

Demand Side Management Programs

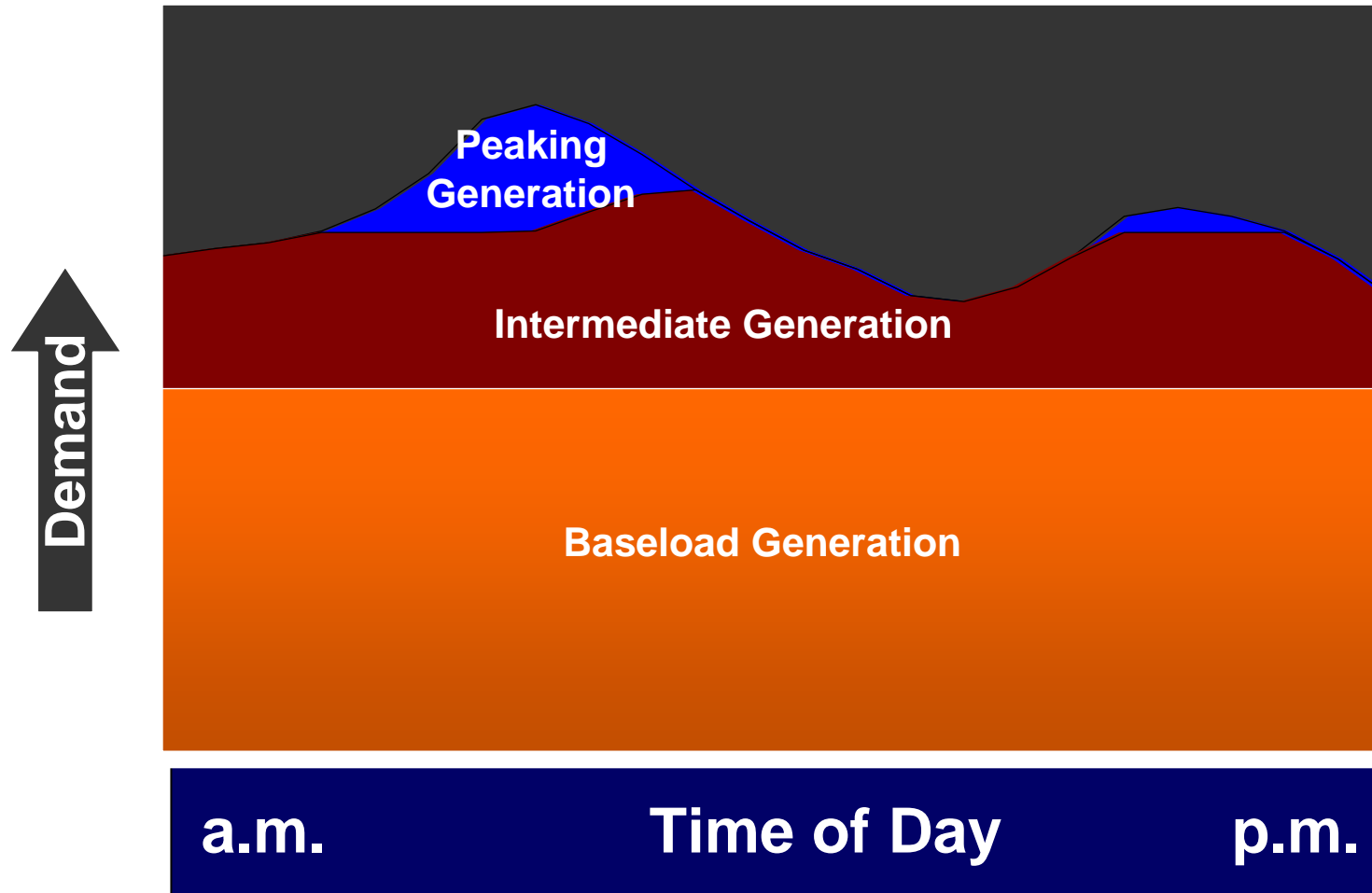
Chris Edge
