



# ETCC Quarterly Meeting

March 10, 2011

PG&E's Pacific Energy Center



# Welcome / Safety / Introductions

# Agenda – ETCC Open Meeting

Time	Topic	Presenter
9:30 am	Welcome/Safety/Introductions	Randy Wong
9:40 am	ETCC Events <ul style="list-style-type: none"> <li>• ET Summit – Evaluation Results</li> <li>• TRIO Symposium and Round Table summary (Sempra)</li> <li>• TRIO Symposium and Round Table 2<sup>nd</sup> quarter (SCE)</li> <li>• ET Open Forum (SMUD)</li> <li>• ETCC Calendar of Events</li> </ul>	Bruce Baccei Ahmed / Robin Zander  Edwin Hornquist/Robin Zander  Bruce Baccei Randy Wong
10:10 am	E-Source Services around Innovative Technologies	Katie Elliot, E-Source
10:30 am	Break	
10:45 am	Innovative lighting and other Technologies	Ira Krepchin, E-Source
11:15 am	EPRI's Emerging Technologies activities	Ammi Amarnath, EPRI
Noon	Lunch	
1:00 pm	Leveraging E-Source Resources	Katie Elliot, E-Source

# ETCC Events

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- ET Summit – Evaluation Results - Bruce Baccei
- TRIO Symposium and Round Table summary (Sempra) – A. Ahmed
- TRIO Symposium and Round Table 2nd quarter (SCE) – Edwin Hornquist
- ET Open Forum (SMUD) - Bruce Baccei
- ETCC Calendar of Events – Randy Wong

# ET Summit Debrief

November 7-9

Sacramento Convention Center & Hyatt



Bruce Baccei

[bbaccei@SMUD.org](mailto:bbaccei@SMUD.org)

916-732-5715



Pacific Gas and  
Electric Company



An EDISON INTERNATIONAL Company



Sempra Energy utility



Sempra Energy utility



**SMUD**

SACRAMENTO MUNICIPAL UTILITY DISTRICT

The Power To Do More.





