

Presentation to:



Enabling Technologies for Advancing Load Response Programs

Andrew Bakey
Vice President of Sales
Powerweb Technologies
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Outline

- Who is Powerweb?
- Who are our customers?
- Distributed Resources Software Design
- Real Time Metering
- Internet Controlled Lighting
- Generator Control
- Internet Thermostat Control
- Case Study - Aventis Pharmaceutical
- Notification Methods
- Settlement Services



Who is Powerweb Technologies?

- Privately owned corporation founded in 1991 located in suburban Philadelphia
- Developed and patented a distributed resource platform that allows end use customers curtail load through Internet enabled devices
- Fully operational web-based systems
- Over 7 years experience installing turnkey IT solutions



Who are our customers?

Playtex

Johnson & Johnson



Bristol-Myers Squibb Company



THE JOHNS HOPKINS HOSPITAL



THE HOWARD COUNTY PUBLIC SCHOOL SYSTEM

THE ROUSE COMPANY
founded 1939 listed New York Stock Exchange: RSE



Powerweb's Products

1. The Omni-Link Internet Platform

Real Time PJM Pricing, Instant Curtailment Notification, Energy Settlement, and Load Curtailment Control to provide income which covers the cost of equipment.

2. Internet Metering

Real Time Metering to facilitate verifiable load curtailment and settlement without connection to the grid.

3. Internet Dimmable Lighting

Internet Control of Westinghouse Retrolux Dimming System allowing for NegaWatts to be sold back to the grid

4. Integration to O'Brien Energy Generators and Cogeneration Equipment

5. Internet Controlled Thermostats



4 Steps to Successful Demand Reduction

1. Notification
 - Price and Reliability Alerts now redistributed instantaneously through e-mails, pagers, cell phones, & PDA's.
 - Trigger Price Setting
2. “Real-Time” Metering Compliance
 - Instant feedback on metering demand
 - Instant feedback on curtailment activities
3. Curtailment
 - Internet-based automated curtailment
 - User-Friendly dispatch capabilities
4. Settlement
 - Automated Settlement
 - Instant “Nega-watt” calculation