July 20, 2007



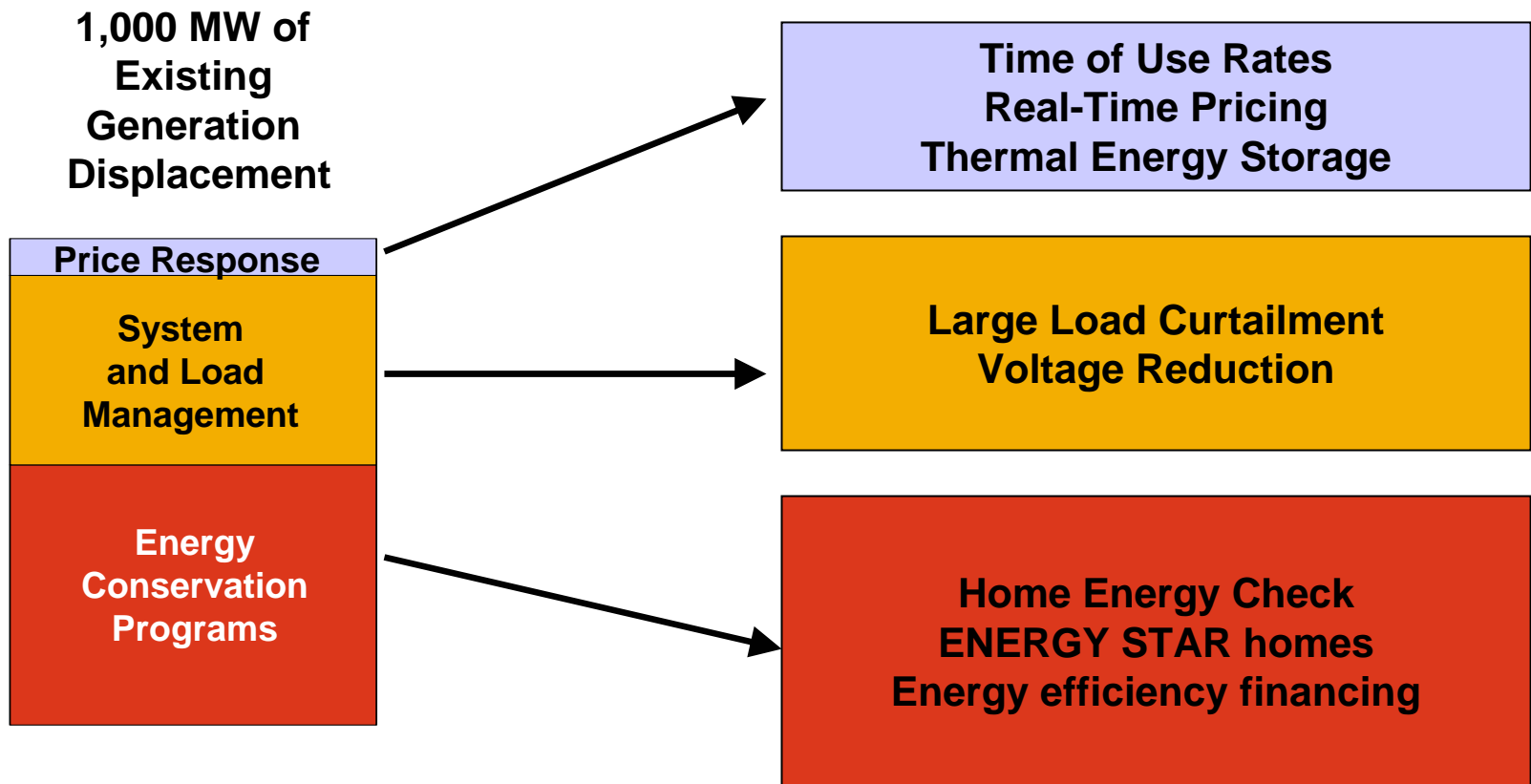
What is Demand Side Management?