## Participation:



◆ 500 attendees

◆ 56 Exhibitors

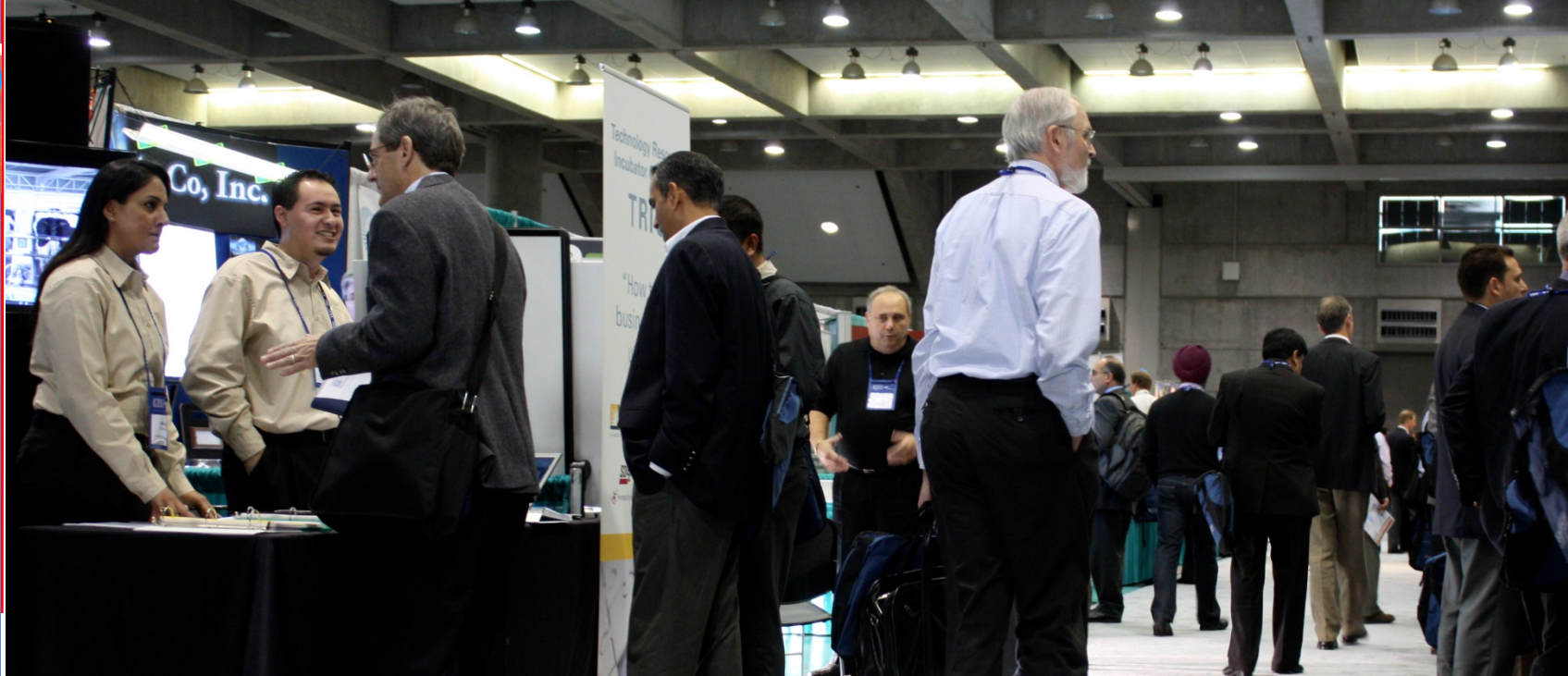


◆ 130 Speakers in 4 tracks

◆ 7 Keynote speakers



# Exhibitors: Start ups/out of the lab to National Leaders





# Team Effort

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## ◆ ETCC Committee

Randy Wong

Paul Delaney

Sharareh Moaddeli

Chris Scruton & Mike Lozano



## ◆ RDL Enterprises (event planners)

## ◆ Jonathan Livingston – Invaluable-Major Role

## ◆ Gregg Ander

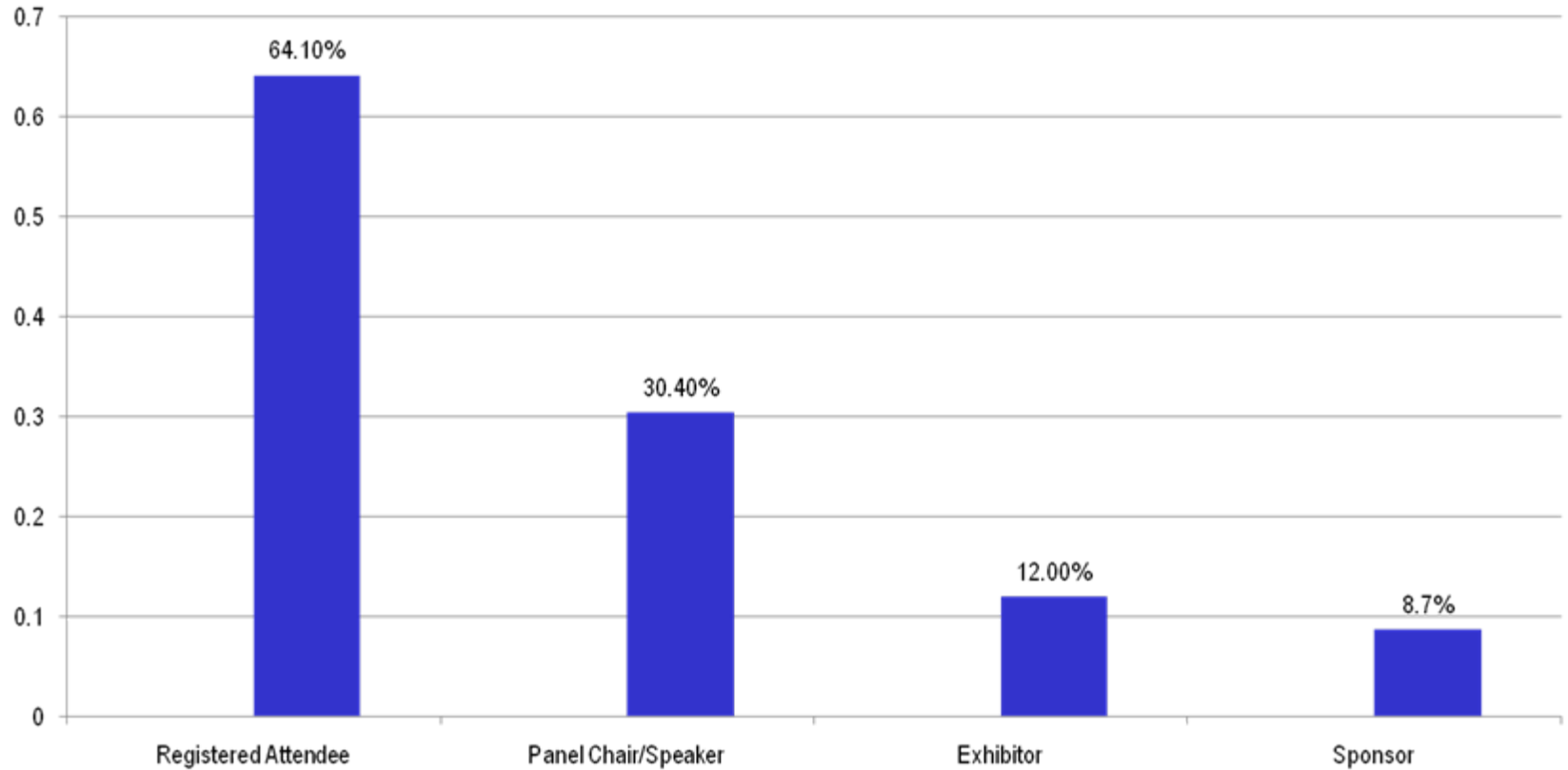
## ◆ Entire ETCC



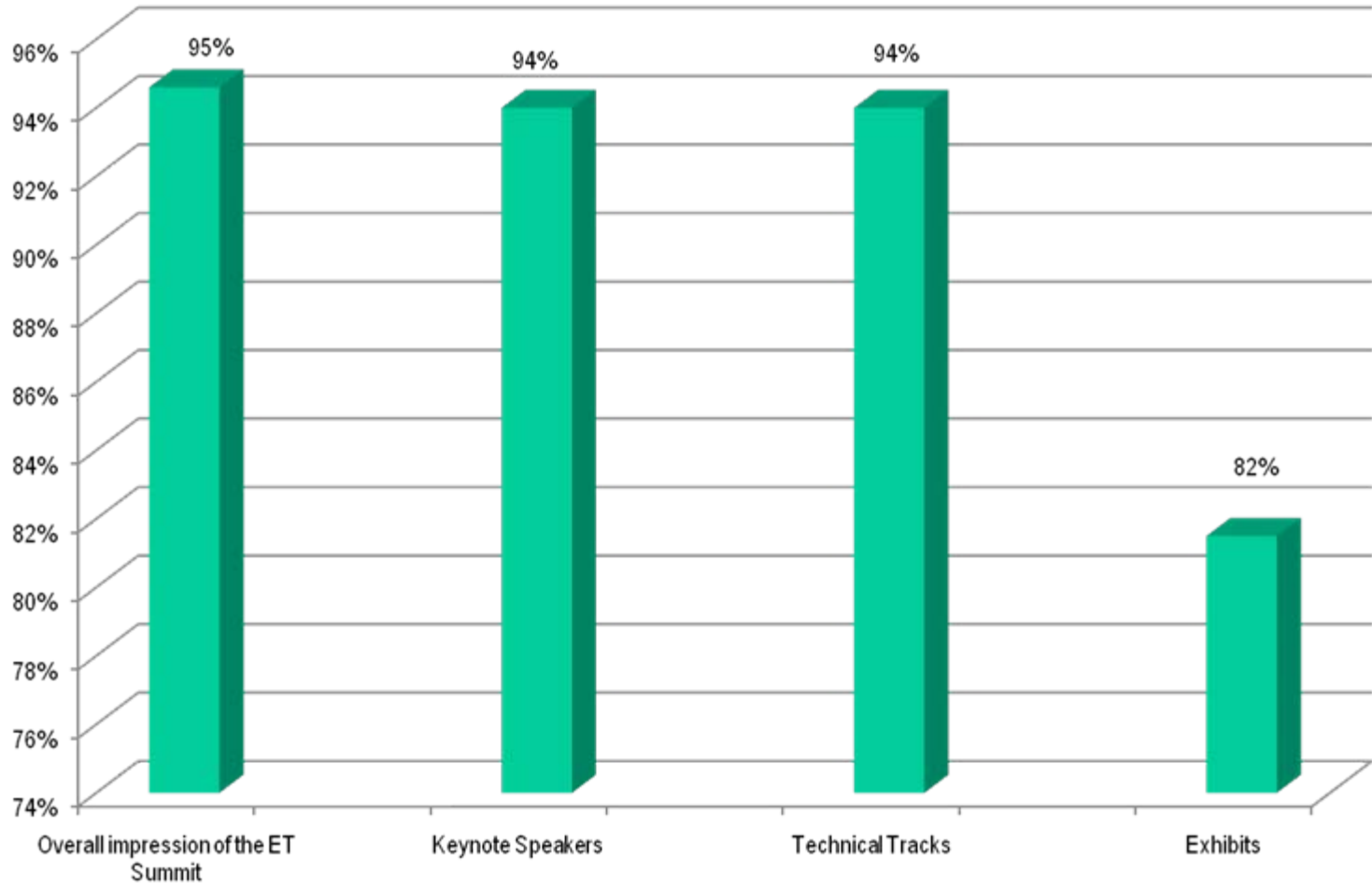




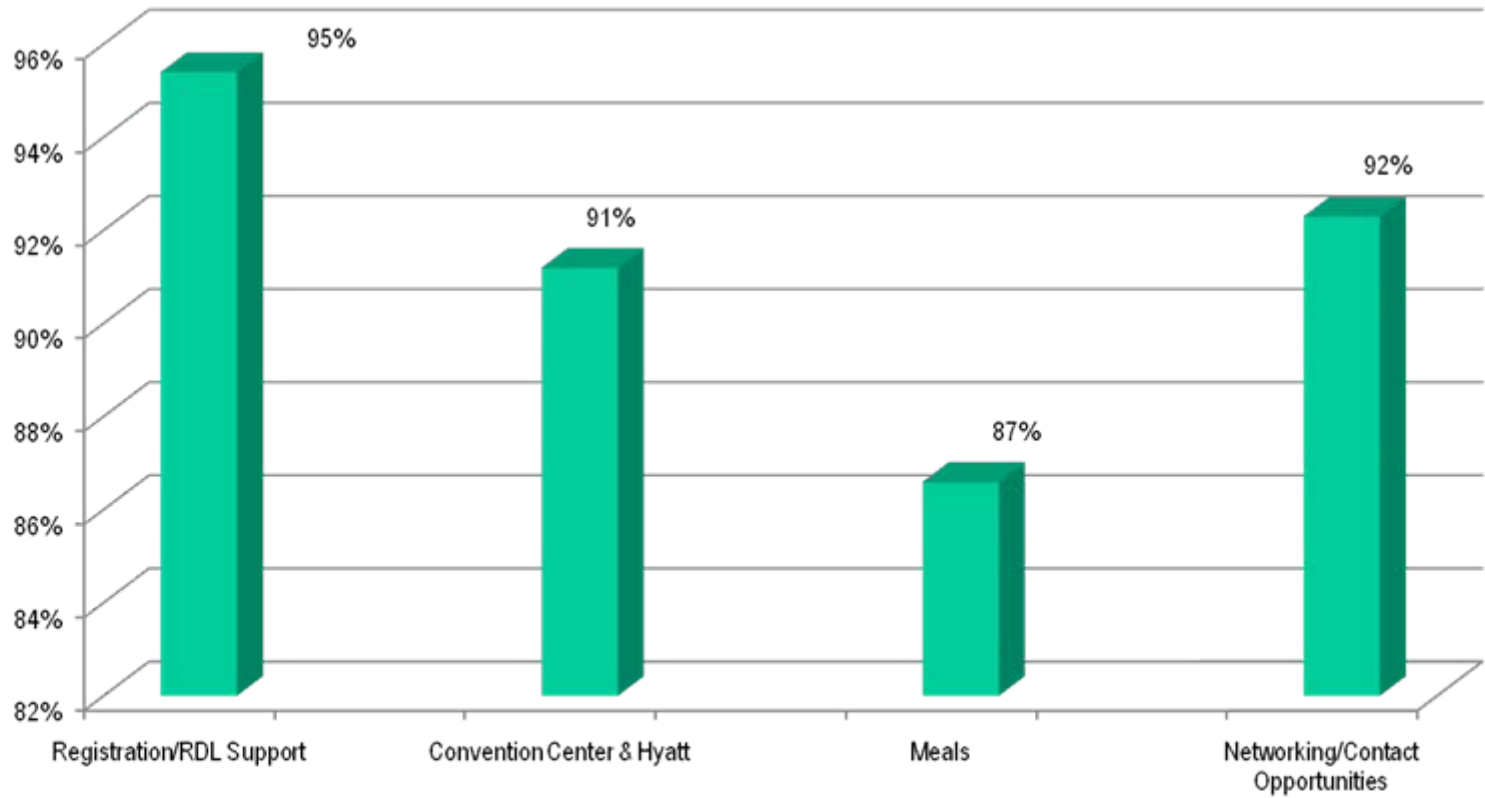
# Survey Respondents: 92 or 19%



# Survey Respondents: 92 - 19%

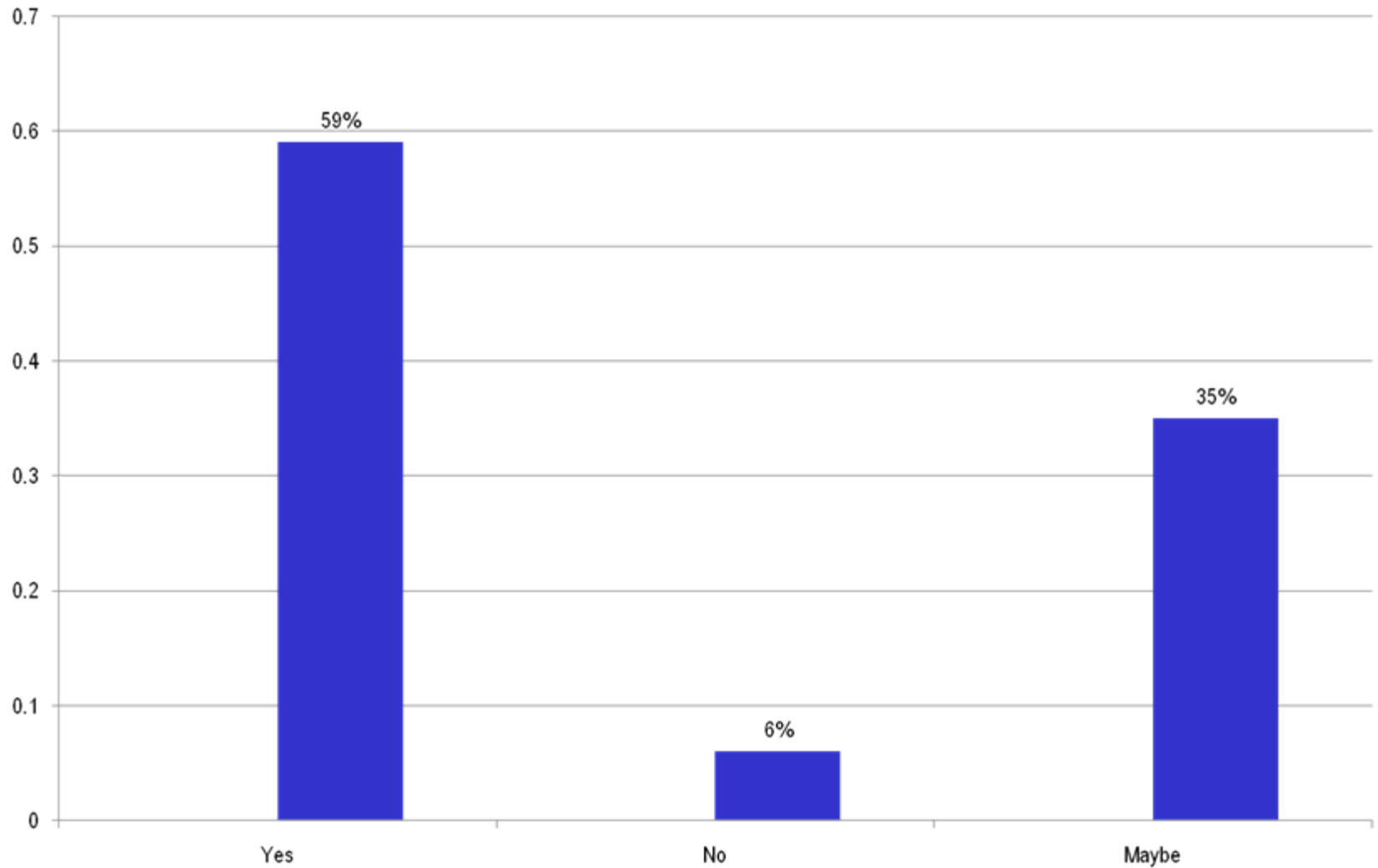


# Registration, Facilities, etc.










# Attend 2012 Summit?





# Recommendations:

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- 
- ◆ Exhibitors time, 1<sup>st</sup> morning after Welcome Keynotes
  - ◆ Fewer Keynotes
  - ◆ Continuous Process/Marketing
  - ◆ Hire a Marketing Firm & Event Planner
  - ◆ Stay with “Accelerating Our Energy Efficient Future”
  - ◆ Thank you to all participants and respondents to SurveyMonkey
- 
- 
- 
- 

# ETCC Calendar of Events

2011			
	Jan	Feb	Mar
1st Quarter	ET-ETP Planning Mtg - SCE Jan 24	TRIO Round Table - Sempra Mar 2	IOU SW Collaboration Mtg - PG&E Mar 9
	TRIO Symposium - Sempra Jan 27 at UCSD	ET Spotlight - PG&E Feb 24	ETCC Mtg - PG&E Mar 10
	Apr	May	June
2nd Quarter	ET-ETP Planning Mtg - SCE April 18	Open Forum - SMUD May 5	IOU SW Collaboration Mtg - PG&E June 1
	TRIO Symposium - SCE April 28		ETCC Mtg - SMUD June 2
	July	Aug	Sept
3rd Quarter	TRIO Symposium - PG&E July 14	TRIO Round Table - PG&E TBD	IOU SW Collaboration Mtg - Sempra TBD
	ET-ETP Planning Mtg - SCE July 18		ETCC Mtg - Sempra TBD
	Oct	Nov	Dec
4th Quarter	ET Spotlight - Sempra TBD	Open Forum - SCE TBD	IOU SW Collaboration Mtg - SCE TBD
	ET-ETP Planning Mtg - SCE Oct 24		ETCC Mtg - SCE TBD



# E-Source Services around Innovative Technologies

Katie Elliot

Product Manager, Technology Assessment Service

E-Source



# E Source Emerging Tech Overview

**Katie Elliott**  
Product Manager, Member Services



# Who Is E Source?

- Membership-based energy advisory service
- Serving the entire energy market, mainly utilities, plus Fortune 500 company energy managers
- **Unbiased research and analysis**
  - Fuel-neutral
  - Product-neutral
  - Vendor-neutral
  - Program-neutral
  - Country-neutral
- About 80 people on staff
- Founded in 1986



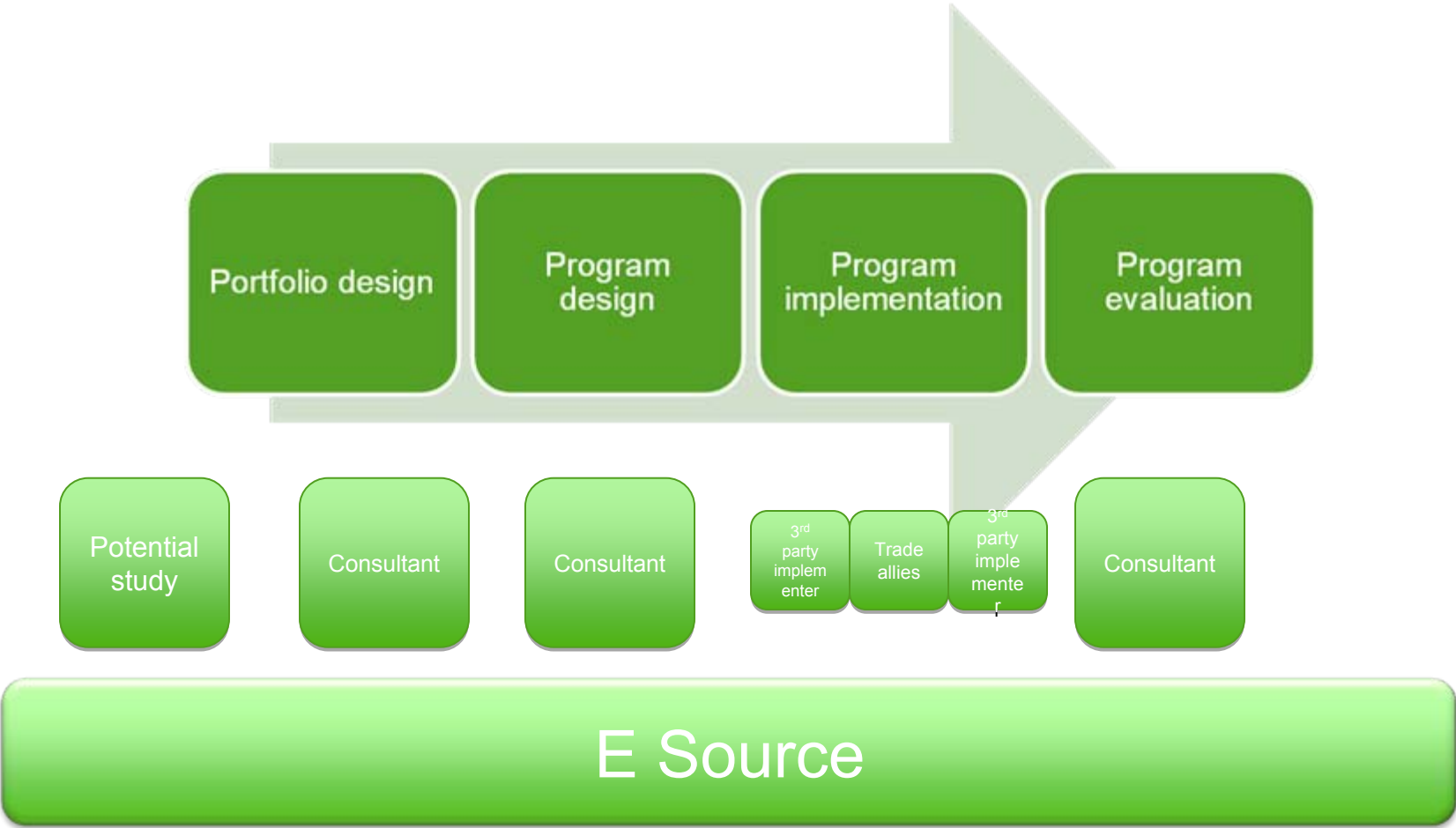
# How We Conduct Our Research

- Third-party analysis of
  - Testing results
  - Evaluation studies
  - Utility filings
  - Other primary research
- Network within the industry
  - Conferences
  - In-person discussions



Courtesy: J.J. McCullough

# Where Do We Fit In?



# E SOURCE Services for Utilities

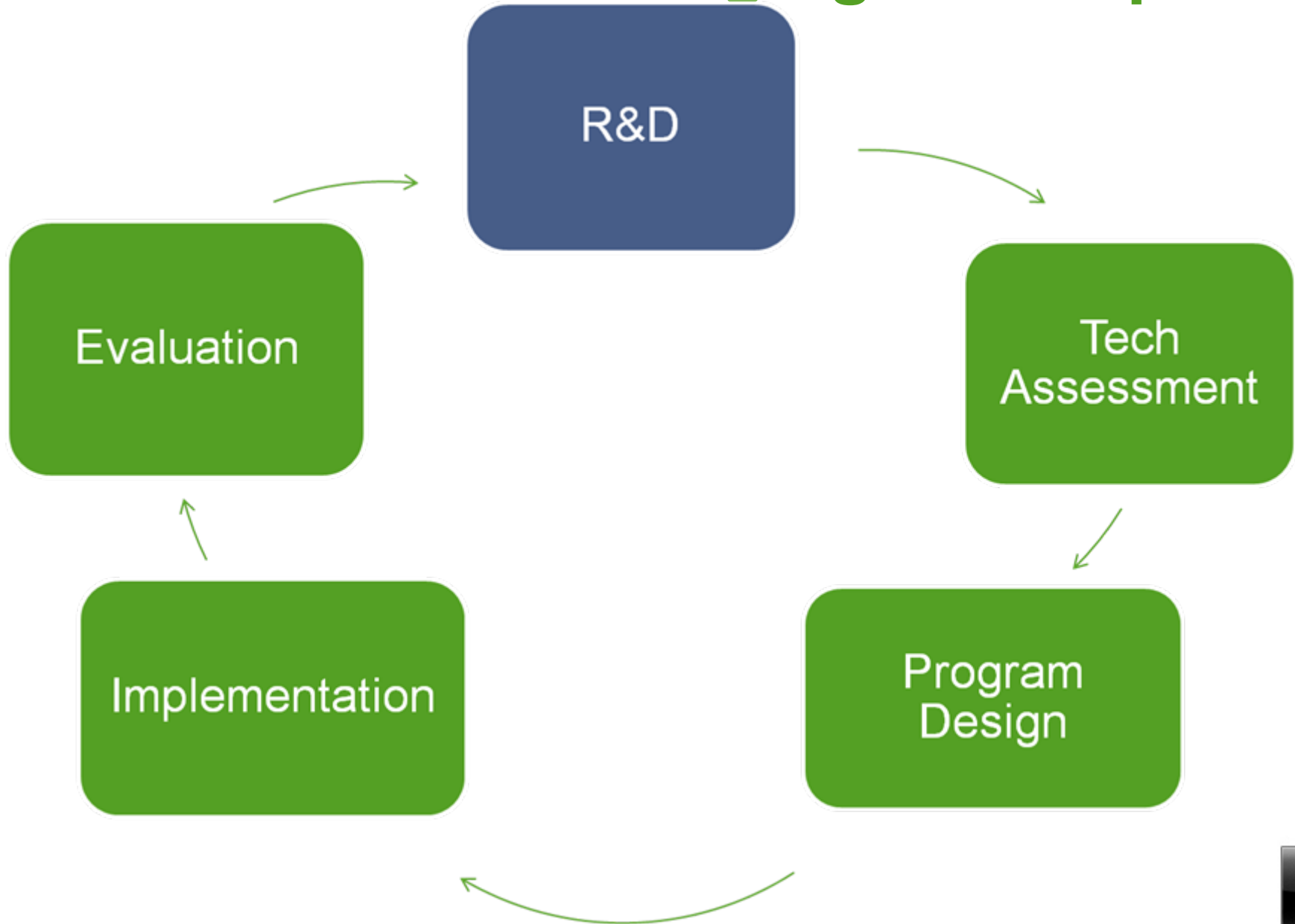
**DSM**

**Marketing &  
Communications**

**Customer Care**



# Our Work in the Emerging Tech Space



# Member Inquiries: A Wealth of Market Research

What's the latest on plug-in electric vehicles for fleets?

What should we do about our water heater program, given all the new standards?

A vendor says their product saves 25%, is that accurate?

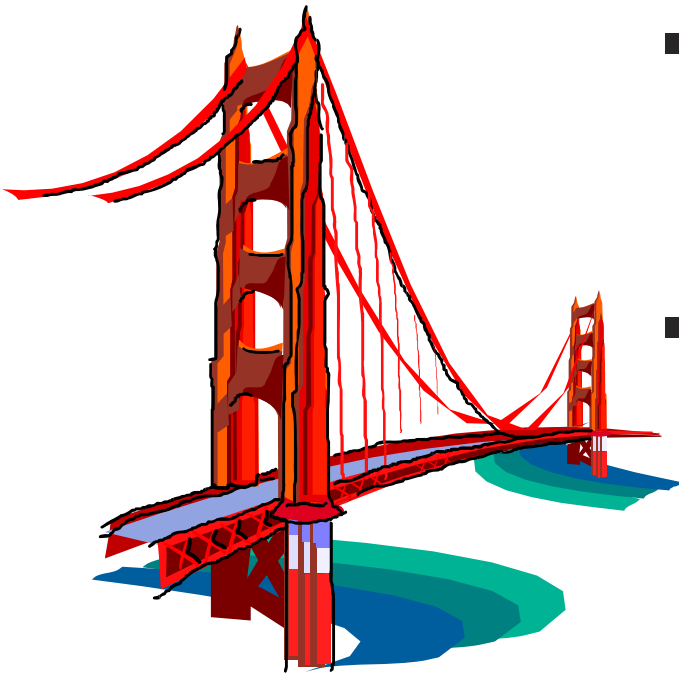
Who has already done this that we could learn from?

Are LED replacements for T8s ready for prime time?

# PIER Technical Briefs



- Distill dense reports into ‘the least you need to know’
- Outreach to utilities, trade associations, and building professionals



- 45 reports published in 94 articles with over 22,000 downloads
- Developing alternative outreach media including podcasts, videos, and webinars



# For More Information



**Katie Elliott**

Product Manager, Efficiency Services

303-345-9163, [katie\\_elliott@esource.com](mailto:katie_elliott@esource.com)







# ETCC Tech Roundup

Ira Krepchin

Director, Technology Assessment Service

E Source



# ETCC Tech Roundup

## March 2011

**Ira Krepchin**

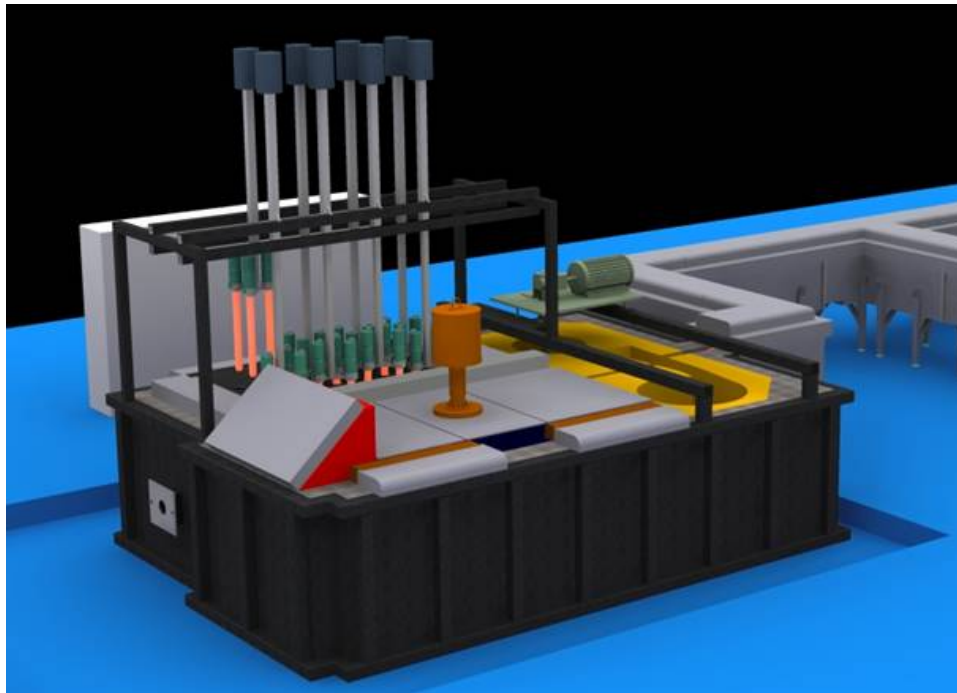
Director, Technology Assessment Service  
E Source

# Technologies We'll Cover

1. IsoThermal Melting
2. Boiler controls
3. Plasma Lighting
4. Halogen Infrared Lighting
5. Other

# IsoThermal Melting

- 32 billion pounds of aluminum melted/yr
- Using 5 to 8 times the theoretical energy
- New technology provides up to 75% savings



Source: Apogee Technology Inc.