Omni-Link Software Platform for Distributed Resources

Powerweb - Microsoft Internet Explorer

File Edit View Favorites Tools Help

OMNI-LINK®
Distributed Generation Internet Platform

Plant Locator

Weather

Energy Alarms

Bid/Ask

Load Control

Advanced Metering

Negawatt Graph

Consolidated Operations

Settlement

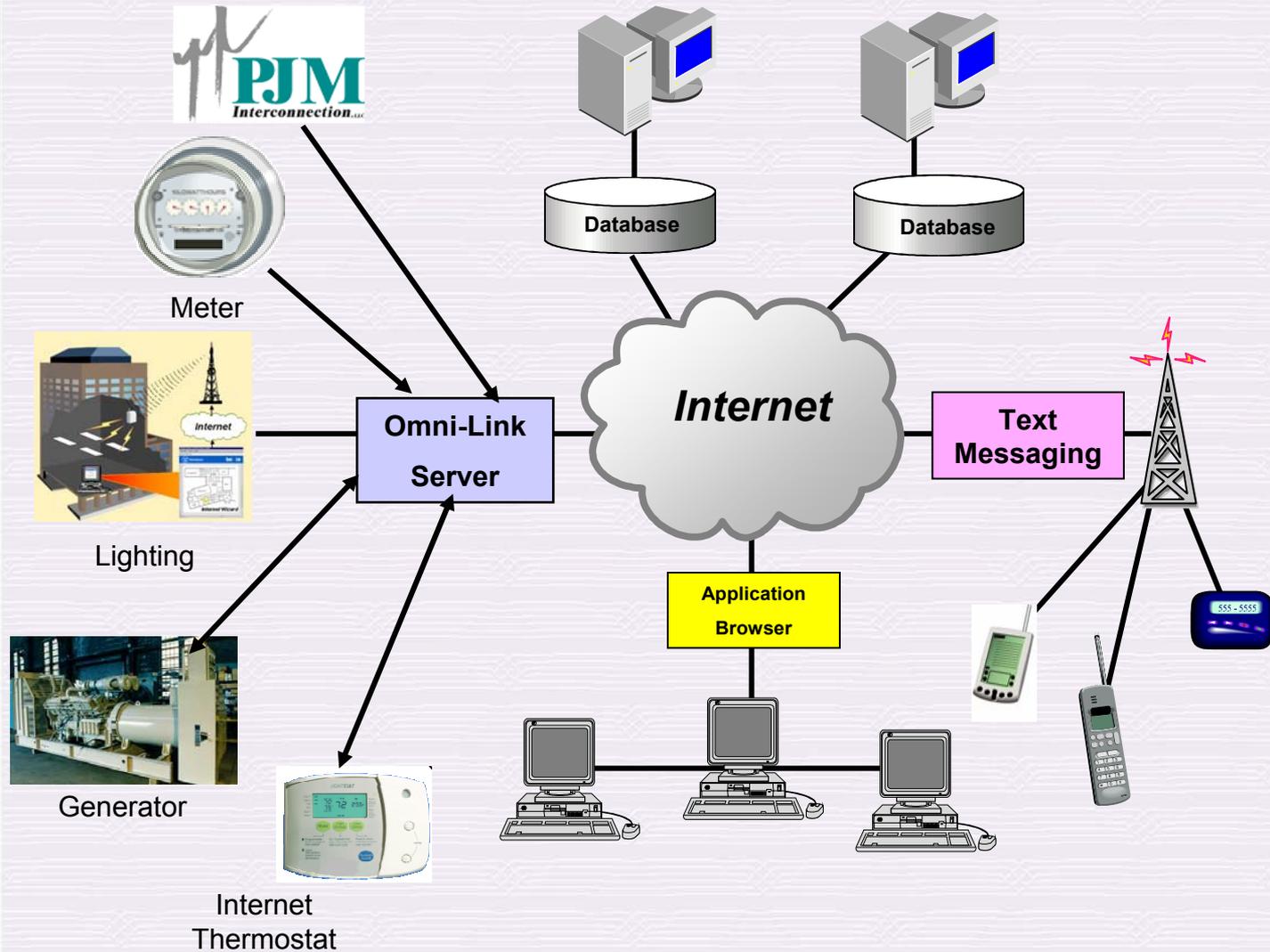
Real-Time Pricing

Notification Methods

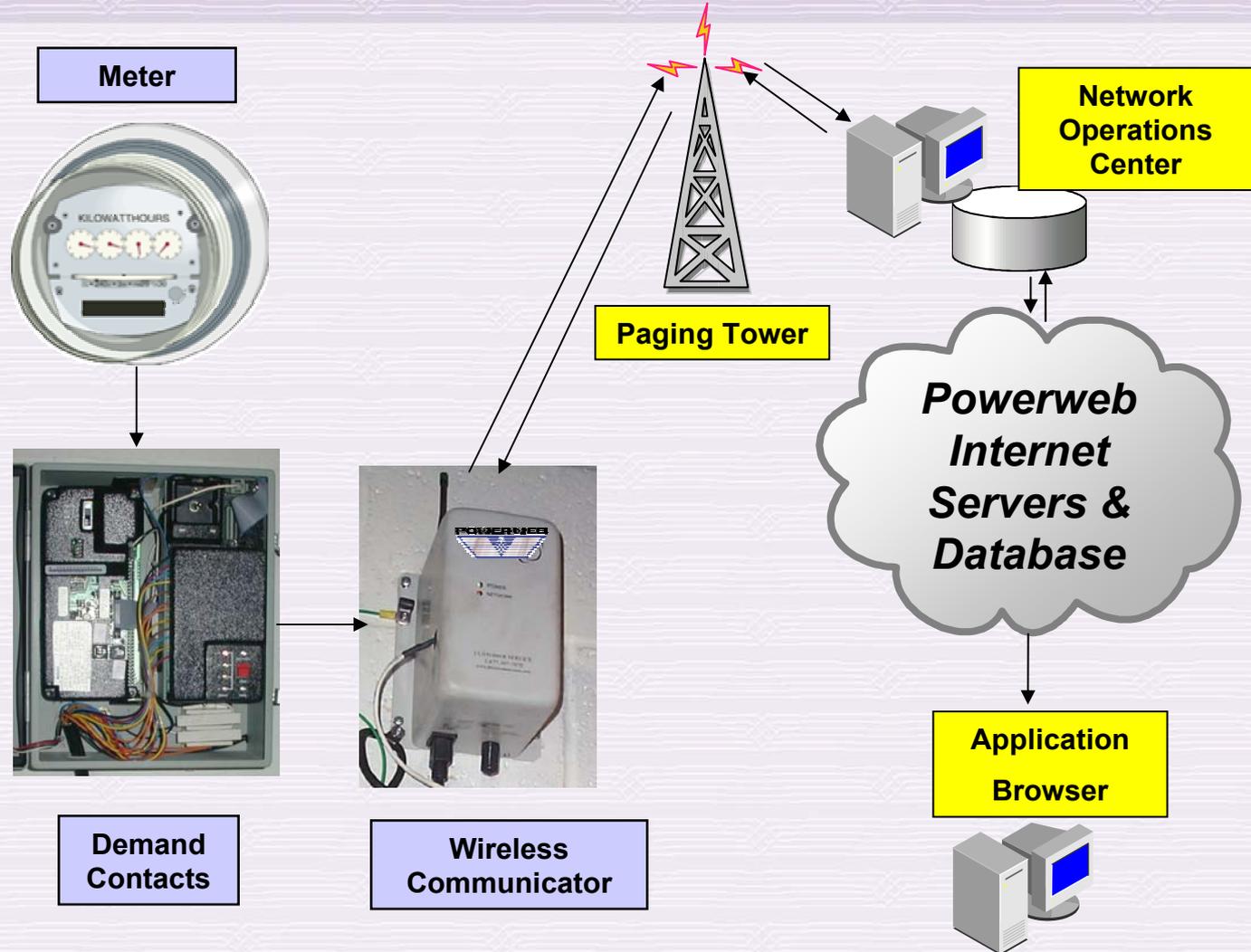
Generation Dispatch



Hardware & Software Integration



Wireless Real Time Metering





Westinghouse

Retrolux Lighting System



Snaps into lampholder – no wiring

Original ballast remains untouched



Dimming and Demand Response Savings

Energy Savings	
	4 Lamp
# of Fixtures	200
Wattage of Existing Fixture	181
Wattage of Retrofit	96
Wattage Savings	85
Burn Hours/Year	3,500
kWh savings per fixture	297.5
Total kWh Savings	59,500
Energy Savings \$.10/kWh	\$5,950
Dimming Savings (20%)	\$1,190
Sell Back to Grid (200 hrs)	\$576
Total Energy Savings/facility	\$7,716
Energy Savings per fixture	\$38.58

Equipment and Labor Costs	
	4 Lamp
Ballast/Lamp Combo per fixture	\$60
Equipment Costs	\$12,000
Software/Hardware Costs	\$500
Labor Costs (\$5.00)	\$1,000
Total Costs	\$13,560
Total Cost per fixture	\$68