DEMAND SIDE MANAGEMENT (DSM)	
Demand Response	Energy Efficiency
<u>Direct Load Management</u> Control of customer heating, cooling and appliances.	<u>Building Envelope</u> Programs, standards and incentives to reduce the energy needs of a commercial or residential building structure.
<u>Contractual Load Reduction</u> Agreements to reduce load upon notification, normally applicable to large industrial companies	<u>Infrastructure/Equipment</u> Programs, standards and incentives designed to promote the adoption of more efficient heating, cooling and appliances
<u>Voluntary Price Response</u> Customer demand reduction in response to fixed or dynamic pricing signals.	
Education/Awareness Overall programs aimed at increasing awareness of energy issues and changing customer behaviors.	

Meeting Demand



Existing Programs



Existing Demand Response Programs

<i>Price Response</i>	<i>System (Participants)</i>	<i>Western Region (Participants)</i>
Residential TOU	28,952	1,539
C&I TOU	24,944	2,077
Thermal Storage	4	0

<i>Interruptible</i>	<i>System (Participants / MW)</i>	<i>Western Region (Participants / MW)</i>
Load Curtailment	58 / 319 MW	3 / 3.6 MW

Existing Energy Conservation Programs

Residential

- 5% energy discounts
- Home Energy Check
- Energy Star Homes
- High efficiency financing
- Builder training
- HVAC contractor training
- Education/outreach
- Community Energy Savings