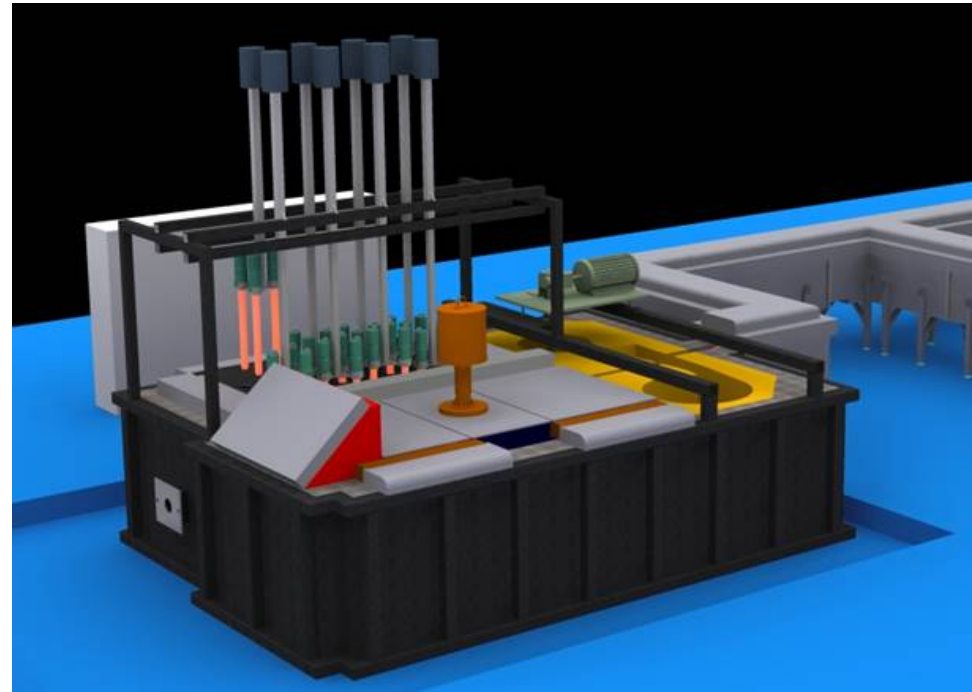
# Melting the old way

- Molten aluminum is very corrosive
- Melting requires non-reactive, insulated vessel
- Radiant heating, lots of losses, uneven, oxidizing
- Like heating water with the flame on top



# Melting the new way

- New materials enable corrosion-resistant electric heaters
- Direct contact, circulation
- Conduction, convection
- Even heating, lower temp, less oxidation
- Better turn-down, one-fifth the space



Source: Apogee Technology Inc.

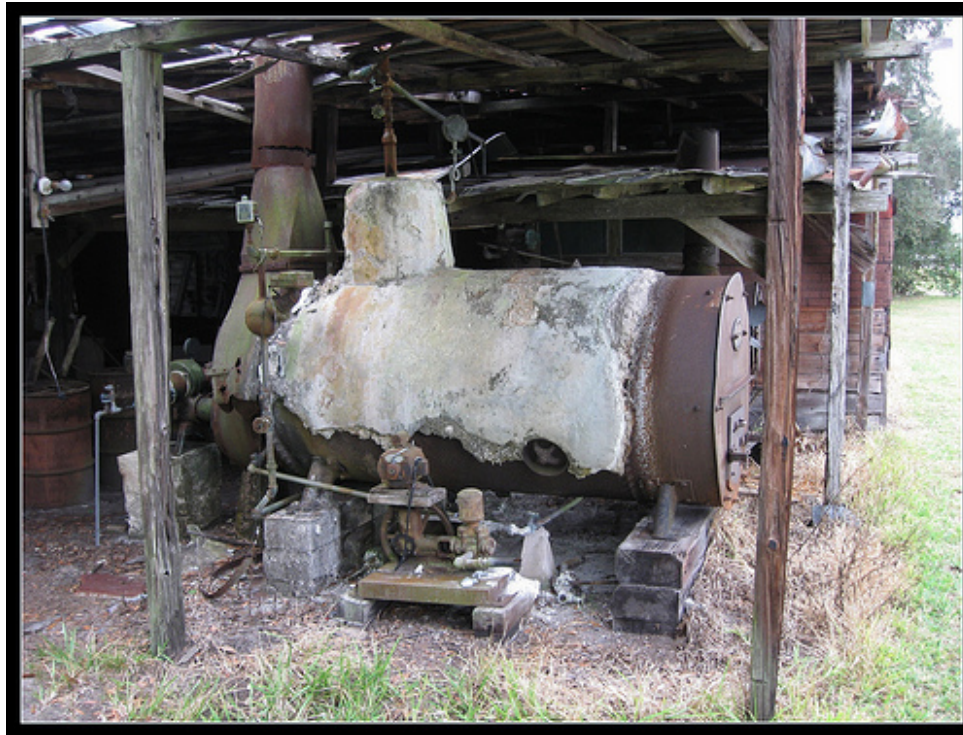
# Melting the new way

- Who: Apogee Technology
  - <http://www.apogeetechinc.com/>
- Cost: \$950K for 4000lb/hr
- Savings: \$1.1M/yr energy and materials
- First unit made for Aleris International
- Not much data yet
- Through DOE Industrial Technologies Program

# Thermodynamic Process Control (TPC): A Paradigm Shift in Boiler Control

Short cycling—it's more than just annoying!

- TPC estimates that about 25% to 45% of a boiler plant's annual fuel consumption is spent on these wasted cycles



Courtesy: Kenneth Knight



E SOURCE



# Short Cycling

## What causes it?

- The boiler is producing more BTUs of heat than the system is using
- The control system resets on outside air
- It does not follow the real-time building load
- It treats the boiler simply as a temperature device



# Example: What Happened to the Load?

## Indiana Office Building in Winter

<b>Time</b>	7:00 AM	10:00 AM
<b>Conditions</b>	Dark	Sunny
<b>Temperature</b>	2F	4F
<b>Building load</b>	76%	38%
<b>Reset temp</b>	178F	176F

50 % decrease in load

1 % decrease in reset temp

© E Source; data from Henry Nichols, Keller-Rivest Engineering



# How Does TPC Do It Better?

Measure the Btus the distribution system is using and match the boiler output to that level.



Courtesy: iStock

Install:

- A water flow meter and supply and return temp sensor
- Controllers on the boilers, dampers, and pumps
- A central data acquisition and control system
- A gas meter on the fuel line

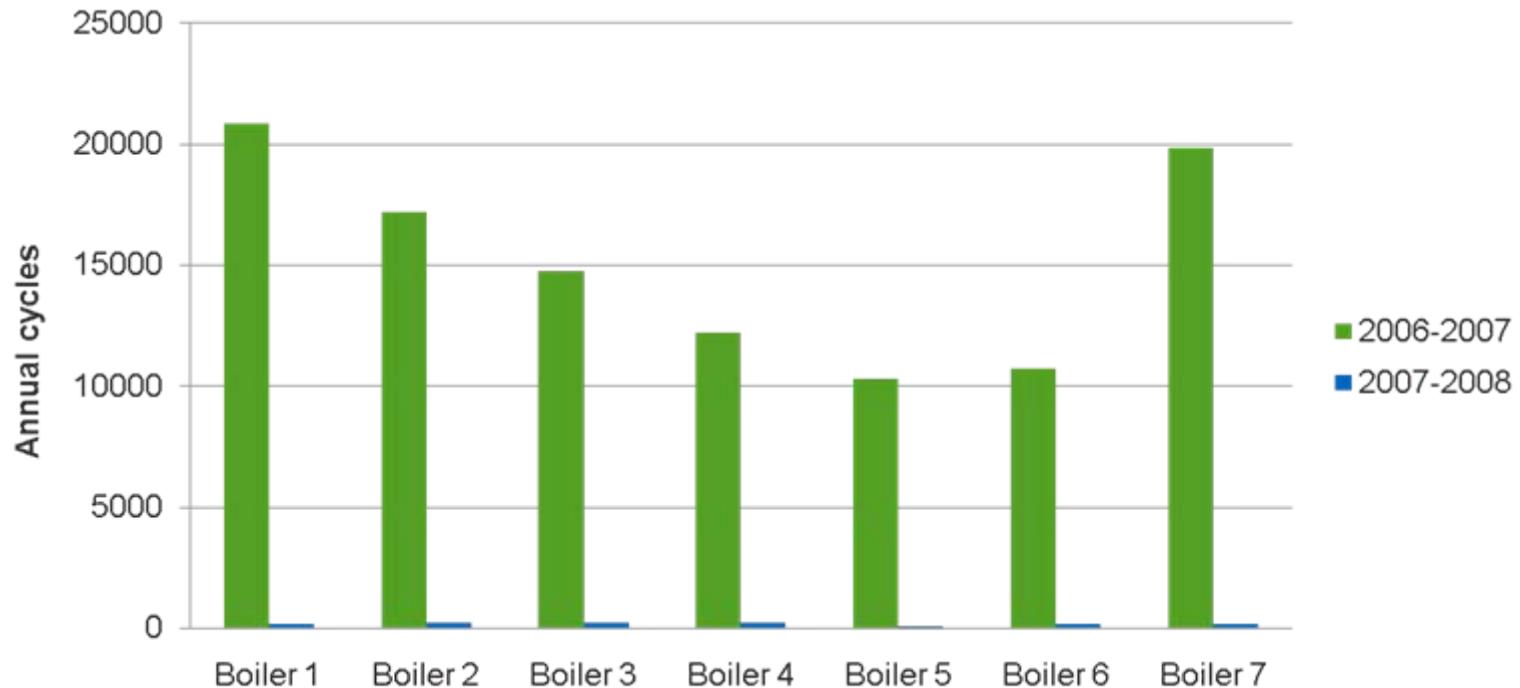
Treat the boiler as an energy device.

# Annual Boiler Cycles: Before and After

Jordan Hall, Butler University

*Plant capacity: 21,000 thousand Btu per hour (MBh)*

- Before: ~6 cycles/hr
- After: ~0.091 cycles/hr (about twice a day)

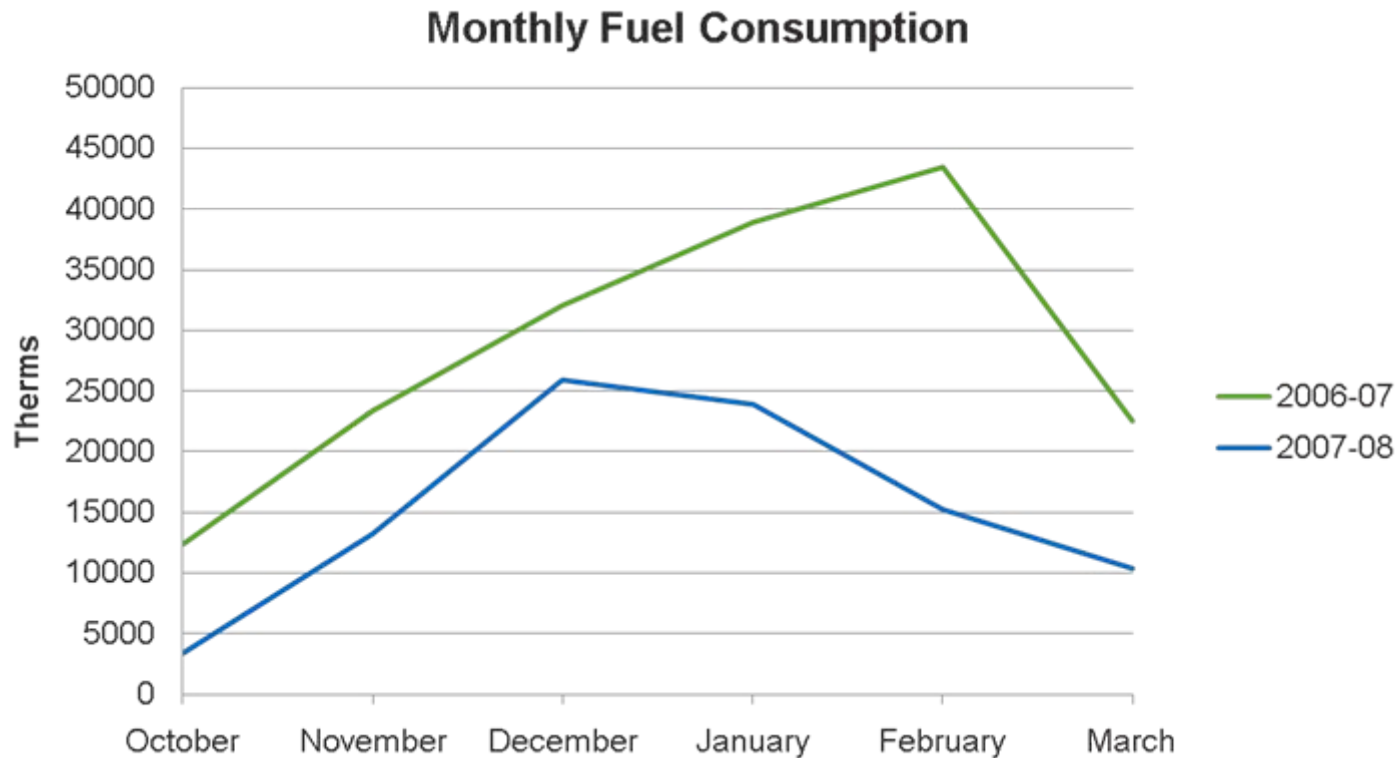


© E Source; data from Thermodynamic Process Controls



# Fuel Savings: ~\$76,700— a Decrease of 53%

Lawrence North High School, Indianapolis, Indiana  
*Five 3,000-MBh boilers, one 15,000-MBh boiler*



© E Source; data from Thermodynamic Process Controls



# Costs

TPC control system, installed cost:

~\$27,000 to \$35,000

Possible additional equipment:

~2,000 MBh modulating boiler, between  
\$17,000 and \$35,000

# Simple Payback Example

## Madison Junior High School, Madison, Indiana

<b>Baseline Energy Use</b>	<b>39,080 Therms/year</b>
<b>Estimated Annual Savings</b>	<b>19,898 Therms/year</b>
<b>Turnkey TPC Project Cost:</b>	<b>\$29,500</b>
<b>Simple Payback Calculation:</b>	<b>2.4 years</b>
<b>Vectren Efficiency Incentive:</b>	<b>\$8,850</b>
<b>Simple Payback Calculation w/Utility Incentive:</b>	<b>1.4 years</b>

Courtesy: Wisconsin Energy Conservation Corp.



