ISO New England
2003 Demand Response Programs

Presented at:

National Accounts Demand Response Seminar

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New England's Electric Power System

- 14 million people
- 350+ generators
- 8,000+ miles of transmission lines
- 4 satellite control centers
- Interconnections to 3 neighboring systems
- 30,000 MW of installed generating capacity
- Peak load: 25,348 MW on August 14, 2002

ISO and satellite facilities

400 mi.
650 km

320 mi.
520 km
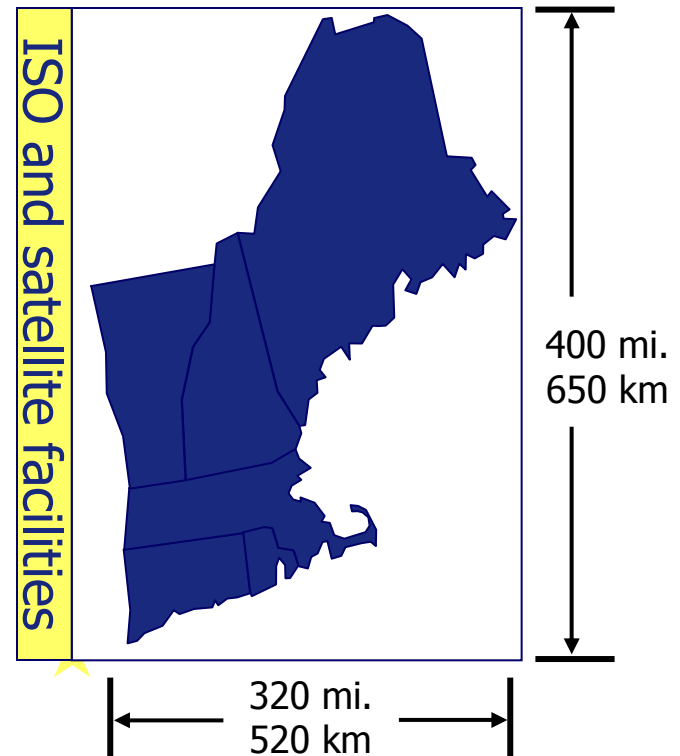
Two Program Types

- **Reliability (Demand) Based**:
  - Customers respond to System Reliability Conditions as determined by the ISO New England Control Room

- **Price Based:**
  - Customers respond to Wholesale Spot Prices as determined by the Market.

2003 Programs

	Reliability	Price
Individual Customer	30-Minute and 2-Hour Real-Time Demand Response Programs	Real-Time Price Response Program
Groups of Customers	Real-Time Profile Response Program	

Real-Time Price Response

| Who?	Individual or Aggregated Customers (Minimum 100 kW Reduction)
When?	Notified by ISO that wholesale prices are forecasted to exceed $0.10/kWh either the night before or morning of the event day.
How fast?	**Voluntary!** Customer decides when and for how long.
How much?	Greater of Real Time Price or Guaranteed Minimum of $0.10/kWh
How long?	Price response "window" open as early as 7AM and remains open until 6PM.
Metering?	Requires hourly (interval) meter

Real-Time Price Response – Case Study:

- Wesleyan University was able to use its energy management system (EMS) to control lighting loads and increase the set-point temperature of its HVAC system.

- Elected to enroll in price response program at 100 kW.

- Participated in price response events March 10th through 14th.