PGN Facilities & Fleet

- Facilities
- Load curtailment
- Alt. energy vehicles

Commercial

- Energy Profiler online
- CurrentLines
- Lunch-n-Learns



Western Region participation

Home Energy Checks – 2,700+
5% Discount – 19,528
Energy Star Homes – 189



CURRENTLINES



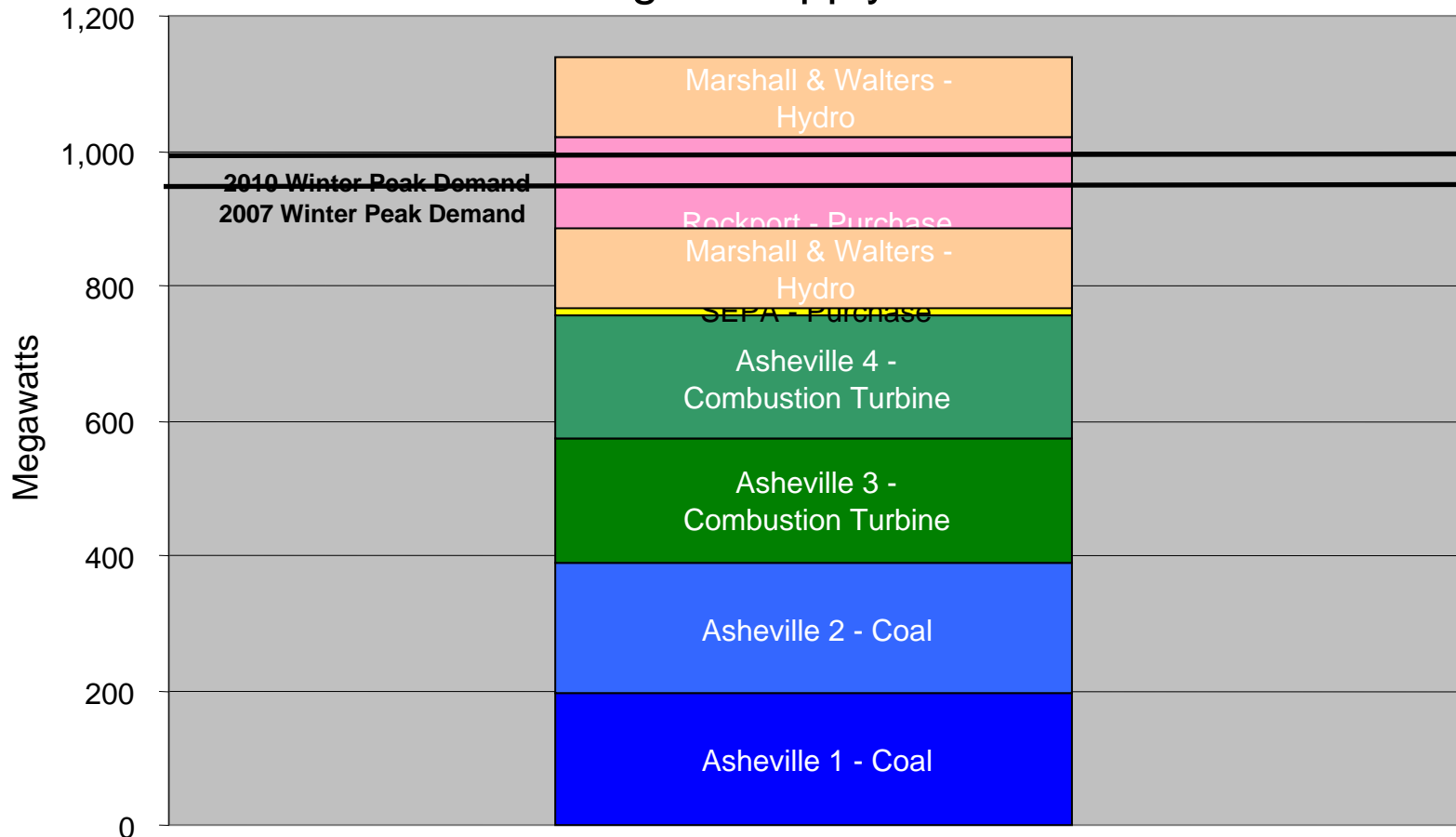
PEC Facilities and Fleet

- Plug-in hybrid Prius
- Additional alternative fuel use and vehicles
- Company-wide computer change out
- Auditing all western NC Progress Energy buildings



Why Are We Here? When Demand > Supply

West Region Supply Resources



Program Design Approach

**Conduct Market
Assessment**

- Appliance Saturation Survey
- Personalized Energy Report



**Program
Design**

Appliance Information & Usage Study

- 13,200 8-page surveys mailed out July 13
- Minimum ending sample of 2,182
- Strata break down:
 - ▶ Geography
 - ▶ Energy Usage
 - ▶ Housing Type (single-family, multi-family, mobile home)
- Develop Residential Information Database
 - ▶ End-use devices
 - ▶ Customer usage habits
 - ▶ Attitudes about energy usages & potential changes
- Final Report & Data Available mid-September

Personalized Energy Report (PER)

- Survey to all Western Region customers with 2+ years of service (approx. 87,000)
- Collects information about energy use
- Sending to homes in Fall 2007
- Will be used to help design additional programs for Western Region



Program Design Approach

Pilot New Concepts & Technologies

- Energy Displays
- Energy Advisor On Loan
- Community Energy Savings
- HVAC Tune-Ups
- Duct Repair & Testing
- CIG Online Audit
- Smart Thermostats

Conduct Market Assessment

- Appliance Saturation Survey
- Personalized Energy Report

The diagram features a central dark blue circle with the text 'Program Design' in white. Two red arrows point from the left and right boxes towards this central circle. The left box is red with white text, and the right box is yellow with black text.

Program Design

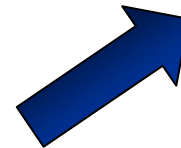
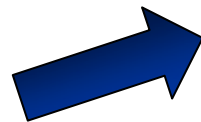
Energy Displays

- Offers customers access to information about energy use
- Portable, in-home display provides real-time information about electricity use and the costs of that use
- Program in Canada showed between 1% and 15% reduction