# Plasma Lighting

- ~Electrodeless HID lamp
  - Uses radio frequency energy to generate light
  - High efficacy, long life
- High luminance apps:
  - outdoor street and area lighting, high-bay lighting, and sports arenas

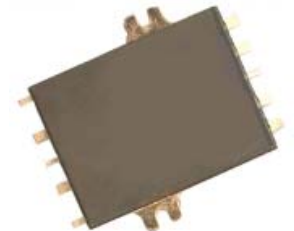
Quartz bulb,  
halide fill



Resonator



RF Power  
amplifier

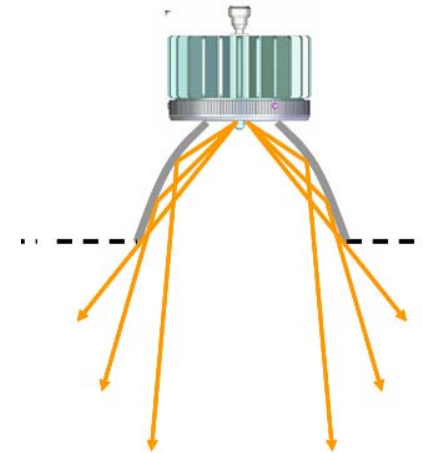


Courtesy: Luxim



# Plasma Lighting Attributes

- Tiny → optical efficiency
- Dimmable
- Not instant on



	Plasma	MH
Warm-up time	45 sec	1-3 min
Restrike time	w min	2-20 min



Courtesy: Luxim

# Where Plasma May Cost Less

- At 400 W: HID\$ < Plasma\$\$ < LED\$\$\$

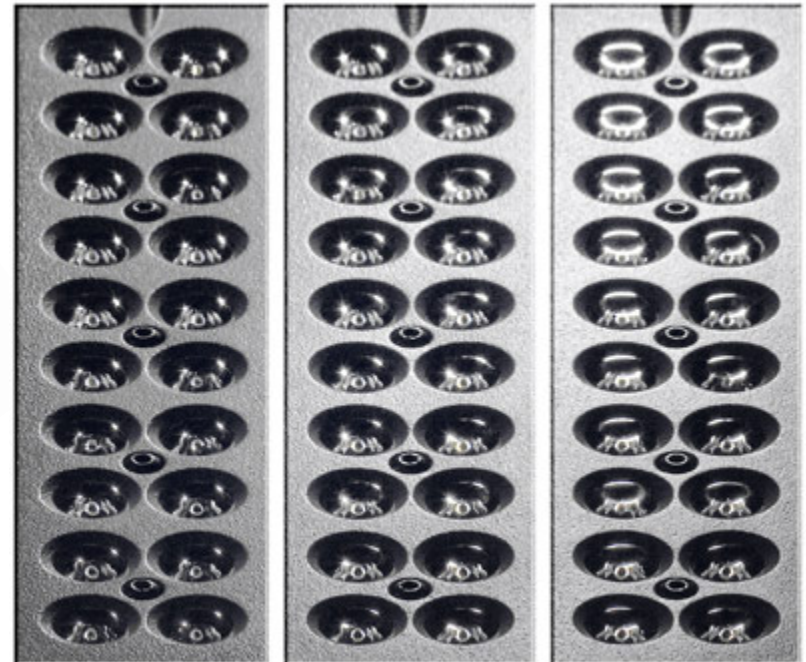
Plasma



MH



LED

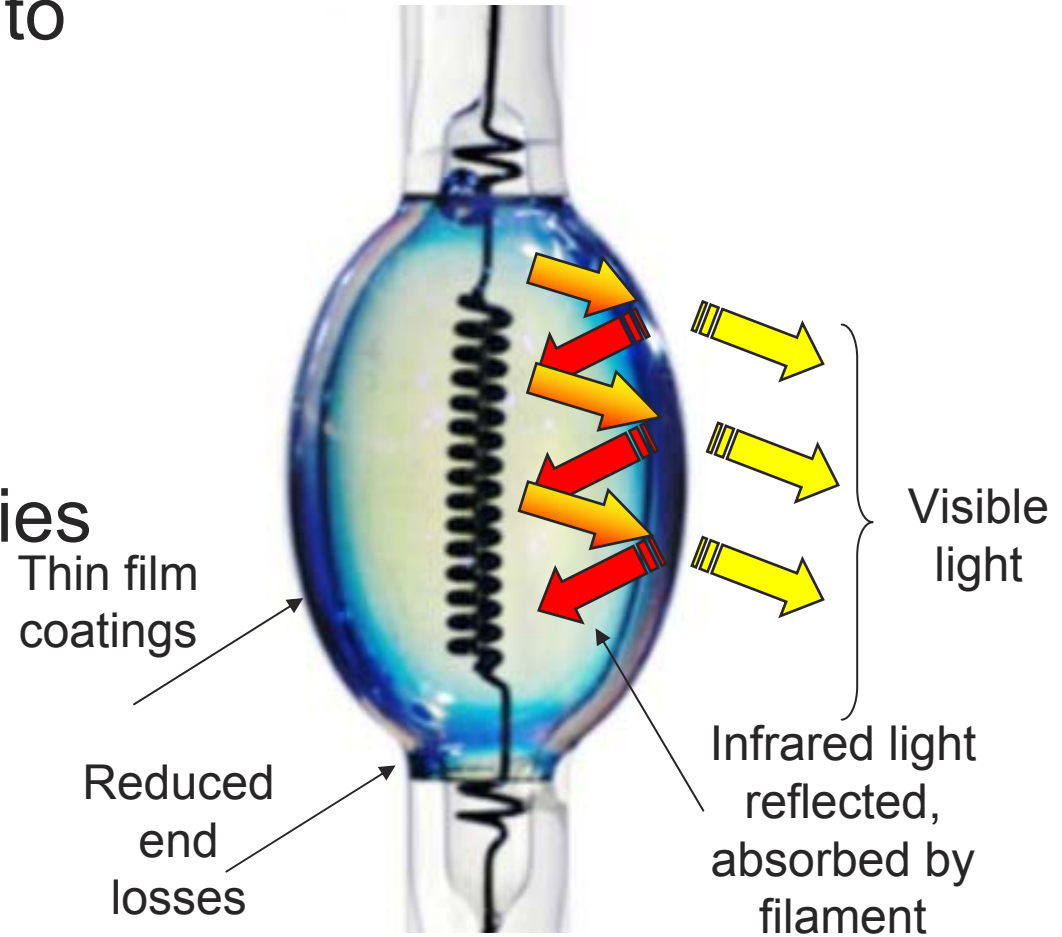


Courtesy: Luxim



# Hybrid Halogen

- Recovers waste heat to surpass EISA requirements
- Price increment  
~\$0.50 to \$0.70
- Incandescent Properties
  - Color quality
  - Dimmable
  - Instant on
  - No mercury
  - Small, light-wt



Courtesy: ADLT

# Hybrid Halogen Products

- First product from TCP
  - 33 lm/W
  - Available late 2011
  - Goal: 45 lm/W before 2020
  - Reusable cover
  - A-lamp will be first; then reflectors
  - Price not released yet
  - Later: 40W for 75 W; 30W for 60W



Courtesy: ADLT

# Hybrid Halogen vs 100 W A-lamp Equivalents

	EISA	Incandescent	Hybrid Halogen	CFL	LED
Life, hours	1000	750	1000+	10,000	NA
Output, lumens	1490-2600	1600	1600	1600	NA
Power, watts	72	100	50	23	NA
Initial efficacy, lm/W	>20	16	32 (to 45?)	69	NA
Instant on?	NA	Y	Y	Coming?	NA
Dimmable	NA	Y	Y	Getting better	NA
Price, \$	NA	<1	2-3?	2.25	NA

# Watching Other Technologies

- Energy scavenging
- Optical communications
- New approaches to daylighting
- LEDs and OLEDs
- EVs
- Smart grid
- Gas appliances
- Cooling
- Sensors
- Wireless controls
- Follow ARPA-E
- etc



# For More Information

- Apogee Technology

<http://www.apogeetechinc.com/>

- [Thermodynamic Process Control, Inc.](#)
- 866-660-FLOW (3569) Tony Johnson
- [Take Your Foot Off the Gas: New Boiler Control System Yields 20 to 50 Percent Gas Savings.](#) E Source Research Brief, 2010
- Energy Star Partners Meeting, 2010; Steve Stockdale, ADLT, [Hybrid Halogen](#)

# For More Information

- E Source article, [Plasma Lighting: The Next Little Thing](#)
- **Plasma Lighting Manufacturers**
  - [Luxim www.luxim.com](#)
    - Lots of fixtures; street lighting installation underway
  - [Topanga topangatech.com](#)
    - Products in 2011
  - [Ceravision www.ceravision.com](#)
    - High bay products coming
  - [Plasma International www.plasma-i.com](#)
    - Owner of sulfur lamp technology



# For More Information

## Ira Krepchin

Director, Research, E Source Technology Assessment Service

167-739-6723 [Ira\\_Krepchin@esource.com](mailto:Ira_Krepchin@esource.com)

## The E Source Member Inquiry Service

Submit your questions to:

[www.esource.com/questions](http://www.esource.com/questions)



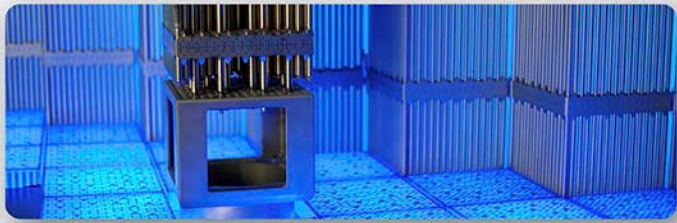


# EPRI's Emerging Technologies activities

Ammi Amarnath

Technical Lead, Energy Efficiency

EPRI



**EPRI**

ELECTRIC POWER  
RESEARCH INSTITUTE

## End Use Energy Efficiency and Demand Response

## Emerging Technology Research at EPRI

**Ammi Amarnath**

Technical Executive

**Ellen Petrill**

Senior Program Manager

**ETCC Quarterly Meeting**

San Francisco

March 10, 2011

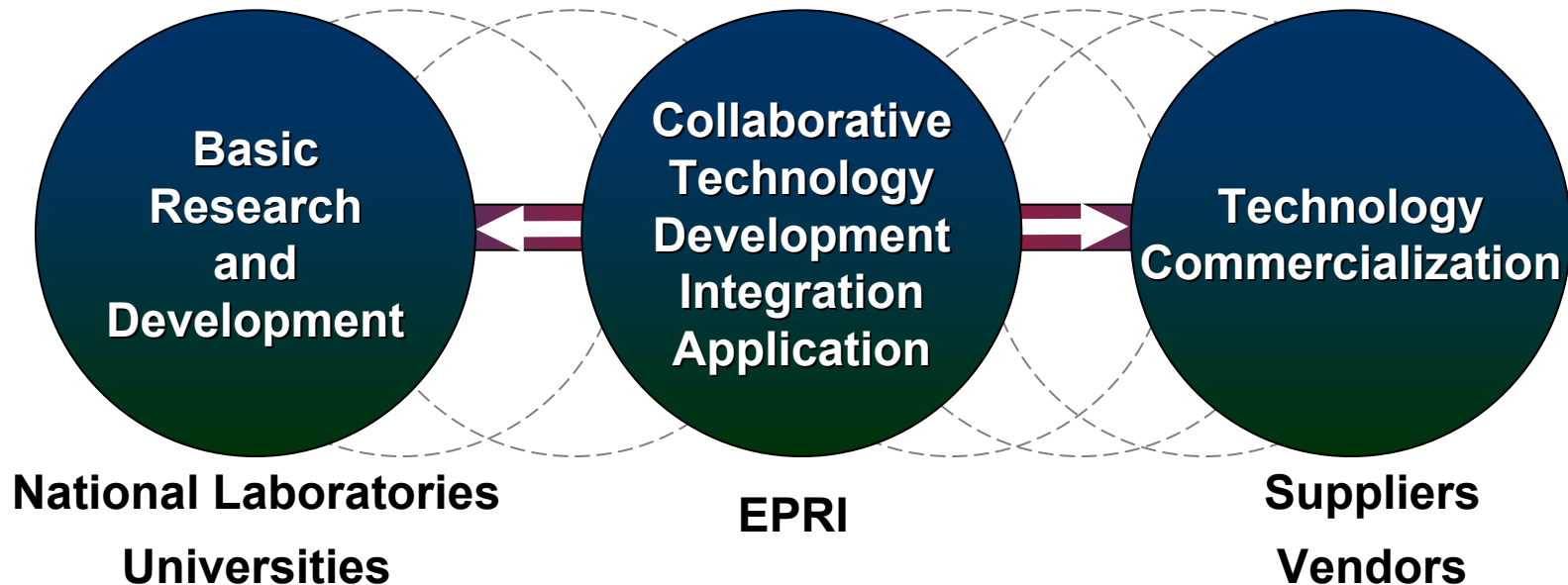
# Electric Power Research Institute (EPRI)

- Founded by and for the electricity industry in 1973 as Independent, nonprofit center for public interest energy and environmental research
- **Collaborative** resource for the electricity sector
  - \$350 million annual R&D funding, ~450 engineers and scientist
  - 450+ participants in more than 40 countries
  - EPRI members generate more than 90% of the electricity in the United States
  - International participation in more than 15% of EPRI's research, development and demonstrations



# EPRI's Role...

*Collaboratively Move Technologies to the Commercialization Stage...*



***Technology Accelerator!***

Independent, non-profit, **collaborative** research institute, with full-spectrum industry coverage

- *Nuclear Power*
- *Generation*
- *Power Delivery & Utilization*
- *Environmental*

# Our program provides critical data to accelerate emerging technologies into utility EE & DR programs

Performance Validation  
(testing, field demos, pilots)

- Energy savings
- Reliability, compatibility
- Cost, ROI
- Customer satisfaction

Deemed Savings

- Region/segment-specific
- Persistence/lifetime

Supporting Analytics

- Economic; Environmental
- Behavioral; Load Profiles

*Risk Mitigation*

EPRI  
RD&D

*Regulatory Approval*

Utility EE  
Programs

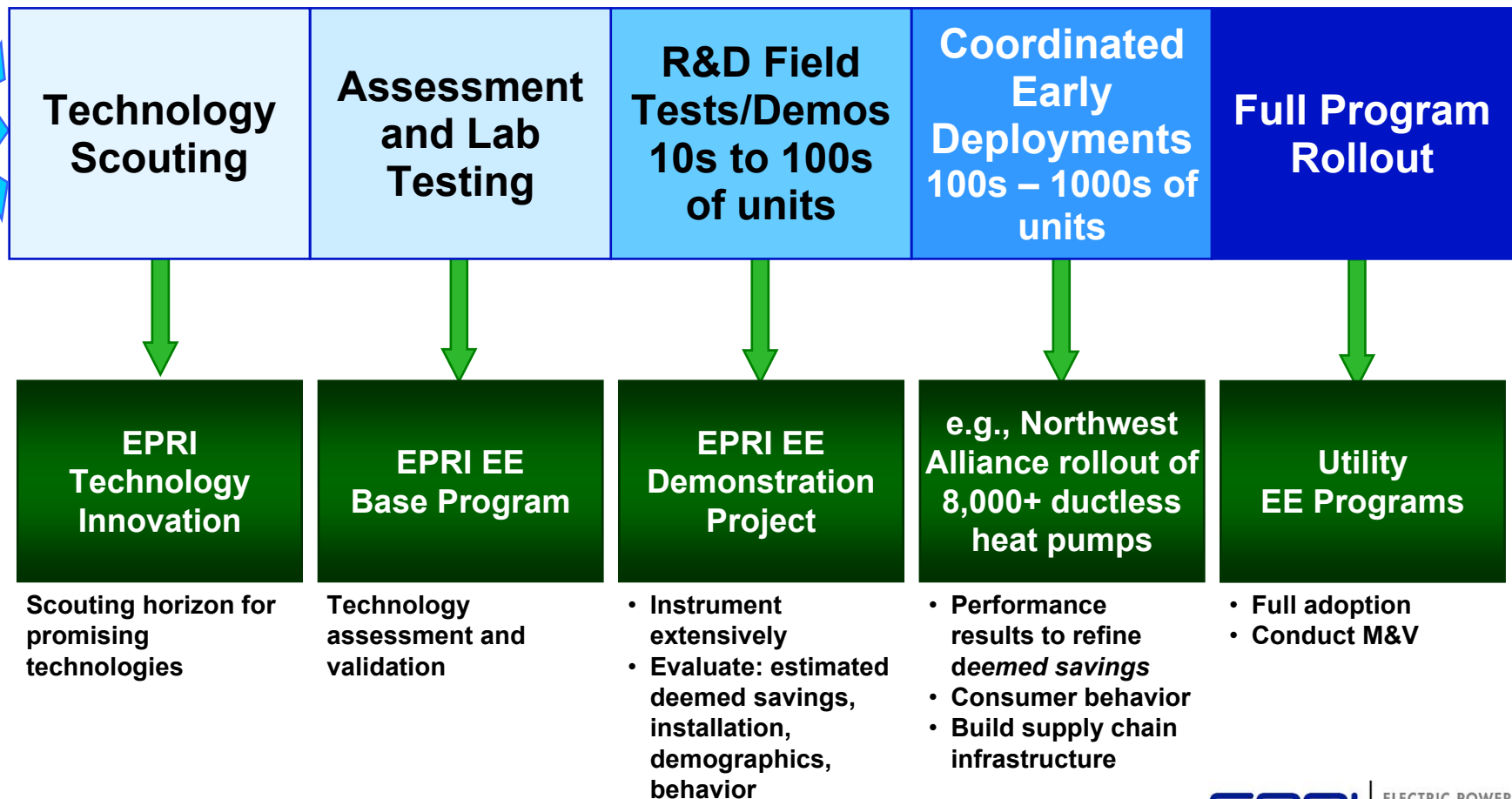
Addressing the  
weak link

Emerging  
Technology

**EPRI working collaboratively with stakeholders to accelerate program adoption**

# EPRI Energy Efficiency Technology Pipeline

Accelerating Readiness of Emerging Efficient Technologies



# EPRI's EE & DR Laboratory: Located in Knoxville, TN

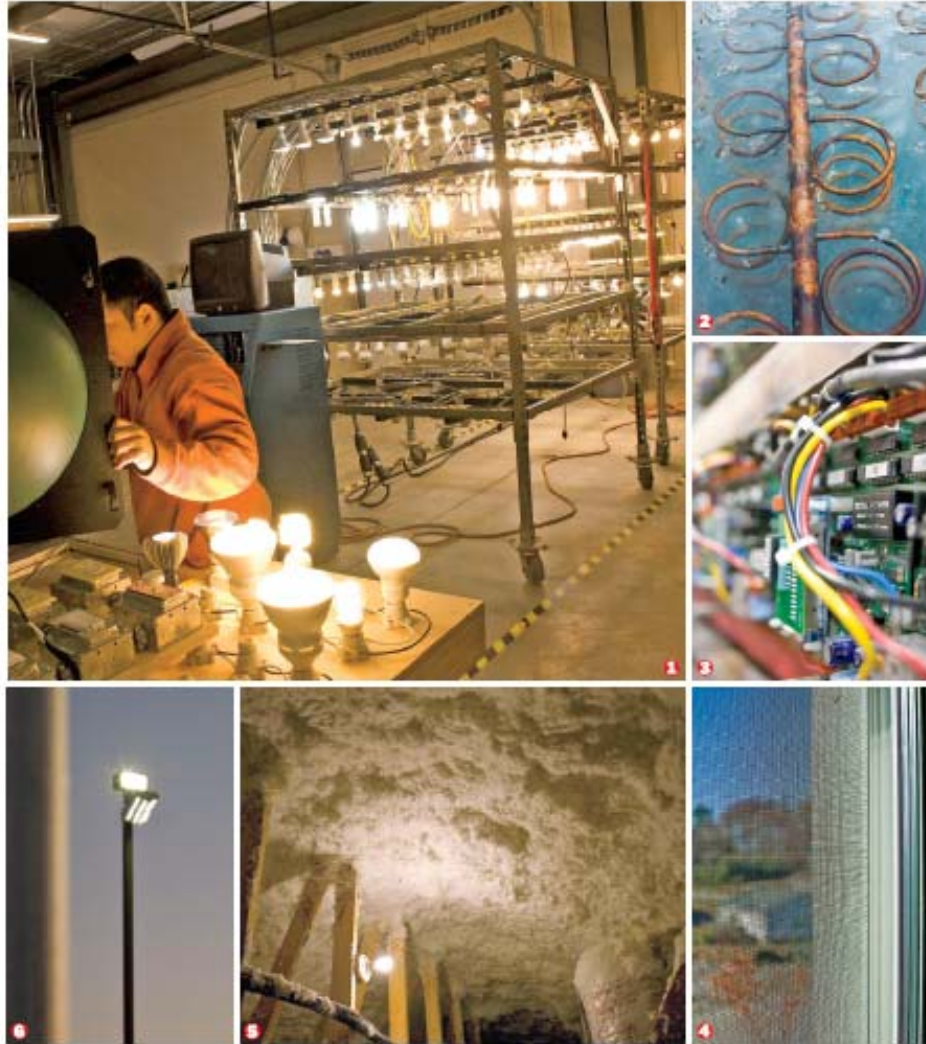
**NATION**

## Wasting Our Watts

We don't need new drilling or new power plants. We need to get efficient

BY MICHAEL BRUNWALD

Evaluating and testing energy efficiency technology



Photographs for TIME by Jeff Jacobson—Redux



the greentech economy. Clearly, it needs an agent. But it's a simple concept: wasting less energy. Or more precisely, consuming less energy to get the same amount of heat for your shower, light for your office and power for your factory. It turns out to be much less expensive, destructive and time-intensive to reduce demand through efficiency than to increase supply through new drilling or new power plants. A nationwide push to save "megawatts" instead of building more megawatts could help reverse our unsustainable increases in energy-hogging and carbon-pewing while creating a slew of jobs and saving a load of cash.