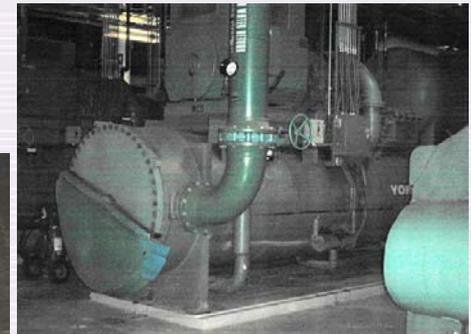
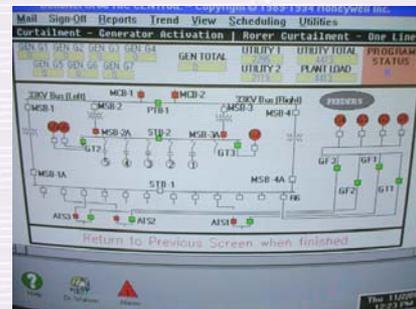
Savings Analysis	
Energy Savings	\$38.58
Equipment Costs	\$68
Simple Payback	1.8

- **Dimming Controlled by 2 way paging signal**
- **Each fixture can be dimmed down to 50 % energy reduction**
- **Each facility would be accessible over the Internet via an Internet wizard**
- **Sell back energy to power grid during Peak Demand days.**