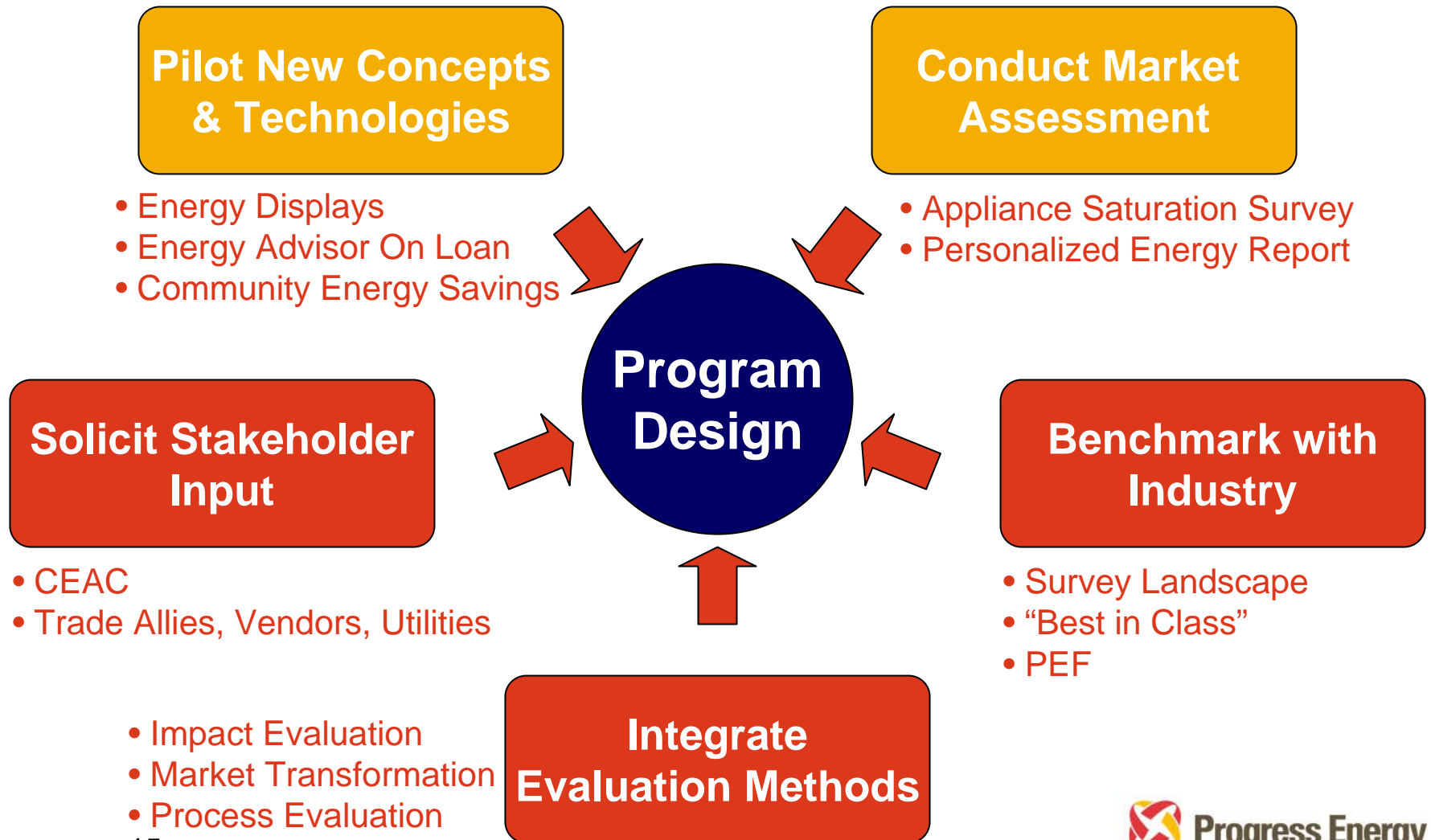


Smart Thermostats

- Deployed 500 Smart Thermostats
- Measure Load Impact over Summer Period
- Analyze Technology
- Evaluate Customer Acceptance



Program Design Approach



Program Guidelines

- Simple
 - ▶ Ensure that customers can easily understand
 - ▶ Make participation easy
 - ▶ Evolve to more comprehensive programs
- Cost-Effective
- Well-Managed
 - ▶ Focus on programs that are modular and quick to deploy
- Adequate service & delivery infrastructure
 - ▶ Maximize benefit from the marketplace