Now this may sound like Jimmy Carter's 30-year-old plea for us to turn down the heat and put on sweaters or like an eco-lecture nagging us to turn off lights, drive less and otherwise

**'A lot of simple answers are just sitting around waiting for us to execute.'**

—TOM REDDOCH, ELECTRIC POWER RESEARCH INSTITUTE



# EPRI Energy Efficiency Technology Pipeline

Accelerating Readiness of Emerging Efficient Technologies



**EPRI  
Technology  
Innovation**

Scouting horizon for promising technologies

**EPRI EE  
Base Program**

**Technology assessment and validation**

**EPRI EE  
Demonstration  
Project**

- Instrument extensively
- Evaluate: estimated deemed savings, installation, demographics, behavior

**e.g., Northwest Alliance rollout of 8,000+ ductless heat pumps**

- Performance results to refine *deemed savings*
- Consumer behavior
- Build supply chain infrastructure

**Utility  
EE Programs**

- Full adoption
- Conduct M&V

# EPRI applying new Thermal Environmental Chambers to test HVAC equipment at controlled indoor and outdoor conditions



- Controlled laboratory testing—  
performance mapping
- Monitored field testing
  - Energy Efficiency Demo
  - other field installations

10 ton testing capacity

Air-to-air & air-to-water testing

0°F – 120°F range

Individual temperature & humidity control in each room



# Air Source Heat Pump Technologies: Low-Ambient Heat Pump System Details



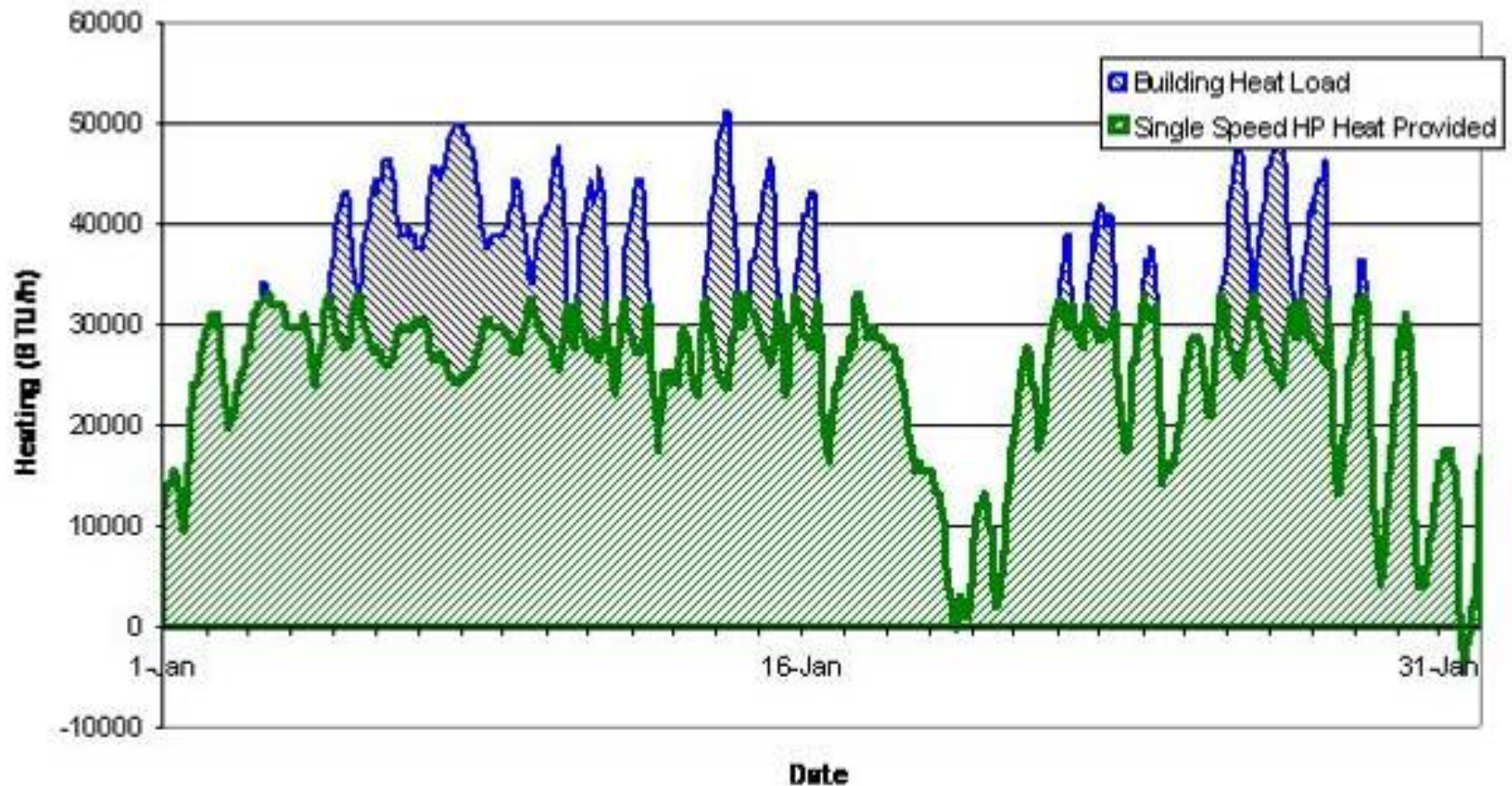
**Indoor Air Handler**

- Initial testing done on Mitsubishi PUZ-HA30 split-system
- 30,000 BTU/h nominal capacity in heating mode
- Designed for ducted, ceiling-mounted indoor configuration
- Airflow rate in heating mode ~940 CFM
- Controlled steady-state testing from 60°F through -5°F outdoor air temperature (OAT); indoor held at AHRI conditions: 70°F/55% RH

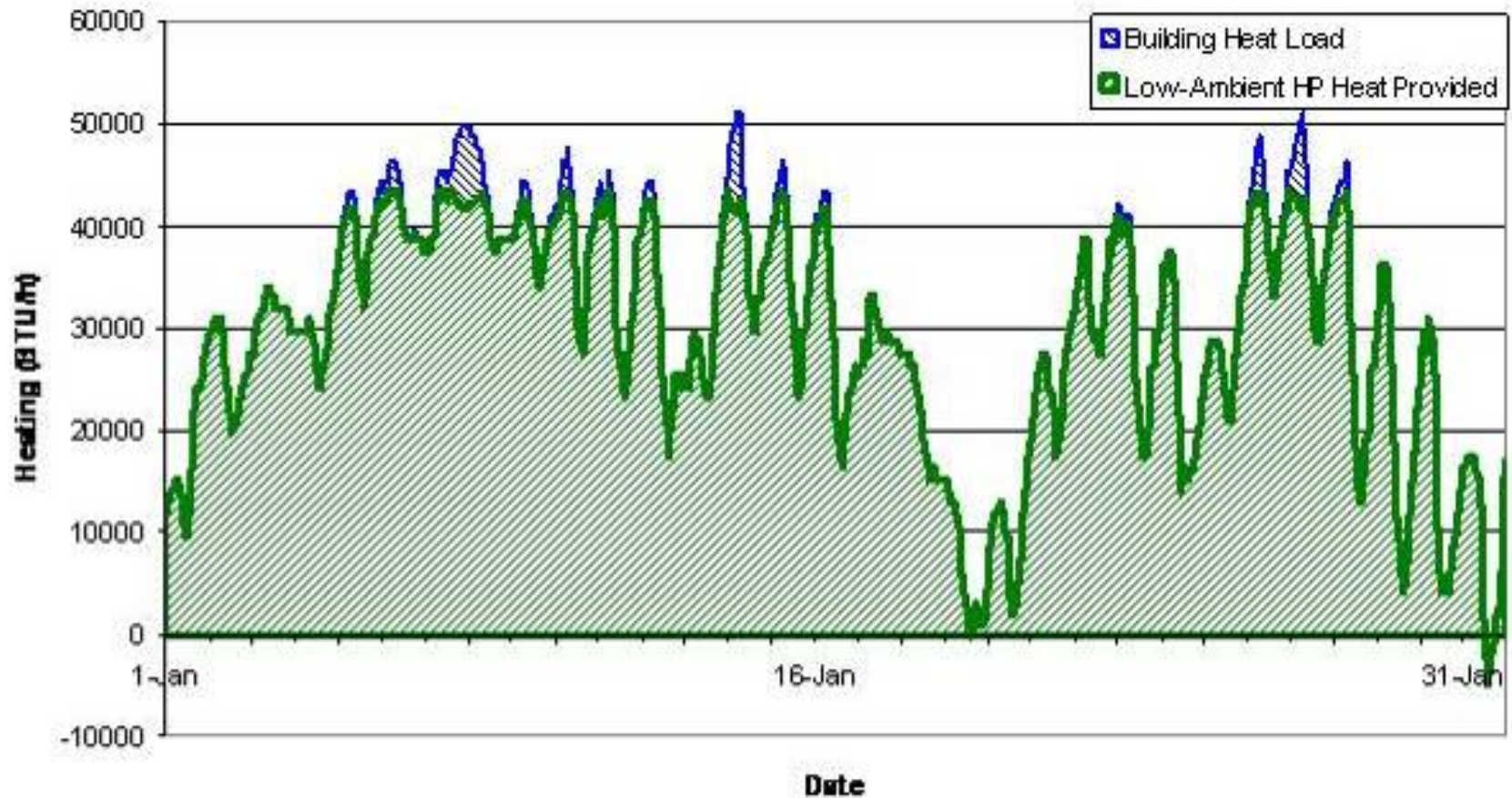


**Outdoor Unit**

# Simulated Single Speed Heat Pump, Atlanta



# Simulated Low-Temp Heat Pump, Atlanta



# Heat Pump Water Heater Research at EPRI

## *Independent Data on Operation & Performance*

### Residential HPWHs with Energy Factors > 2.0

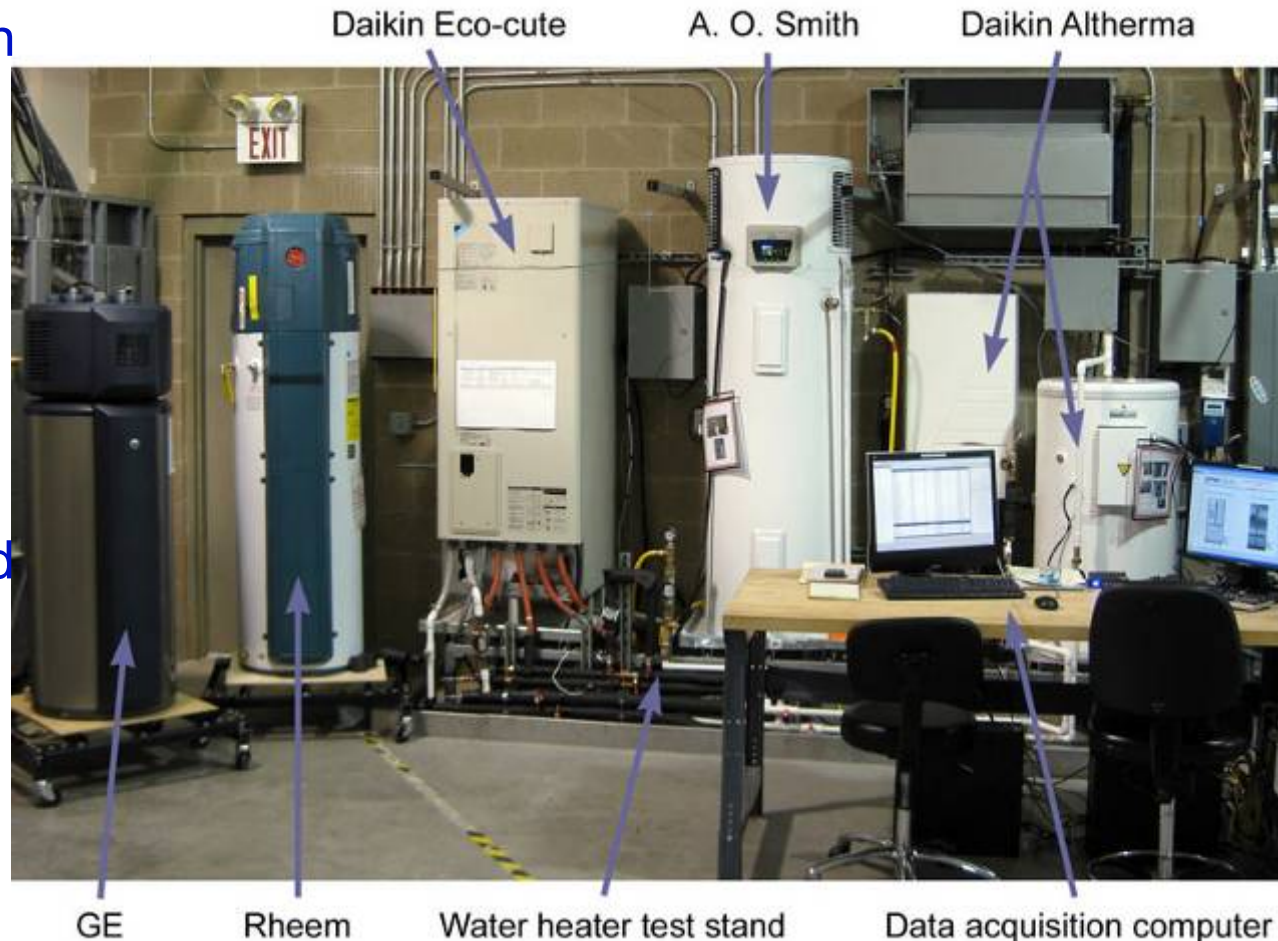
–ENERGY STAR® status

–Major players: A.O. Smith, Rheem, GE, Stiebel-Eltron, etc.