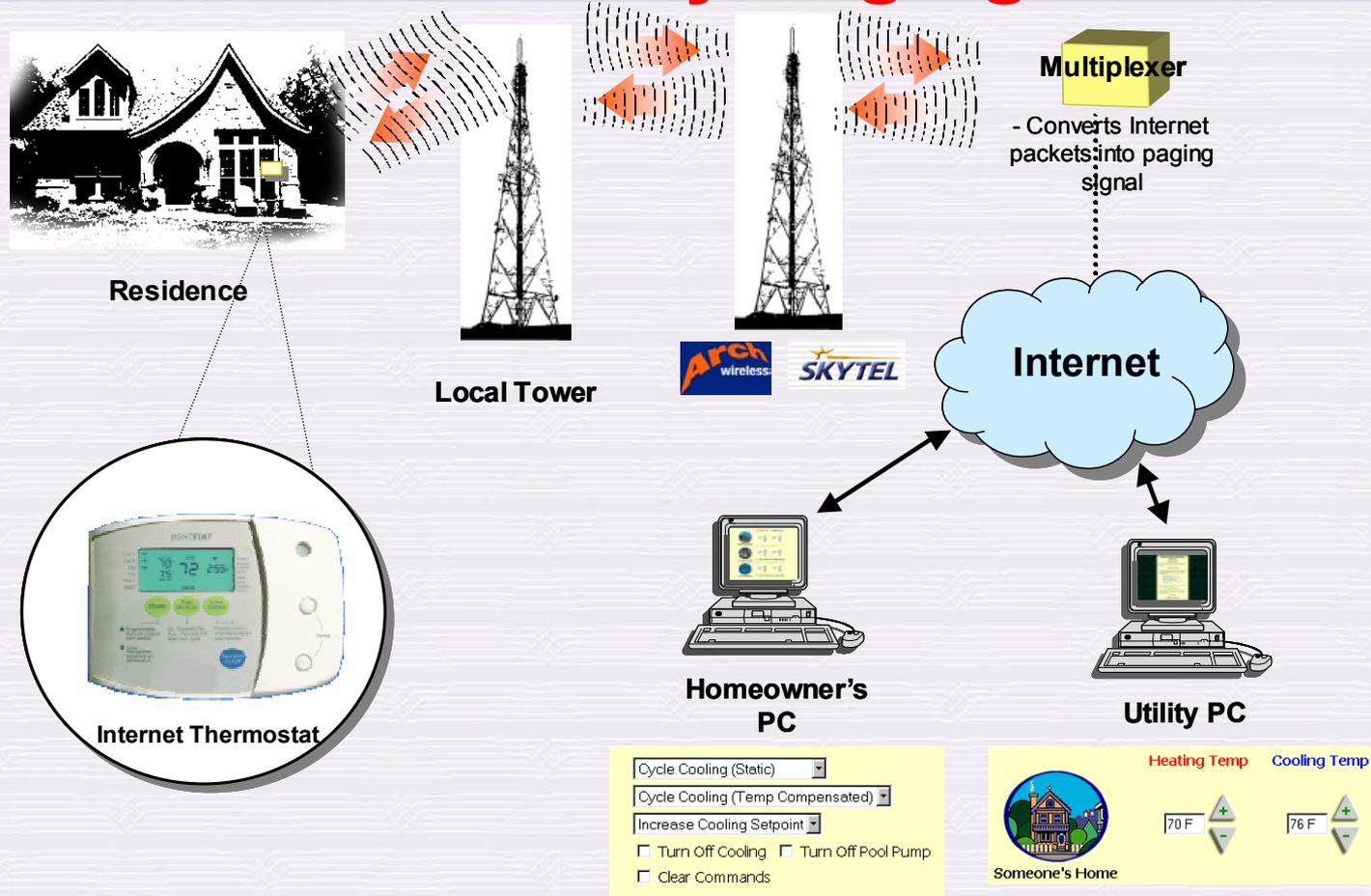
Generation Control

- Integration with Operations Control Software to run generators or chillers
- Generators start up according to dynamic spot prices
- Sell Back Power to the Grid during volatile price periods
- Real Time Calculations of Generating Value available on the Internet



Internet Thermostat Technology

Two-Way Paging



Advantages: Temp. Read, On/Off Status, Message Receipt



Case History



- Pharmaceutical R&D Facility
- 10 Years Old
- 12 MW of Load
- 10 MW of Standby Generation
- Honeywell Control System
- Fixed Price Utility Tariff



Opportunity

- Deregulation allowed for third party suppliers to buy **capacity** directly from customer.
- PJM Load Response Program allowed for **energy** payments directly to customer.
- Customer seeking ways for secondary use of generating assets.
- Fixed Utility Payments causing substantial losses for utility.