Comprehensive Benchmarking Study

- 2006 comprehensive study to identify best practices across country with respect to program offerings
 - ▶ Online databases, publishings, & interviews
 - ▶ Identified factors unique to NC and SC
- Identified “best-in-class” programs
 - ▶ Potential kW and kWh impact
 - ▶ Broken down by Residential & Commercial
 - ▶ Additional consideration for “Widely Practiced” vs. “New/Innovative”

Residential Programs Under Development

Demand Response Programs

- Central AC Load Control
- Water Heater Load Control
- West Region Heating Load Control
- West Region WH Load Control
- Critical Peak Pricing Pilot

Energy Efficiency Programs

- HVAC Tune-Up
- Duct Testing & Repair
- High Efficiency HVAC rebates
- Insulation/Air Sealing Upgrades
- CFL's

New Construction

- Energy Star Builder Rebates
- Energy Star Builder Training

Energy Information & Audits

- In-Home Energy Displays
- On-line Audits
- Walk-Through Audits
- Mail-in Audits
- Personalized Energy Reports
- Energy Education Expositions

Low-Income Initiatives

- Personalized Energy Reports
- Energy Saving Kits
- Low income specific program rebates

Commercial, Industrial, & Governmental Programs Under Development

Demand Response Programs

- Standby Generator Program
- Summer AC & WH Load Control
- Rates

Energy Efficiency Programs

- HVAC Tune-up
- Duct Testing & Repair
- High Efficiency HVAC rebates
- High Efficiency Lighting rebates
- Energy Efficient Motors
- Cool Roof
- Energy Innovation
- Retrofits

Audits, Education & Awareness

- Walk-Through Audits
- Online Audits
- Energy Manager On-Loan Pilot
- Schools Benchmarking Program
- Energy Newsletters
- Energy Profiler On-line

PEC Facilities Initiatives

- Walk –Through Energy Audits
- Generator Load Shed
- Summer AC & Water Heater Control
- Employee Awareness Program

Other Programs Under Development

Intelligent Grid – Phase 1

Alternative Energy Initiatives

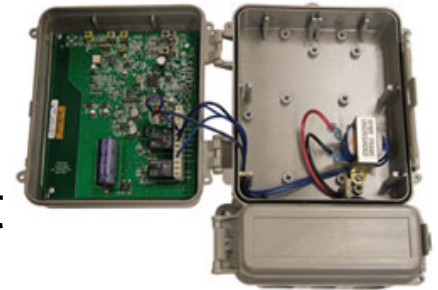
- Renewable Education & Demonstration Initiatives
- Fuel Cells & PV
- Plug-In Hybrid vehicles

Future Programs (Under Consideration)

- Water Heater Timer Pilot
- Solar Thermal Water Heating Pilot
- Appliance Recycling program
- Comprehensive Retrofitting Programs
- Premier Power
- Department of Defense Action Plans
 - Summer AC & Water Heater Control for military base housing

Water Heater Control

- Remotely control residential water heaters during times of peak load
- Significant load impact opportunity
 - 0.7 KW – 1.0 KW for Winter Peak Impact
 - 101,400 eligible customers



Eligible Customers	If Participation Is...	Impact Would Be...	Technical Potential	Technical Potential Impact
101,400	30%	21 MW	100%	71 MW

Keys to Success

- Customer Participation and Commitment
- Aggressive Marketing

Utility	Program Details	# Participants	Total Residential Customers	Participation Rate (%)
Excel Energy (Minnesota)	A/C Switch	285,000	1,194,000	24
Excel Energy (Colorado)	A/C Switch	70,000	1,102,000	6
Madison Gas & Electric	A/C Switch	16,500	116,000	14
Austin Energy	A/C Stat	53,000	322,000	16
Otter Tail Power Co.	KW Controller	7,000	101,000	7
Southern California Edison	A/C Switch	187,000	4,058,000	5
Louisville Gas & Electric	A/C Switch	80,000	342,000	23

* Source: E Source

** % Based on Total # Res Customers, not eligible customers

Electric Strip Heat Control

- Remotely control residential heating systems during peak-load periods
 - Cycle strip heat on electric heating systems
- Must balance customer comfort with PEC's need to control load
 - Avoid participant churn & negative rebound impacts