- Average reduction over the 5 days was 224 kW

- Earned payment of approximately $1,300

March 11, 2003 - Real-Time Price Response Program
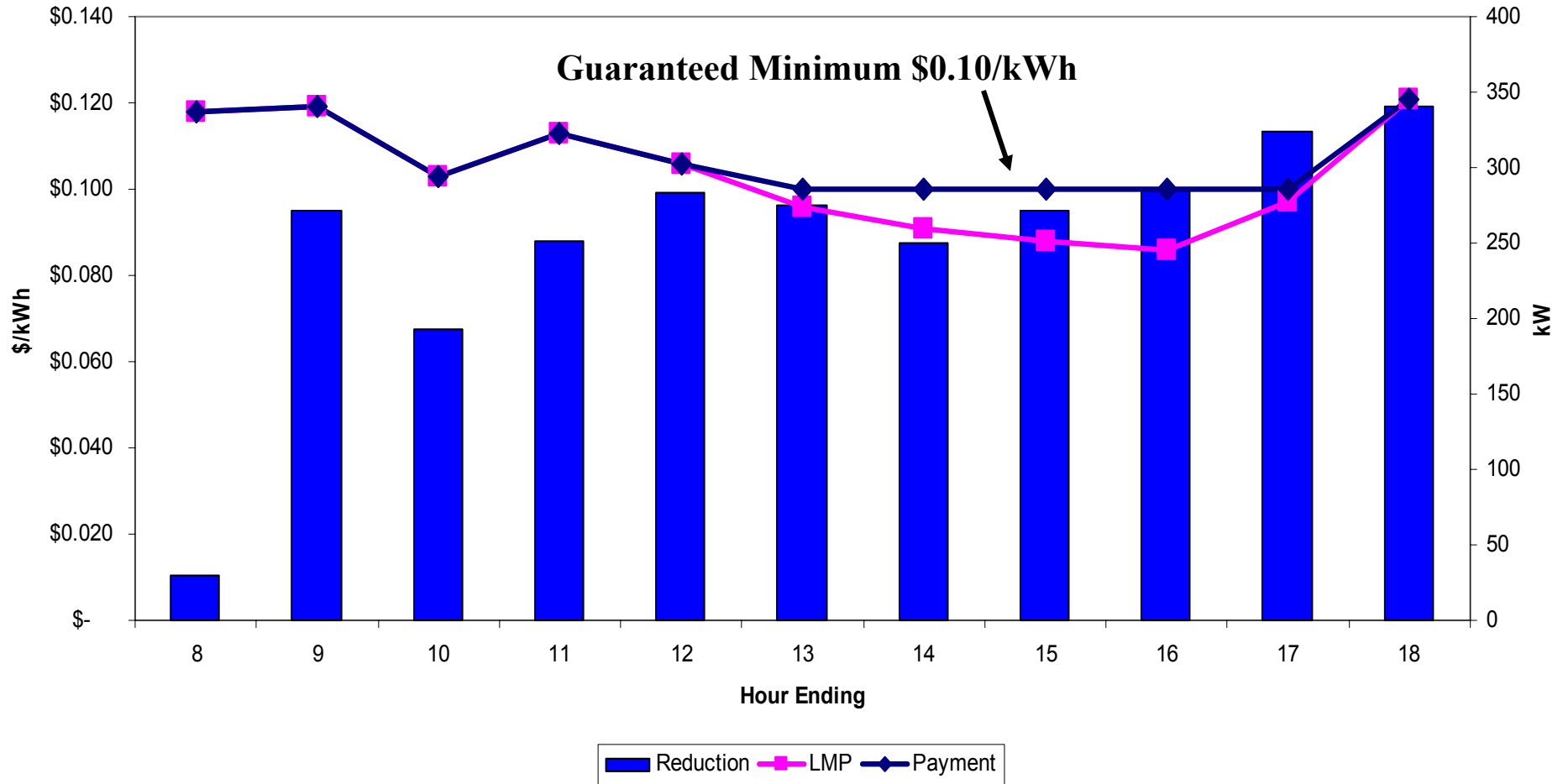
Ways to Participate

- Turning off non-essential lights and office equipment

- Adjusting HVAC, refrigeration and water heater temperatures

- Rescheduling or reducing manufacturing processes

- Operating on-site generators

- Using energy management system (EMS)

The majority of consumers who participated in the 2002 programs reported no adverse impacts on their business

What does **100 kW** look like?

1,250	17" Computer Monitors
1,000	100 Watt Incandescent Bulbs
910	2' x 4' T8 Fluorescent Fixtures
530	150 Watt Metal Halide Fixtures
230	Vending Machines
130	HP Electric Motors @ Full Load
90	Tons of HVAC

Real-Time Price Response

- If you already have an **interval meter** that is read every day via a **phone line** then there is:

  – **No additional cost ***

  – **No risk**

  – **No reason not to sign up!**

* Check with your utility representative

Real-Time Demand Response

Who?	Individual Customers (Minimum 100 kW Reduction)
When?	Respond to ISO Control Room request
How fast?	Within 30-Minutes or 2-Hours of ISO request. Customer must elect option when applying.
How much?	**Energy Payment:** Greater of Real Time Price or Guaranteed Minimum $0.50/kWh for 30-Minute Response and $0.35/kWh for 2-Hour Response. **Capacity Payment:** Monthly Installed Capacity (ICAP) credit ($/kW) based on the monthly ICAP Supply Auction clearing price.
How long?	Minimum 2-Hour guaranteed interruption
Metering?	Requires Internet Based Communication System (IBCS)

Real Time Demand Response - Case Study:

- A large manufacturing facility is able to reduce its load by 3 MW within 30 minute's notice from ISO New England's control room:

Hour	Wholesale Price ($/kWh)	Guaranteed Minimum ($/kWh)	Payment ($/kWh)	Load Reduction (kW)	Payment
13	$ 0.1500	$ 0.5000	$ 0.5000	3,000	$ 1,500.00
14	$ 0.3800	$ 0.5000	$ 0.5000	3,000	$ 1,500.00
15	$ 0.6100	$ 0.5000	$ 0.6100	3,000	$ 1,830.00
16	$ 0.3425	$ 0.5000	$ 0.5000	3,000	$ 1,500.00
Total					$ 6,330.00

Plus, monthly ICAP credit based on 3 MW.
ICAP has average $240/MW over the past few months.
At $240/MW the customer's annual ICAP credit would be $8,640

Real-Time Profile Response

| Who?	Groups of Customers (Minimum 200 kW Reduction for the Group)
When?	Respond to ISO Control Room request
How fast?	Within 30-Minutes of ISO request
How much?	**Energy Payment:** Greater of Real Time Price or Guaranteed Minimum $0.10/kWh **Capacity Payment:** Monthly Installed Capacity (ICAP) credit ($/kW) based on the monthly ICAP Supply Auction clearing price.
How long?	Minimum 2-Hour guaranteed interruption
Metering?	Performance determined through Statistical Analysis

Profile Response - Case Study

- An energy services company installs 2,000 direct load control devices on small commercial HVAC units.

- Statistical valid customer sample is metered to calculate the average load reduction of the entire customer base

Hour	Wholesale Price ($/kWh)	Guaranteed Minimum ($/kWh)	Payment ($/kWh)	Load Reduction (kW)	Payment
13	$ 0.1500	$ 0.1000	$ 0.1500	7,436	$ 1,115.40
14	$ 0.3800	$ 0.1000	$ 0.3800	5,684	$ 2,159.92
15	$ 0.6100	$ 0.1000	$ 0.6100	4,426	$ 2,699.86
16	$ 0.3425	$ 0.1000	$ 0.3425	3,370	$ 1,154.23
Total					$ 7,129.41

Metering Options
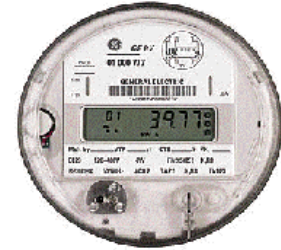
- **Low Tech Option:**
  - Meter data reported to ISO New England by Enrolling Participant within 36 hours for every day.
  - May be able to use existing meter and communication system.

- *Super* **Low Tech Option:**
  - Meter data reported to ISO New England by Enrolling Participant within 3 months of an event day.