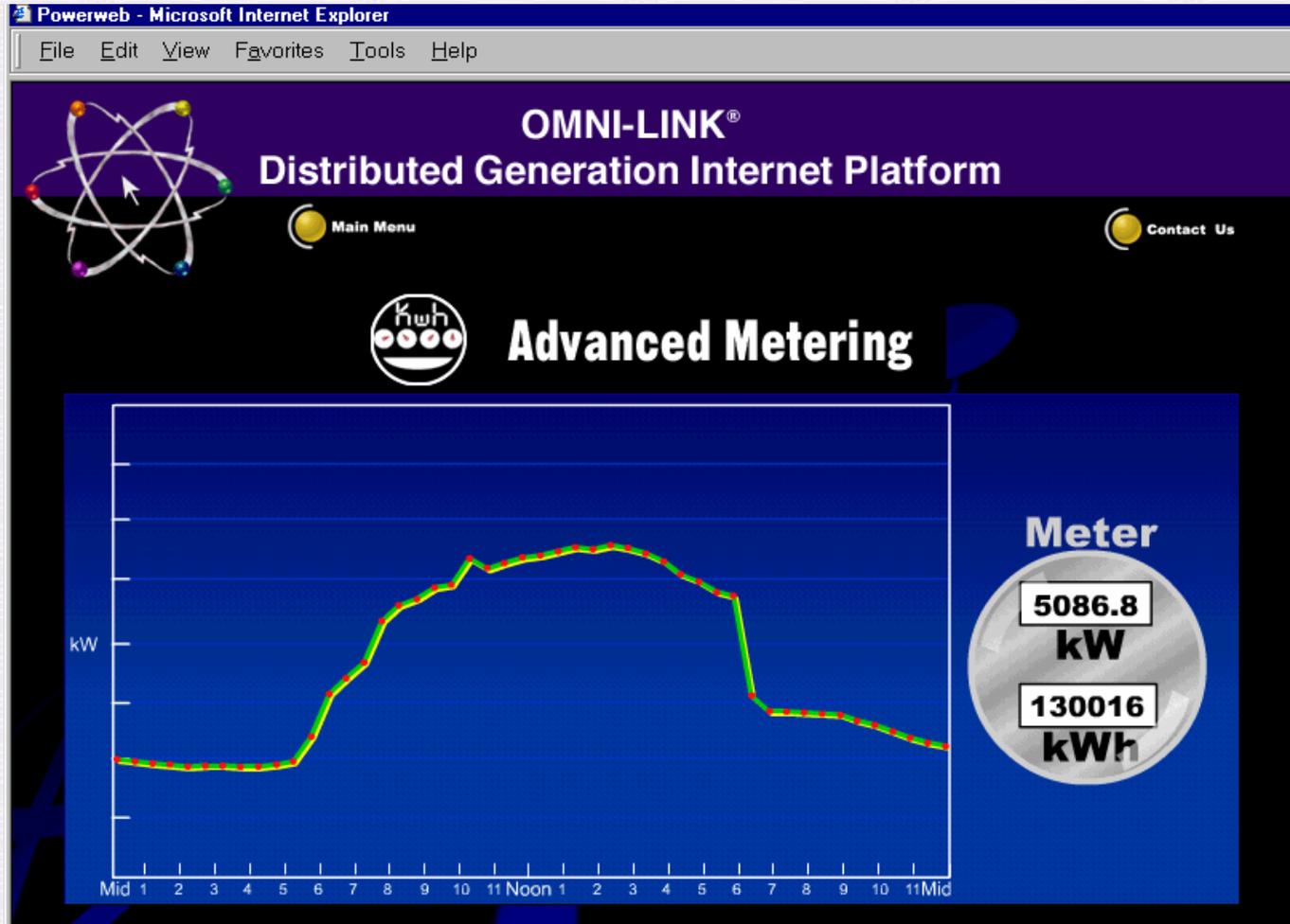


Solution

- Bid Out Capacity to Third Parties
 - Highest Bid \$75/MW-day - \$275,000
 - Mandatory availability from June through September
 - Available between Noon and 8 PM
 - Maximum duration 6 hours
- Join PJM program
 - Voluntary
 - Minimum Energy Payments of 50 c/kWh
- Sell Energy During other times to Utility
 - Set Trigger Prices >10c/kWh
 - Receive Wireless notice
 - Start Generators and Reduce chiller load