Eligible Customers	If Participation Is...	Impact Would Be...	Technical Potential	Technical Potential Impact
31,200	30%	14 MW	100%	47 MW

HVAC Tune-Up and Duct Repair

- Prescriptive incentives to make improvements in performance of heating systems
 - Seal leaks in duct systems (permanent)
 - Improve efficiency of electric heating systems by performing maintenance (ongoing)
- Educating consumers and contractors

Eligible Customers	If Participation Is...	Impact Would Be...	Technical Potential	Technical Potential Impact
40,300 (Duct Repair)	5%	2 MW	100%	40 MW
31,200 (Tune-Ups)	5%	0.6 MW	100%	13 MW

CFLs

- Education
 - ▶ Savings benefits, longevity, and proper application
- Promotion
 - ▶ Community, Retail Partnerships, etc.
- Market Transformation
 - ▶ Buy-down programs, coupons, etc.



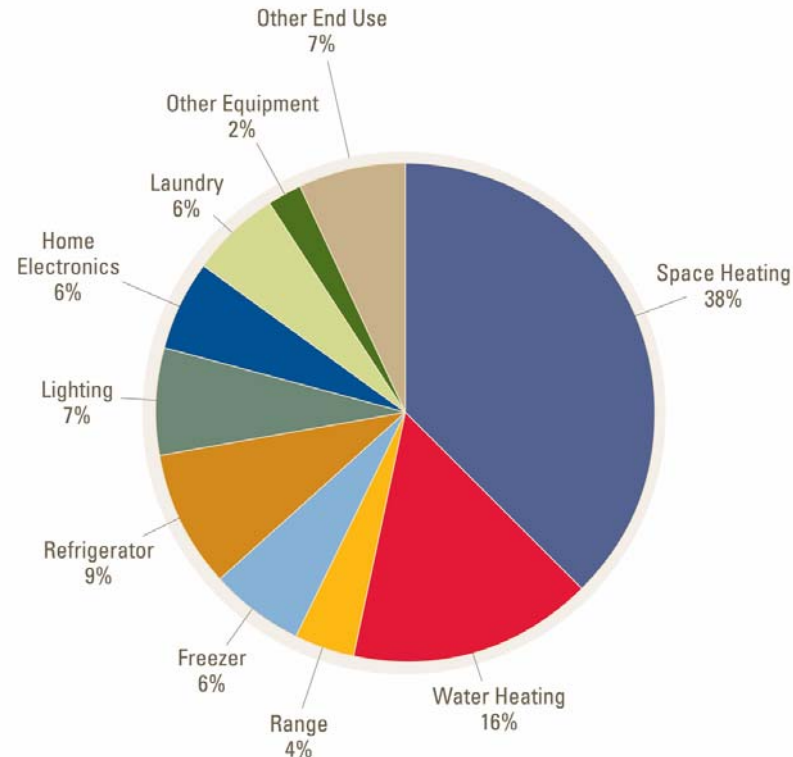
Eligible Customers	If Participation Is...	Impact Would Be...	Technical Potential	Technical Potential Impact
130,000	20%	2.6 MW	100%	13 MW

* Participation Defined as 10 bulbs/household

Western Region

Making It Happen - First Steps

- Education and Outreach
 - ▶ Personalized Energy Report
 - ▶ Western Region Energy Expo
 - ▶ On-line Audit Campaign
- Existing service industry infrastructure
 - ▶ Trade ally training & deployment
- Demonstrated programs that address winter-peaking contributors
 - ▶ Electric Heating and Water-Heating Control
 - ▶ Poorly operating HVAC
 - ▶ High leakage and poorly insulated components
 - ▶ Inefficient lighting and other appliances



Our Goal

**ACHIEVE MAXIMUM CUSTOMER PARTICIPATION AND SAVINGS
FROM A SET OF COST-EFFECTIVE DSM PROGRAMS**

Save the Watts

Cari Boyce
July 20, 2007





SAVE THE WATTS .COM

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Let's
get
started.