### EPRI addressing field efficiency, reliability, and customer satisfaction

–Lab testing in Knoxville

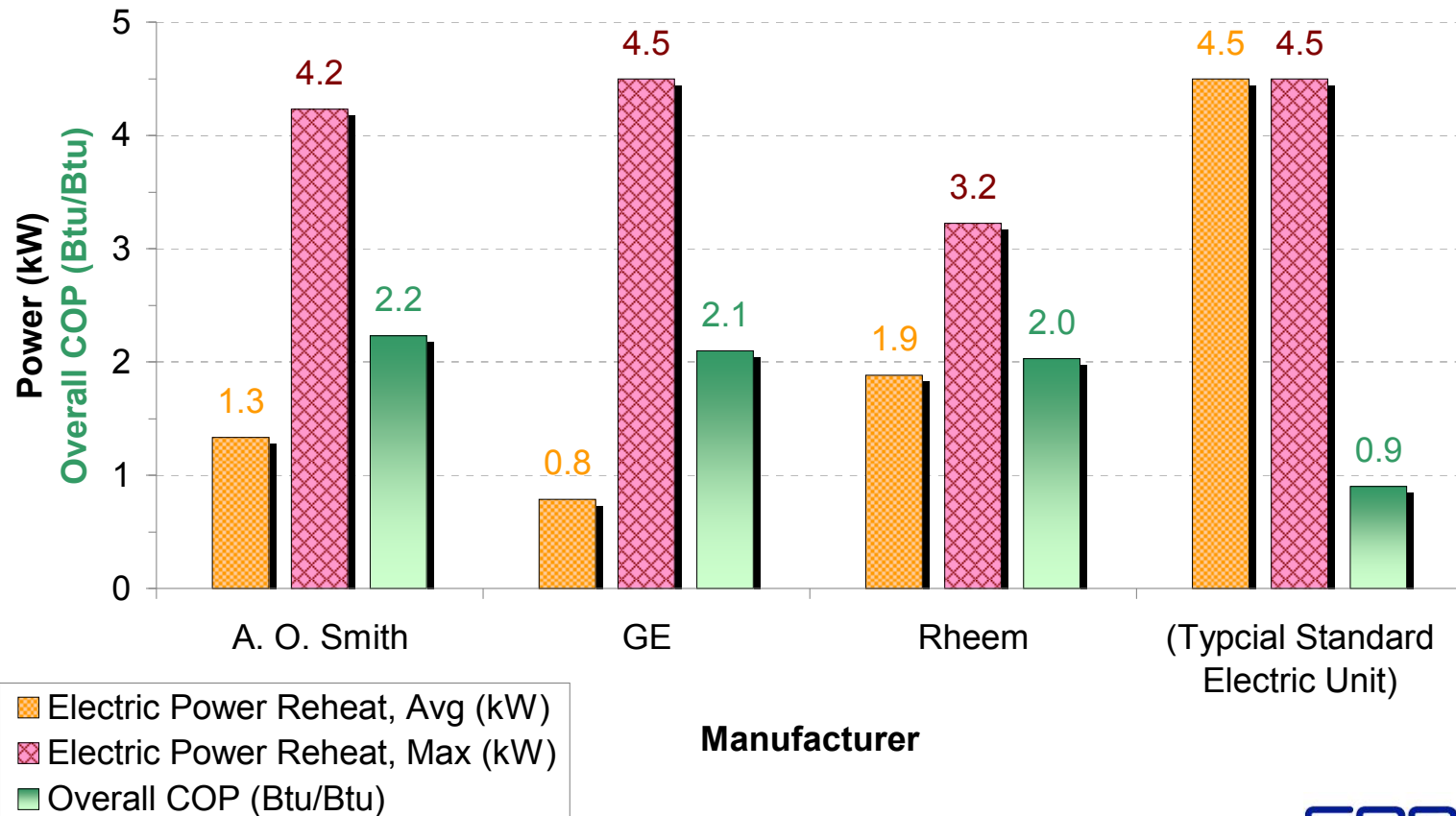
–Field demos around the country in occupied homes



## HPWHs in the EPRI Laboratory

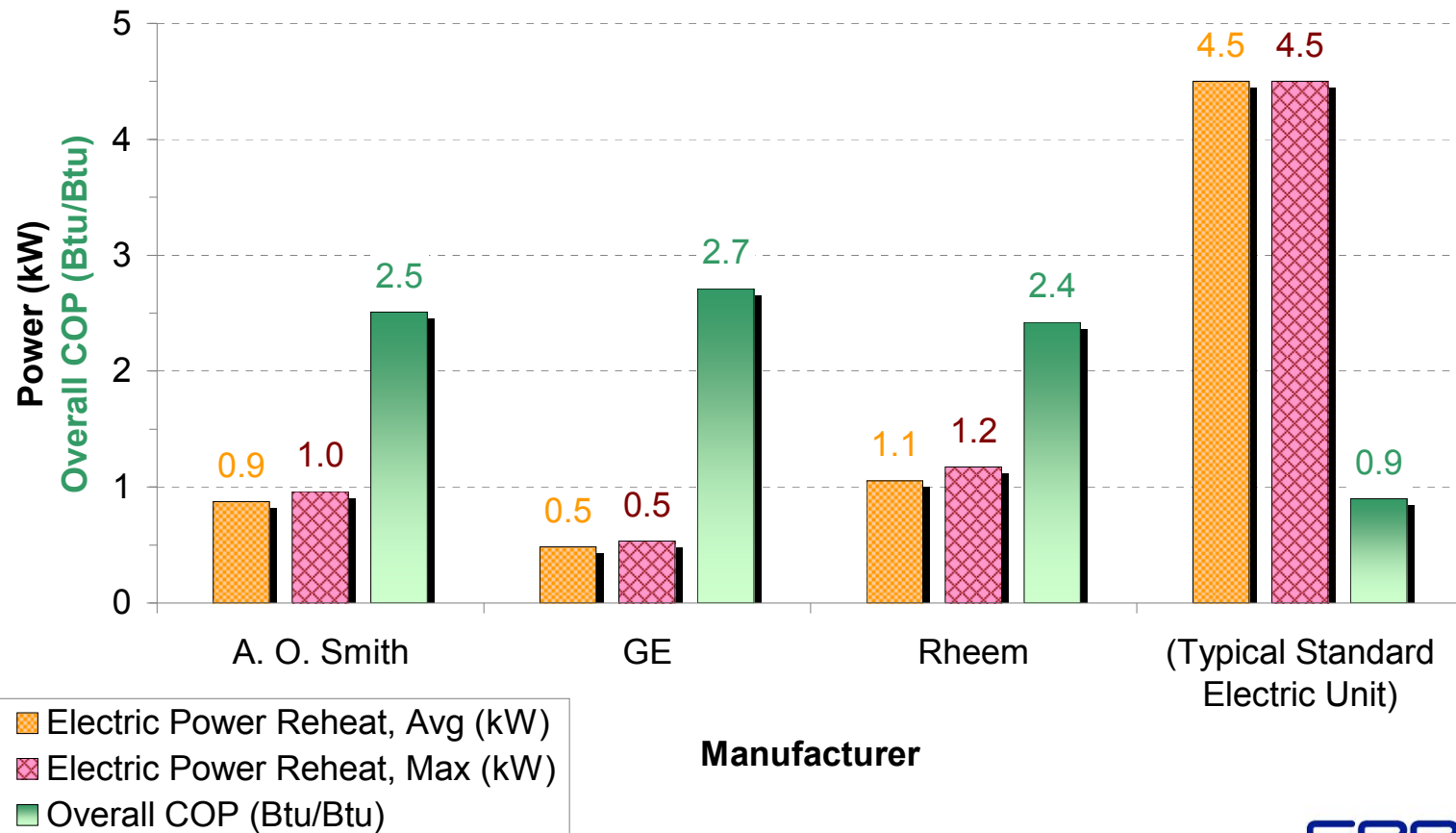
# Draw Test Power and Overall COP

- Single draw at 3 gpm until outlet drops by 25°F
- Default operating mode (Hybrid or Energy Saver) at 120°F setting
- Targeted conditions: ambient 68°F, 50% RH, and 58°F inlet water



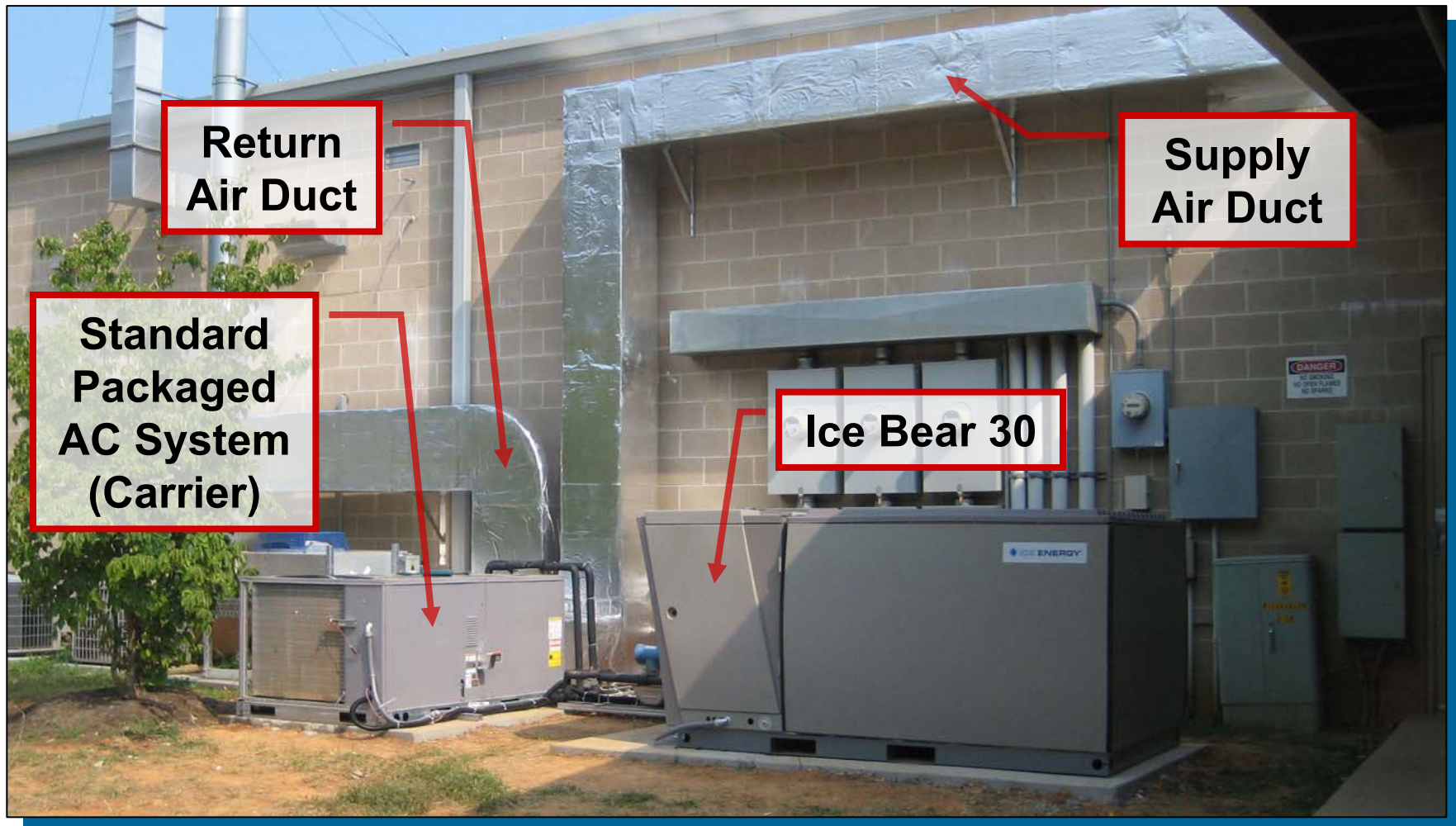
# 24-Hour Test Power and Overall COP

- Six hourly draws, 10.7 gal each at 3 gpm, then standby for 18 hours
- Default operating mode (Hybrid or Energy Saver) at 120°F setting
- Targeted conditions: ambient 68°F, 50% RH, and 58°F inlet water



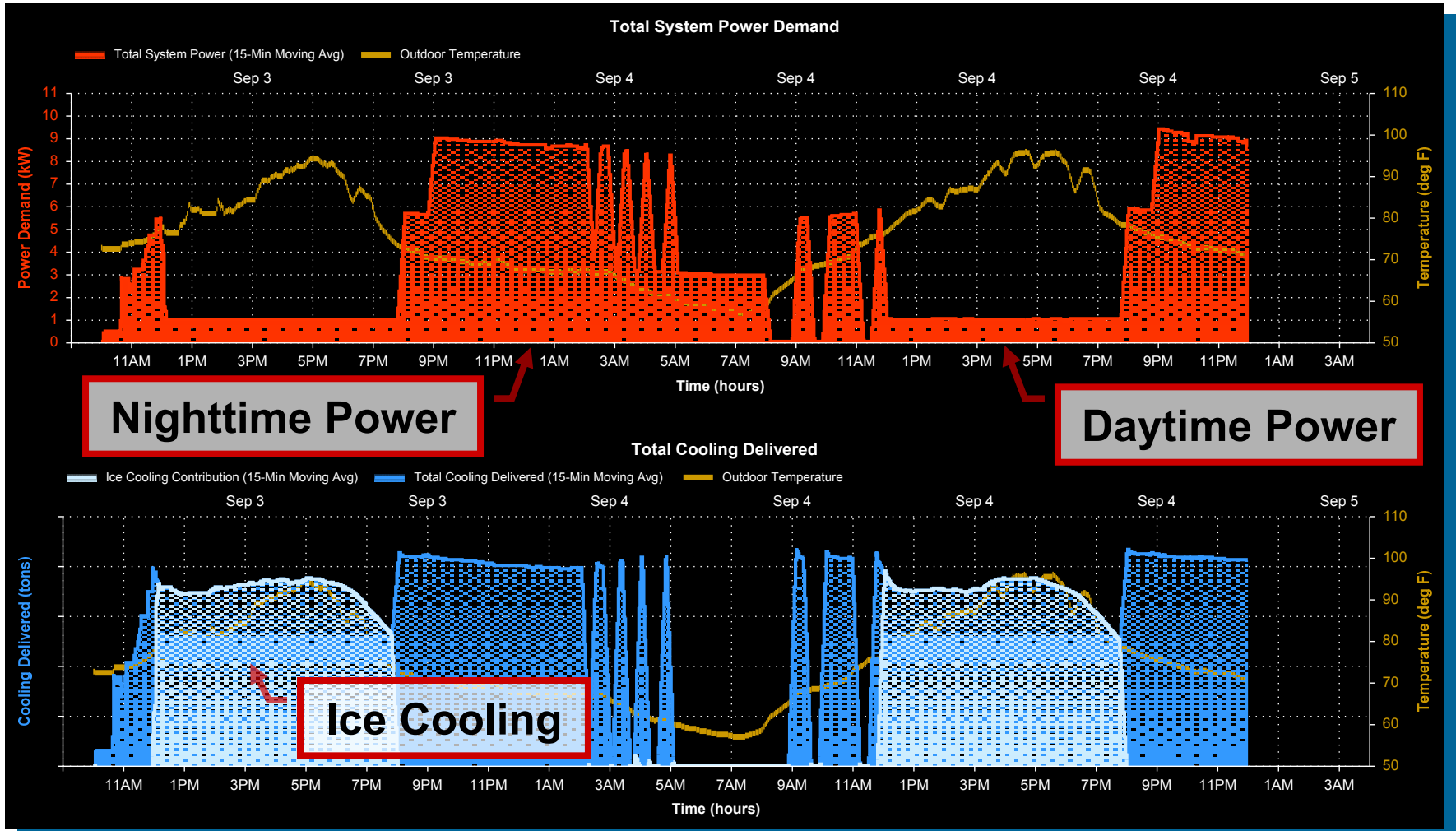


# Thermal Energy Storage: Ice Bear Lab Tests



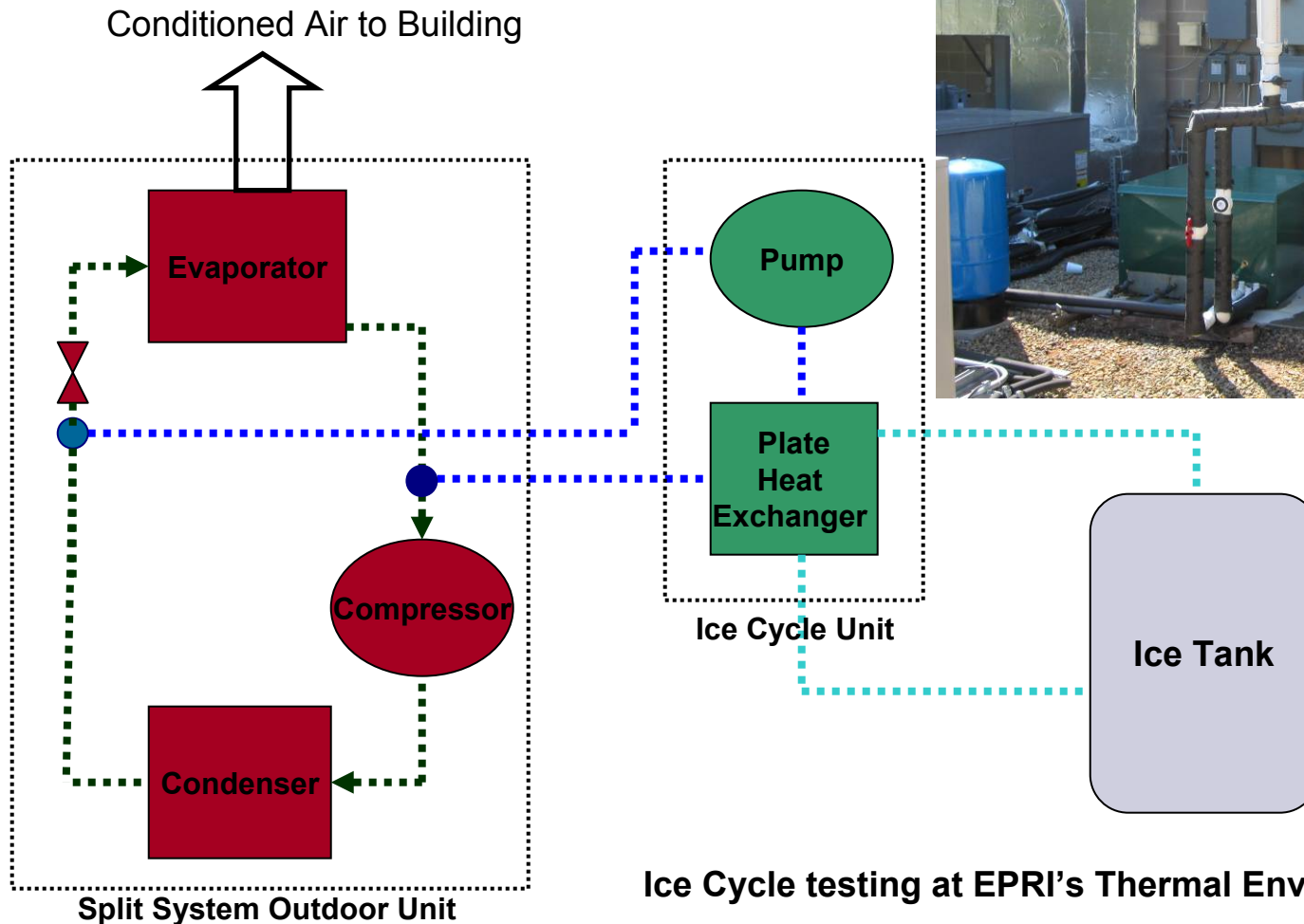
# 2008/2009 Ice Bear Lab Test

## Live Power and Cooling Graphs



Values shown are approximate and are for illustration only

# Thermal Energy Storage -Ice Cycle Testing



Ice Cycle testing at EPRI's Thermal Environmental Lab

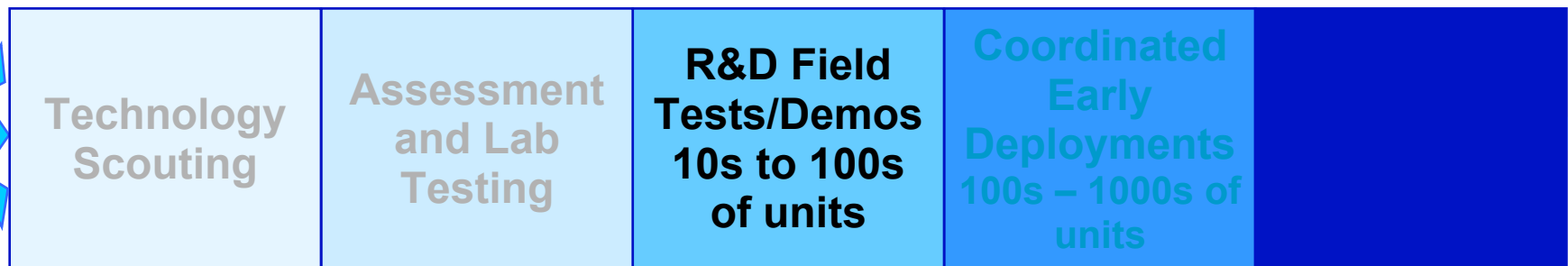
# PLS using TES Technology: Additional Collaborative Field Project