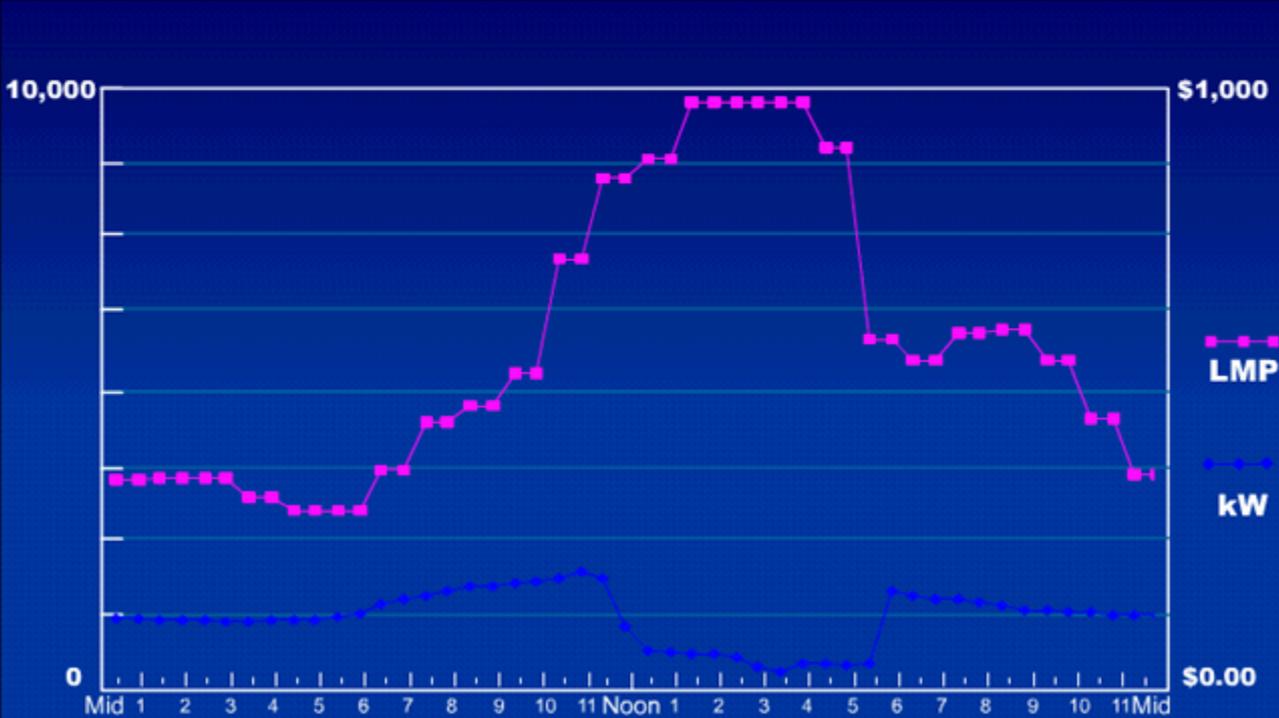
Real-Time Metering



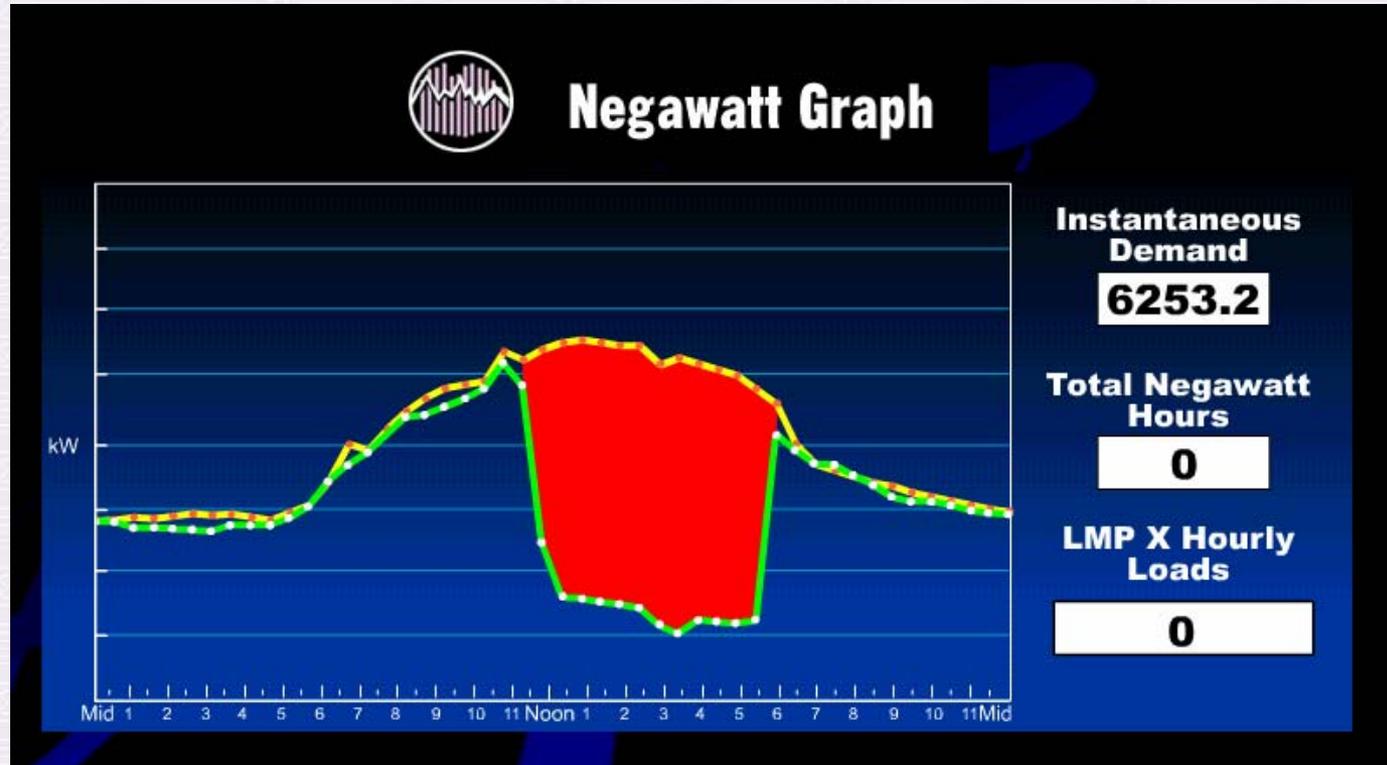
Real-Time Load and Prices



Customer Loads & Prices



NegaWatt Calculation



Settlement Software

Powerweb - Microsoft Internet Explorer

File Edit View Favorites Tools Help



OMNI-LINK®
Distributed Generation Internet Platform

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Settlement

Available kW Generator 1	Available kW Generator 2	Generating kW	Futures Contract cents/kWh	PJM Spot cents/kWh	Delta Value cents/kWh	Generating Value	Cumulative Value
2500	2500	4185	10	68	58	\$ 2844	\$ 25274.25

PJM Spot Pricing

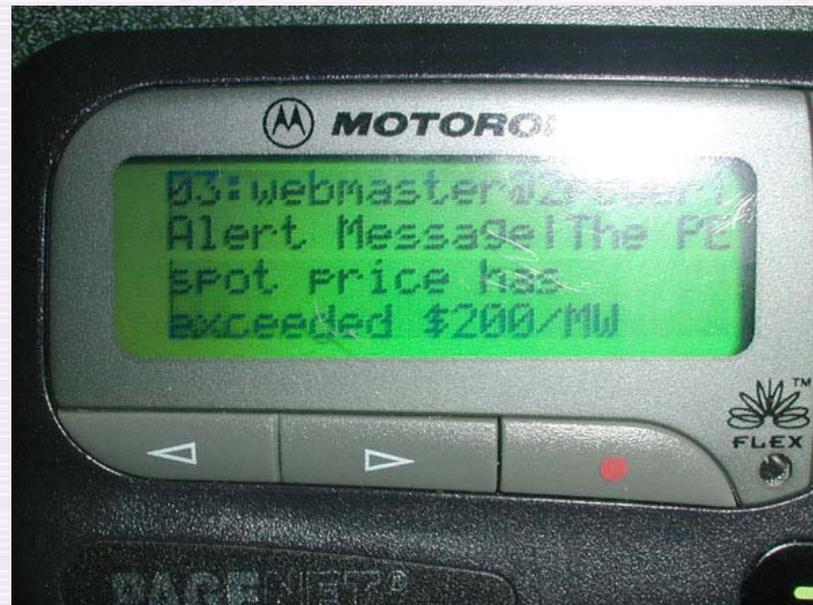
Hour	Price (cents/kWh)
1	10
2	10
3	10
4	10
5	10
6	10
7	10
8	10
9	10
10	10
11	10
12	10
13	10
14	10
15	50
16	85
17	85
18	80
19	70
20	60
21	55
22	65
23	0
24	0



Notification Process “ePoweralert.com”

PJM Technologies, Inc.

- Trigger Prices Set
- Continuous monitoring of PJM Spot Price
- Automatic Notification of Triggers



Summary of Powerweb's Capabilities

- Software is available today.
 - Lighting Control
 - Generation Control
 - Thermostat Control
- Distributed Resources Platform custom designed around the PJM program
- Near real-time or real-time demand information available
- Platform's value add to Utilities, ESCO's, End Users
 - Reduced exposure in Market
 - Aggregate look of all the curtailment customers
 - Increased reliability
 - Increased earnings/share
 - Increased customer satisfaction ratings