- **Event Notification:**
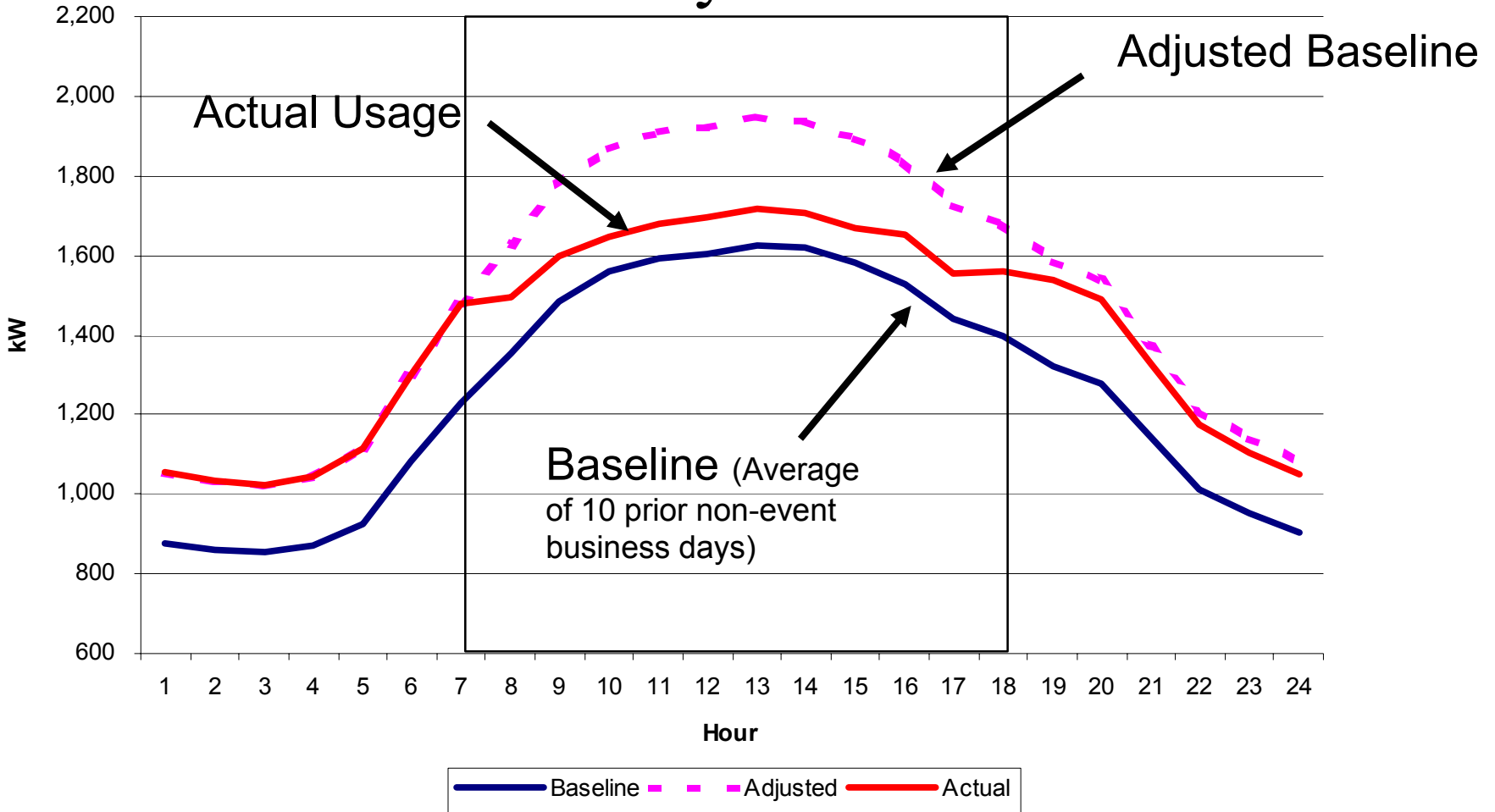 - ISO New England notifies customers by e-mail or FAX

Internet Based Communication System (IBCS)