- Demonstration at a Field Site
  - At a TVA site
- First Energy/JCP&L Smart Grid Demonstration Project
  - 4 Ice Bear systems under tests in the field
- CPS Energy Ice Bear Project
  - Study of three “right-sized” Ice Bear systems in San Antonio



# EPRI Energy Efficiency Technology Pipeline

Accelerating Readiness of Emerging Efficient Technologies



**EPRI  
Technology  
Innovation**

Scouting horizon for promising technologies

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- Instrument extensively
- Evaluate: estimated deemed savings, installation, demographics, behavior

**e.g., Northwest  
Alliance rollout of  
8,000+ ductless  
heat pumps**

- Performance results to refine *deemed savings*
- Consumer behavior
- Build supply chain infrastructure

**Utility  
EE Programs**

- Full adoption
- Conduct M&V

# Field demonstrations of six categories of *hyper-efficient technologies* with the potential to significantly reduce energy usage in U.S. buildings and homes



**Variable-Refrigerant-Flow  
Air Conditioning**



**Efficient Data-Centers**



**LED Street and  
Area Lighting**



**Heat-Pump Water Heaters**

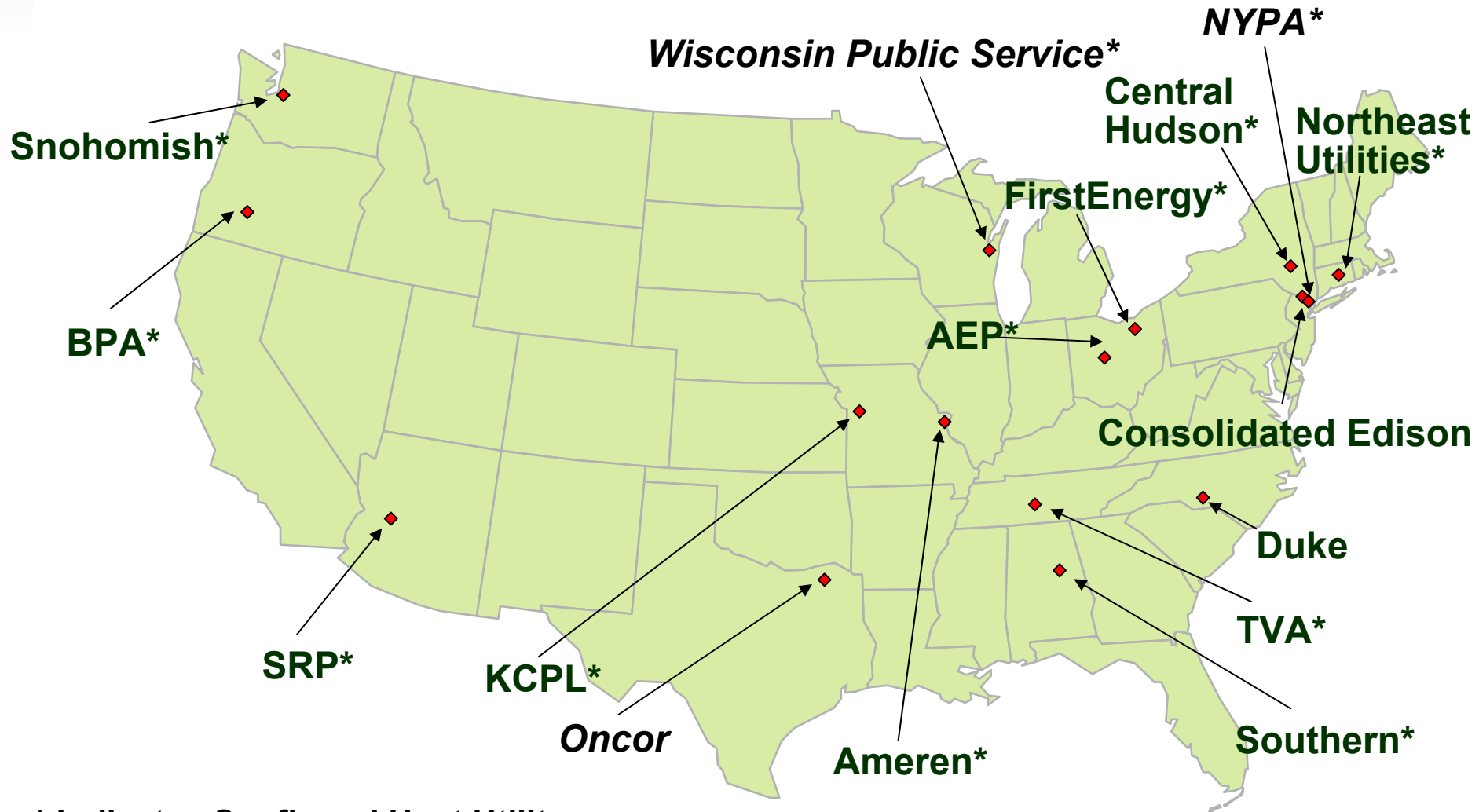


**Ductless, Residential Heat-  
Pumps and Air-Conditioners**



**Hyper-Efficient  
Residential Appliances**







# 16 Committed Collaborators



\* Indicates Confirmed Host Utility

# Status of Deployment

Updated on 01/28/11

		Technology	Installed
Commercial		Variable Refrigerant Flow AC	2
		LED Street and Area Lighting*	211
		Energy Efficient Data Centers	3
Residential		Ductless Heat Pump**	16 / 16
		Heat Pump Water Heater	109 / 117
		Hyper-Efficient Appliances	63 / 132
		<b>TOTAL</b>	<b>401 / 481</b>

**Green** Indicates the Number of Instrumented Sites (Control and Treatment)

\* Includes Supplemental Projects with FirstEnergy, Southern, & TVA

\*\* Does not include 8,000+ devices through Bonneville Power Administration



# Variable capacity heat pumps offers breakthrough energy efficiency

## Benefits

- Energy-efficiency
- Distributed control for room-specific comfort
- Reduces/eliminates need for electric back-up heat

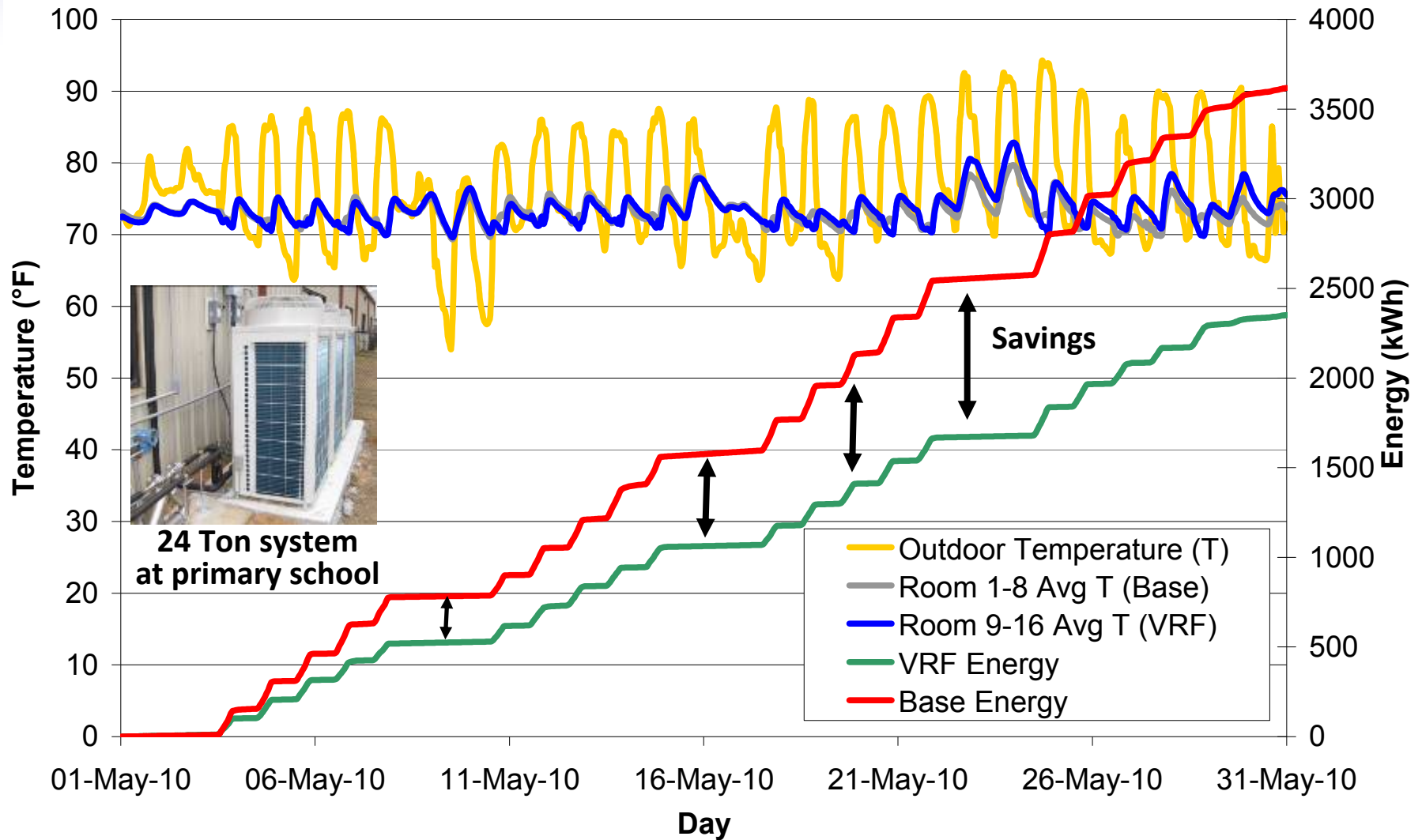
## EPRI addressing technical, design and implementation questions

- Performance mapping across climate regions to develop **metrics needed for deemed savings**
- Performance at low ambient temperatures
- On-demand load shedding with existing controls



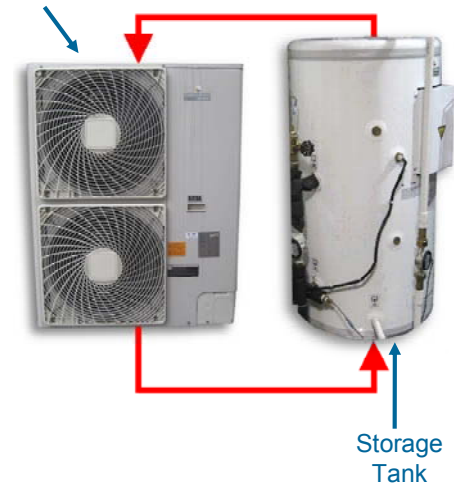
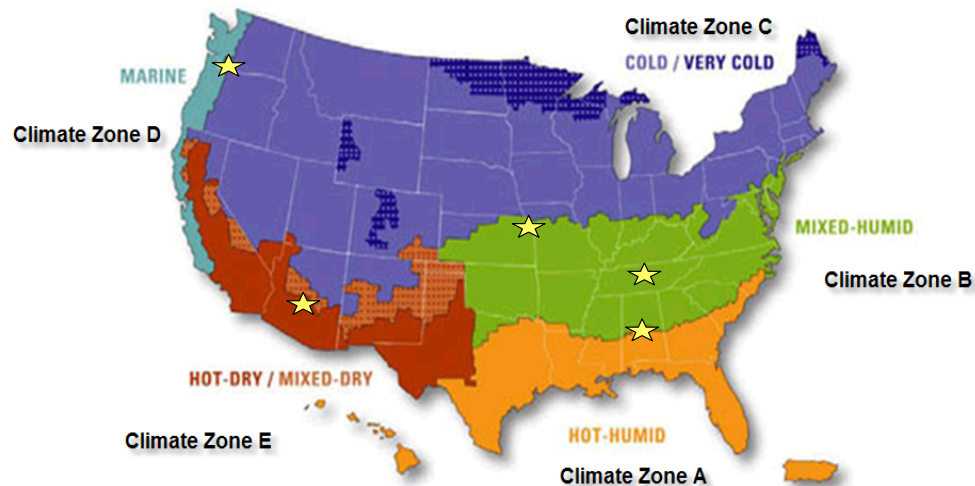
# Energy Efficiency Demonstration

## VRF Performance Comparison at Mobile, AL Site (May 2010)



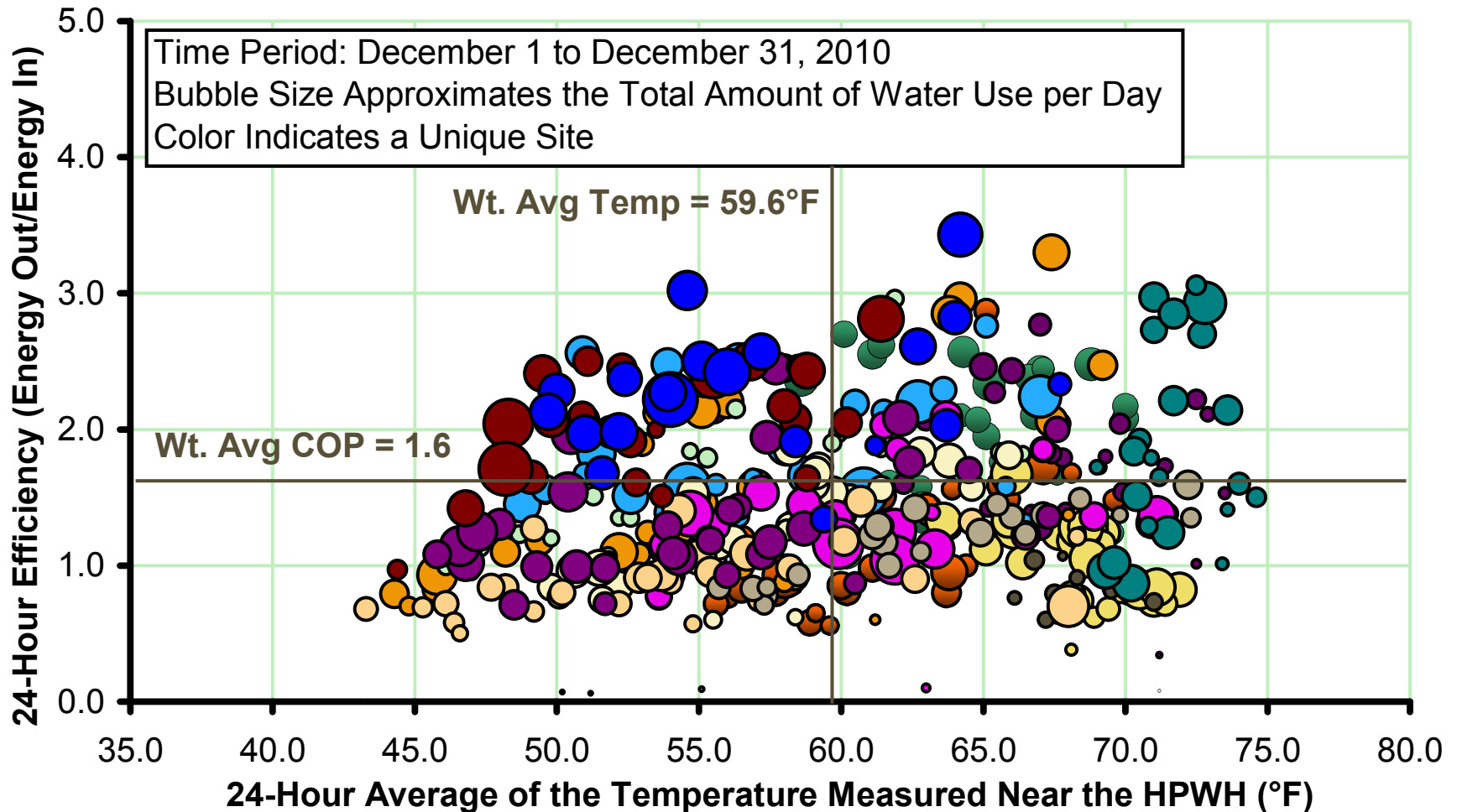
# HPWH Demo Project

- Assess heat pump water heater technology by measuring efficiency.
- Provide credible data on the performance and reliability of heat pump water heaters.
- Assess user satisfaction in a residential setting.



