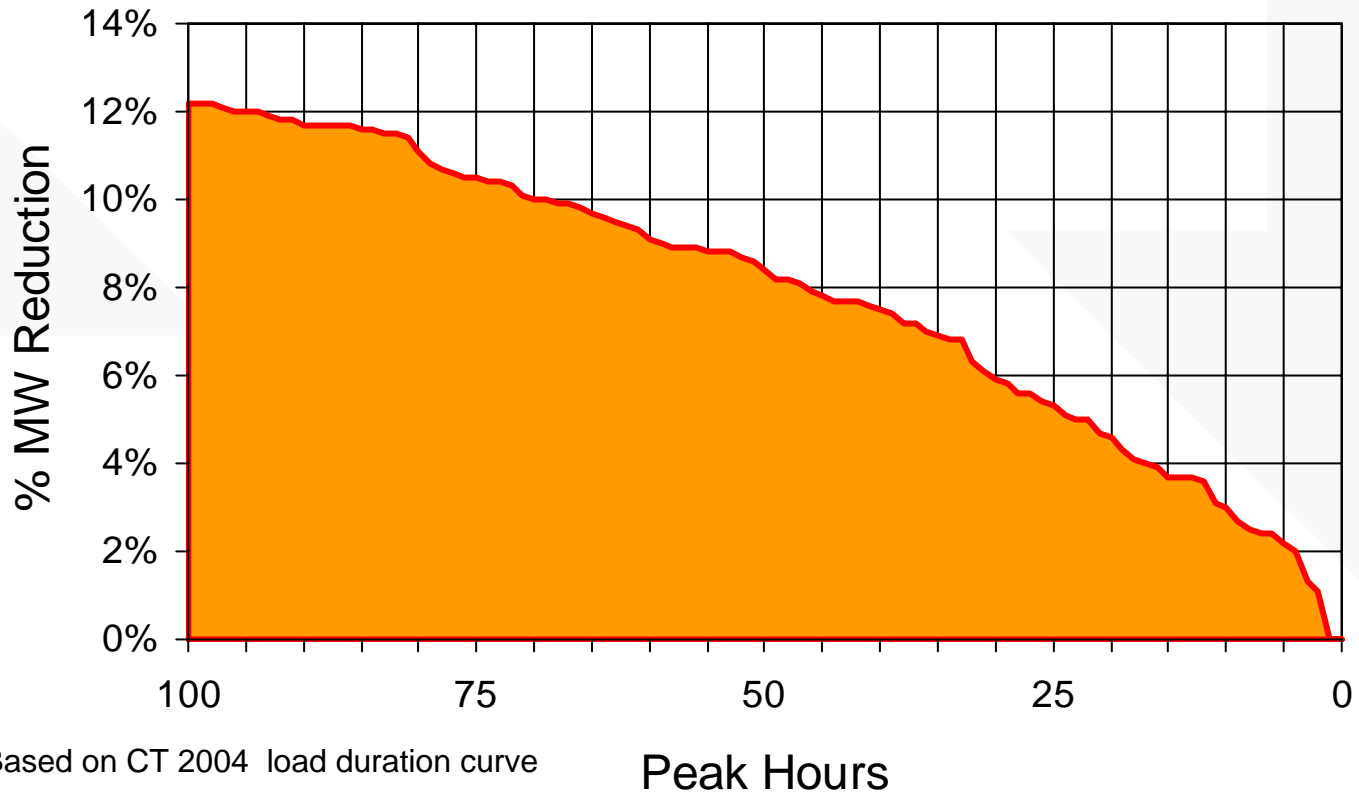


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# Demand Response Impact Potential

A few hours of demand response provide substantial peak load reduction.

## Peak Load Drop Potential



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# Demand Response Myths

- ⦿ Demand response is slow and insignificant – it will never provide enough capacity to address grid issues
- ⦿ Demand response is not reliable
- ⦿ Demand response is not functionally equivalent to generation
- ⦿ Demand response payments have to be uniform within ISO territories
- ⦿ Demand response will fully mitigate energy market price spikes
- ⦿ Demand response is not an environmentally friendly solution

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# Demand Response Market Realities

Demand response is ready for primetime because it is:

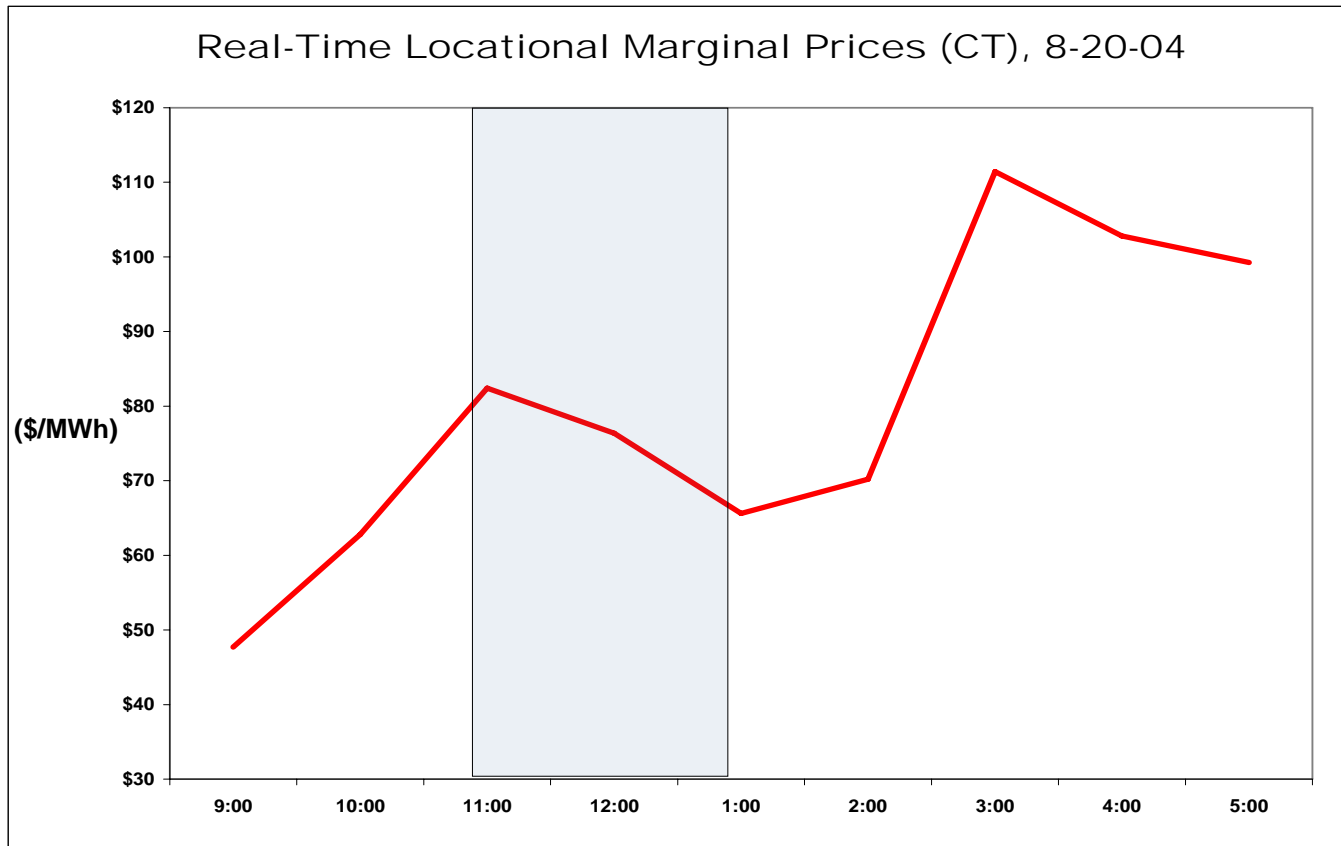
- **Fast and significant** – EnerNOC enabled 40 sites and 100 MW in less than six weeks; these sites can be dispatched within minutes
- **Precise** – Demand response capacity can be brought online exactly where it is needed when it is needed
- **Verifiable and accountable** – EnerNOC captures 5-minute interval data, providing direct visibility into asset performance; EnerNOC accepts penalties for non-performance; utilities and system operators can rely on us
- **Economical** – Demand response capacity is very cost effective compared to alternatives, and customers commit when the price is right, but Demand Response is not a panacea for all market challenges.
- **Environmentally friendly** – Many customers curtail electricity usage during events; others use backup generators (BUGs), and U.S. EPA studies show that demand response can reduce air emissions, even when diesel-fueled BUGs are used

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# EnerNOC Examples and Experience

Demand Response Can Make a Difference

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