- 2-Way Communications between ISO New England and the Customer.
  - Event notification
  - 5-Minute meter readings
  - Web access to meter data, wholesale prices and demand response performance
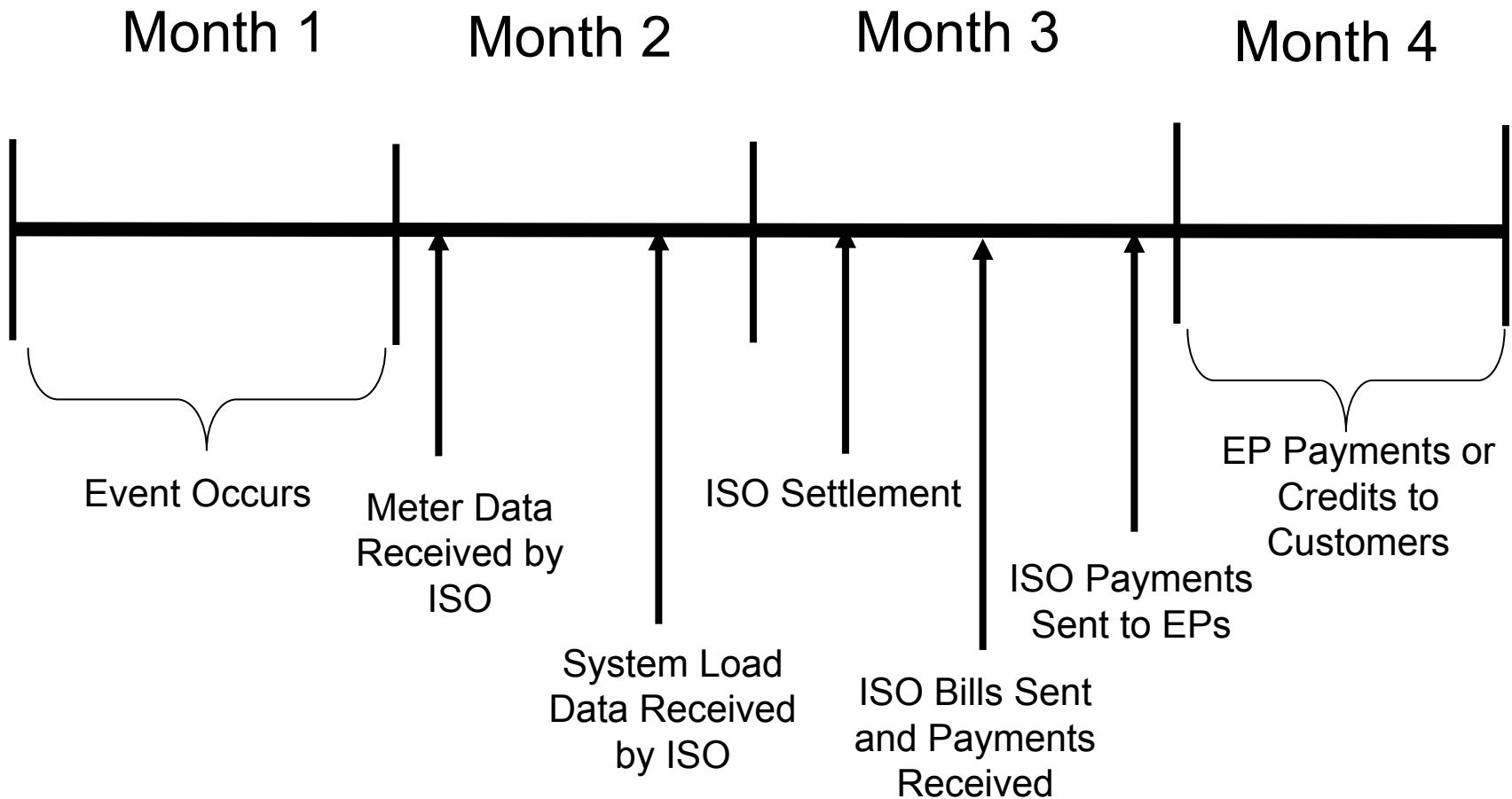- ISO New England's Open Solution allows multiple suppliers of reporting and information services.

Performance and Payment Calculation

Payment Schedule (IBCS and Low Tech Options)

Month 1   Month 2   Month 3   Month 4

Event Occurs

Meter Data Received by ISO

System Load Data Received by ISO

ISO Settlement

ISO Bills Sent and Payments Received

ISO Payments Sent to EPs
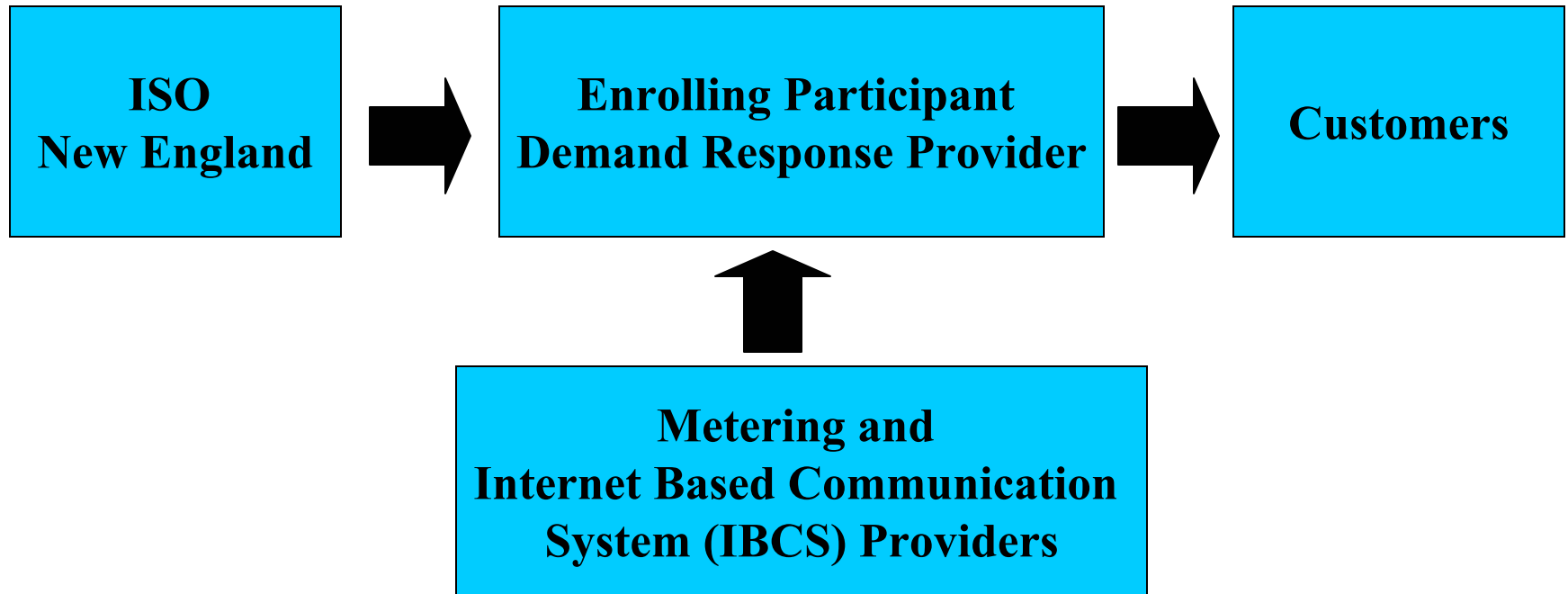
EP Payments or Credits to Customers

Enrollment Process - Who's Involved?

- Customer
- Enrolling Participant
  - Local Distribution Company (LDC)
  - Competitive Supplier
  - Demand Response Provider (DRP)
    - $500 annual fee to become a DRP
- LDC's Metering Division
- ISO New England

ISO New England issues payments to Enrolling Participants and Demand Response Providers, not Customers directly

Program Delivery

| ISO New England | → | Enrolling Participant Demand Response Provider | → | Customers |

Metering and Internet Based Communication System (IBCS) Providers

EEI National Accounts "Wish List"

- **Make Programs Voluntary**
  - Real-Time Price Response Program is 100% voluntary with absolutely no risk.

- **No Penalties!**
  - None of ISO New England's programs have punitive penalties

- **Provide Notice via E-Mail**
  - Notifications can be sent to multiple e-mail accounts and any e-mail addressable device (pager, cell phone, etc)

EEI National Accounts "Wish List"

- **Provide Advanced Notice**
  - Notice of the Real-Time Price Response Program event is usually received the day before an event, typically by 5:00 p.m. for an event that will start as early as 7:00 a.m. the following day

- **Provide Access to Interval Data**
  - Customers who elect to install the Internet Based Communication System (IBCS) can receive Web-based access to their 5-minute interval data.

EEI National Accounts "Wish List"

- **Provide Guaranteed Payout**
  - All ISO New England's programs offer guaranteed minimum energy payments ranging from $0.10/kWh to $0.50/kWh

- **Allow Aggregation**
  - All of ISO New England's programs allow aggregation to achieve the minimum demand response requirements.

Summary of Customer Benefits

- **Paid** for managing consumption in response to reliability or price events.

- **Hourly usage information** that can be used to manage demand and energy charges year round.

- Customers who can manage their demand may be able to negotiate **lower retail electricity prices** from their competitive supplier.

- Help ensure the **reliability** of the region's electrical grid.

- Help **mitigate supplier power** in setting wholesale prices.

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http://www.iso-ne.com/Load_Response/