# COP vs. Ambient Temp for Zone 5

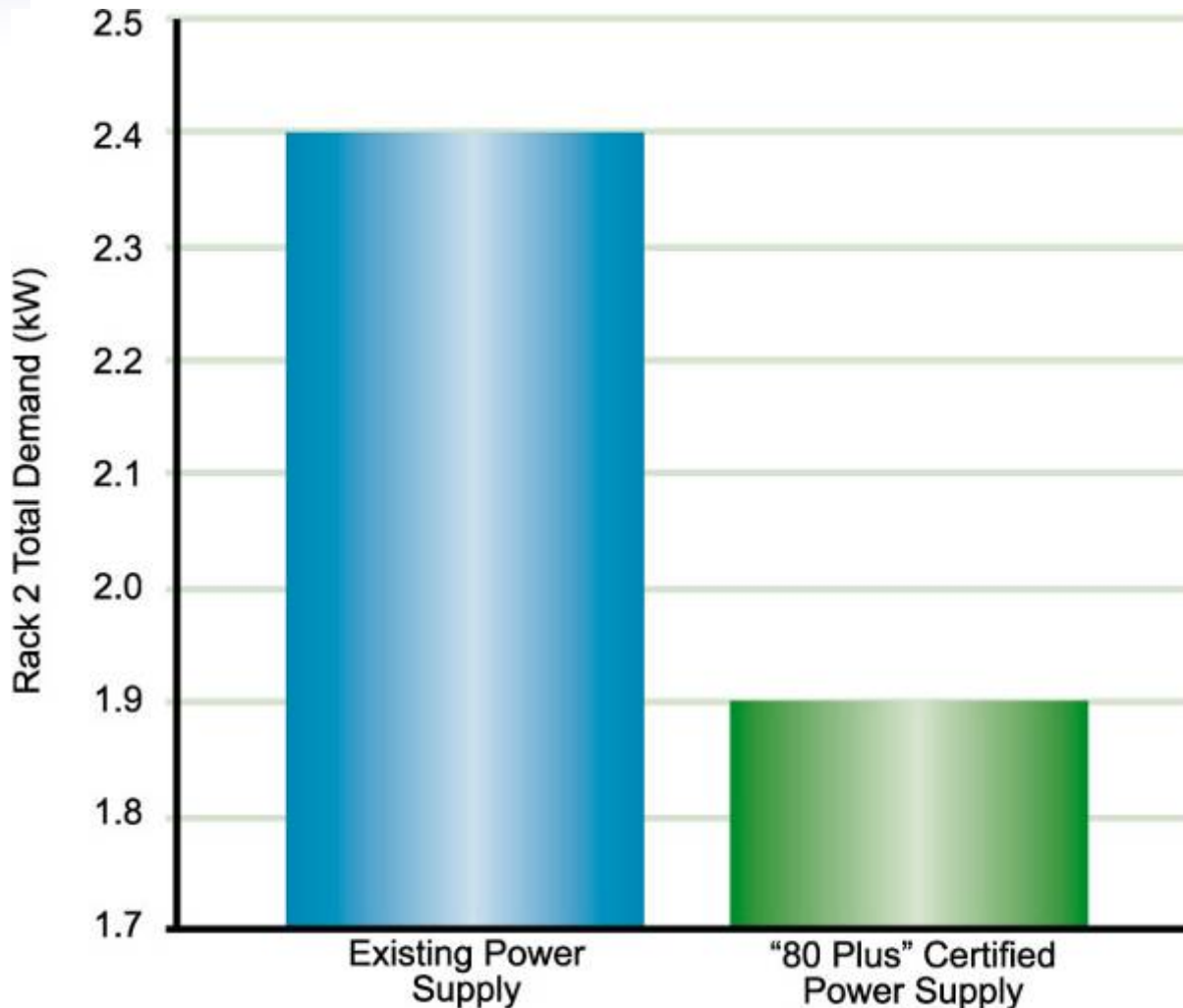
**Caution! Raw Data – Not Fully Analyzed**



Zone 5: Less than 2,000 cooling degree days or more and less than 4,000 heating degree days.

# Energy Efficiency Demonstration

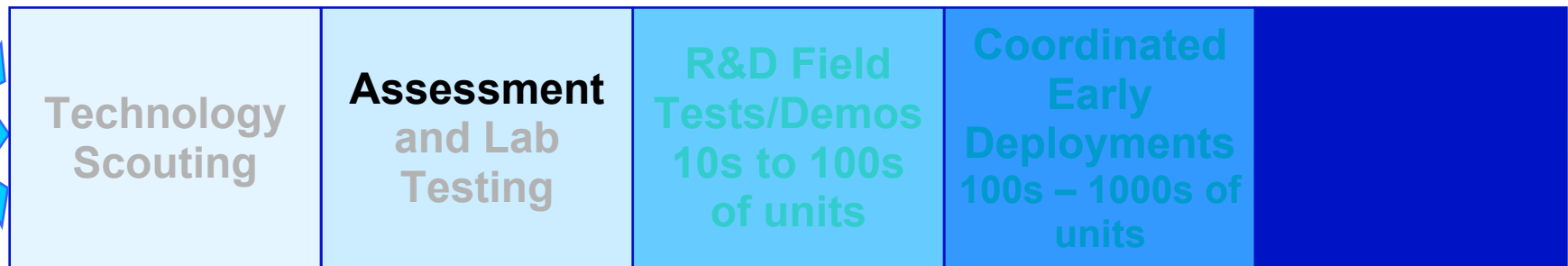
## Data Centers: Test Results – Snohomish PUD



Energy consumption at one of the four blade enclosures dropped from 2.4kW to 1.9kW after all power supplies were replaced with 80-Plus Power Supplies

# EPRI Energy Efficiency Technology Pipeline

Accelerating Readiness of Emerging Efficient Technologies



**EPRI  
Technology  
Innovation**

Scouting horizon for promising technologies

**EPRI EE  
Base Program**

**Technology assessment and validation**

**EPRI EE  
Demonstration  
Project**

- Instrument extensively
- Evaluate: estimated deemed savings, installation, demographics, behavior

**e.g., Northwest Alliance rollout of 8,000+ ductless heat pumps**

- Performance results to refine *deemed savings*
- Consumer behavior
- Build supply chain infrastructure

**Utility  
EE Programs**

- Full adoption
- Conduct M&V

# Zero Net Energy Homes: Assessment of ZNEH Activities

## Details

- Public policy goals to promote zero net energy homes (California, DOE)
- Produces as much energy in year as consumes on a net basis
- PV panels offset demand; their expense makes super efficiency imperative

## Objective and Methods

- Review design and technology features, research needs, policy and utility issues
  - Lessons learned from existing projects emphasized
- Methodology
  - Literature review and Interviews with industry experts

## Results

- ZNEHs technically feasible but not yet cost neutral
- Systems approach is key: Requires integrated approach to design (inc. optimization software), best practice building construction; grid connection
- Combination of better performance and cost of several measure and technology packages; identified in update
- ZNEHs can alter peak; critical area for study



## Application

- Understanding of the technical and non-technical issues of ZNEHs important in understanding residential sector RD&D needs and integration issues.

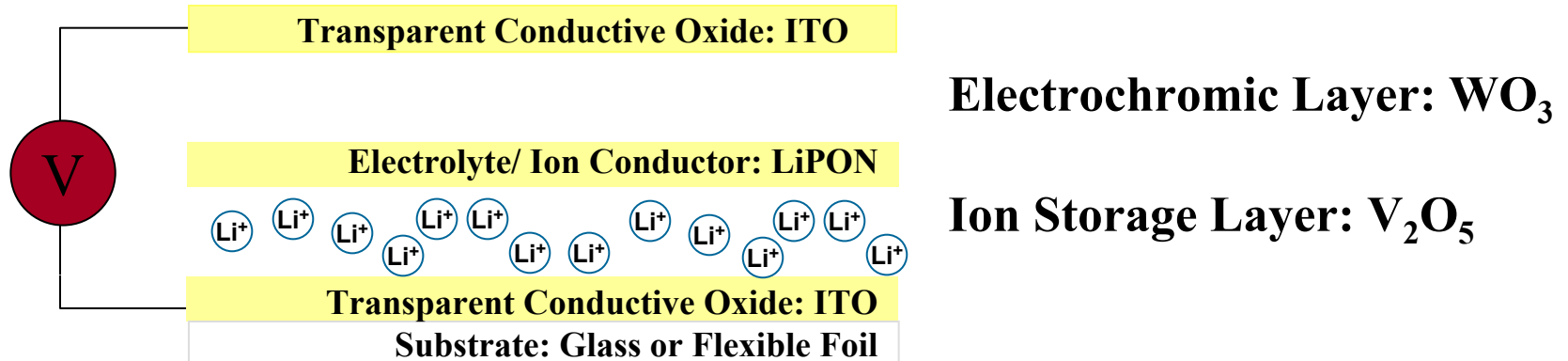
# EPRI Demo Projects Related to ZNE Buildings

- Hawaii Project: ZNE Homes at Kaupuni Village, Oahu
  - EPRI focus: Dashboards
- TVA Campbell Creek Homes Project
  - EPRI focus: Technical Support
- Southern California Project: Commercial Building
  - Installation of highly efficient devices
  - PV Integration
- Technology Innovation Projects
  - Electrochromic Windows
  - PCM Wallboards





# Technology Development Project: Low Cost Electrochromic Films on Windows



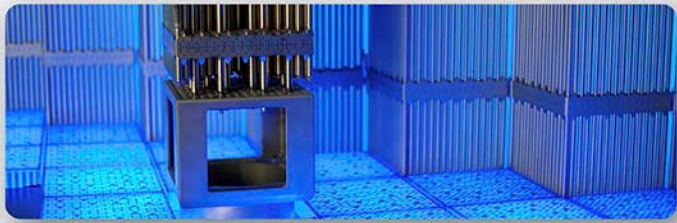
*Solid State Lithium Electrochromics are a Thin Film Multilayer Coating that can Change Color with the Application of Voltage*

# Summary on Collaborative Activities

**Examples showed how we infuse** technology pipeline for EE/DR programs through development, testing & demonstration

**Next Presentation** is on “Coordinated Early Deployments of EE Technologies”





**EPRI**

ELECTRIC POWER  
RESEARCH INSTITUTE

## Coordinated Early Deployments of Efficient End-Use Technologies

### Proposed Initiative

**Ellen Petrill**  
Senior Program Manager  
Energy Efficiency

**Emerging Technologies Coordinating  
Council**

March 10, 2011

# Contents

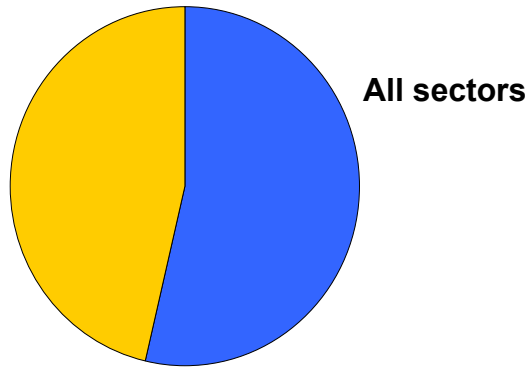
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- The challenge
- Proposed Coordinated Early Deployments Initiative
- Phase 1
- Action

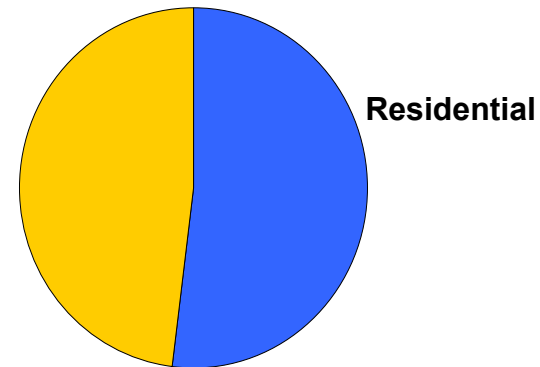
# Significant Savings from CFLs



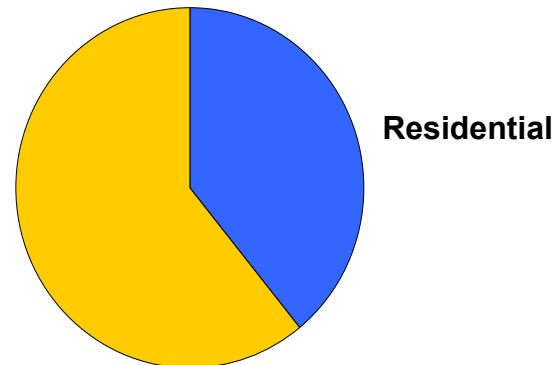
**California, 53%**



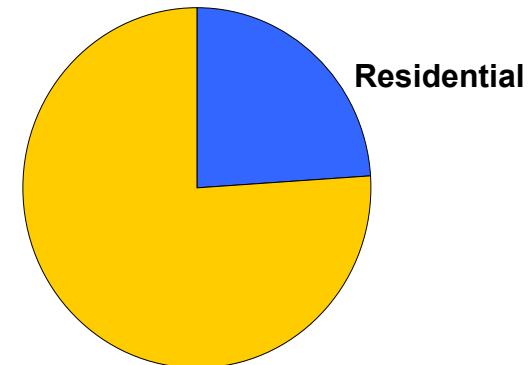
**Massachusetts, 52%**



**Vermont, 39%**



**New York, 24%**



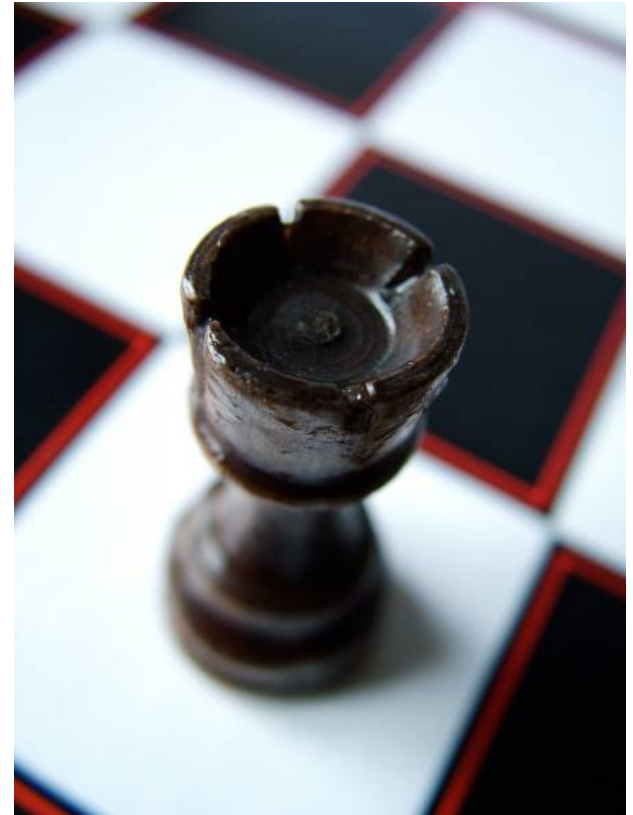
**2009 Savings**

-  CFL Savings
-  All Other Savings

**EISA 2007 Lighting Efficiency Standards will Change That!**

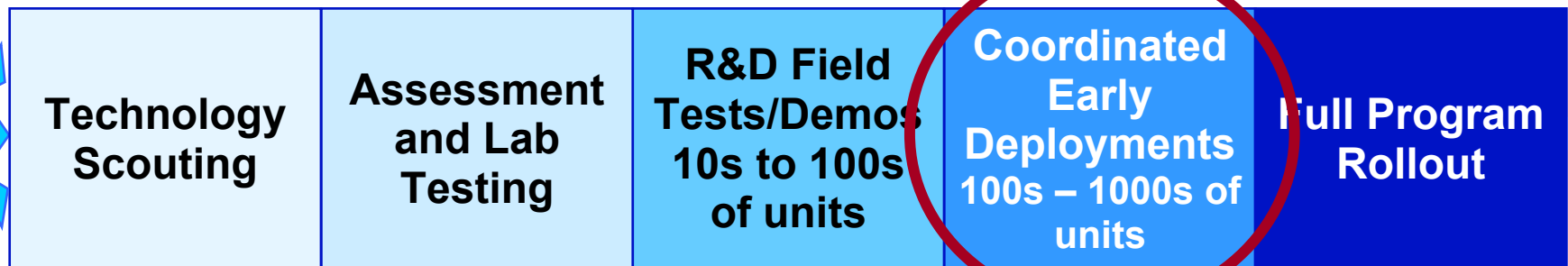
# The Challenge: Meeting Ambitious EE Goals

**Develop a strategy to  
accelerate readiness of  
new EE technologies  
for full program rollout**



# EPRI Energy Efficiency Technology Pipeline

Accelerating Readiness of Emerging Efficient Technologies



EPRI  
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Innovation

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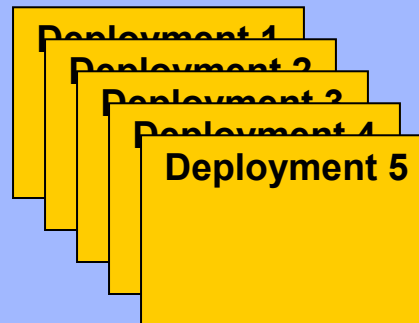
Utility  
EE Programs

- Full adoption
- Conduct M&V

# EE Coordinated Early Deployments Initiative

**National Collaborative  
Create Framework**

**Multiple Coordinated Deployment Projects**

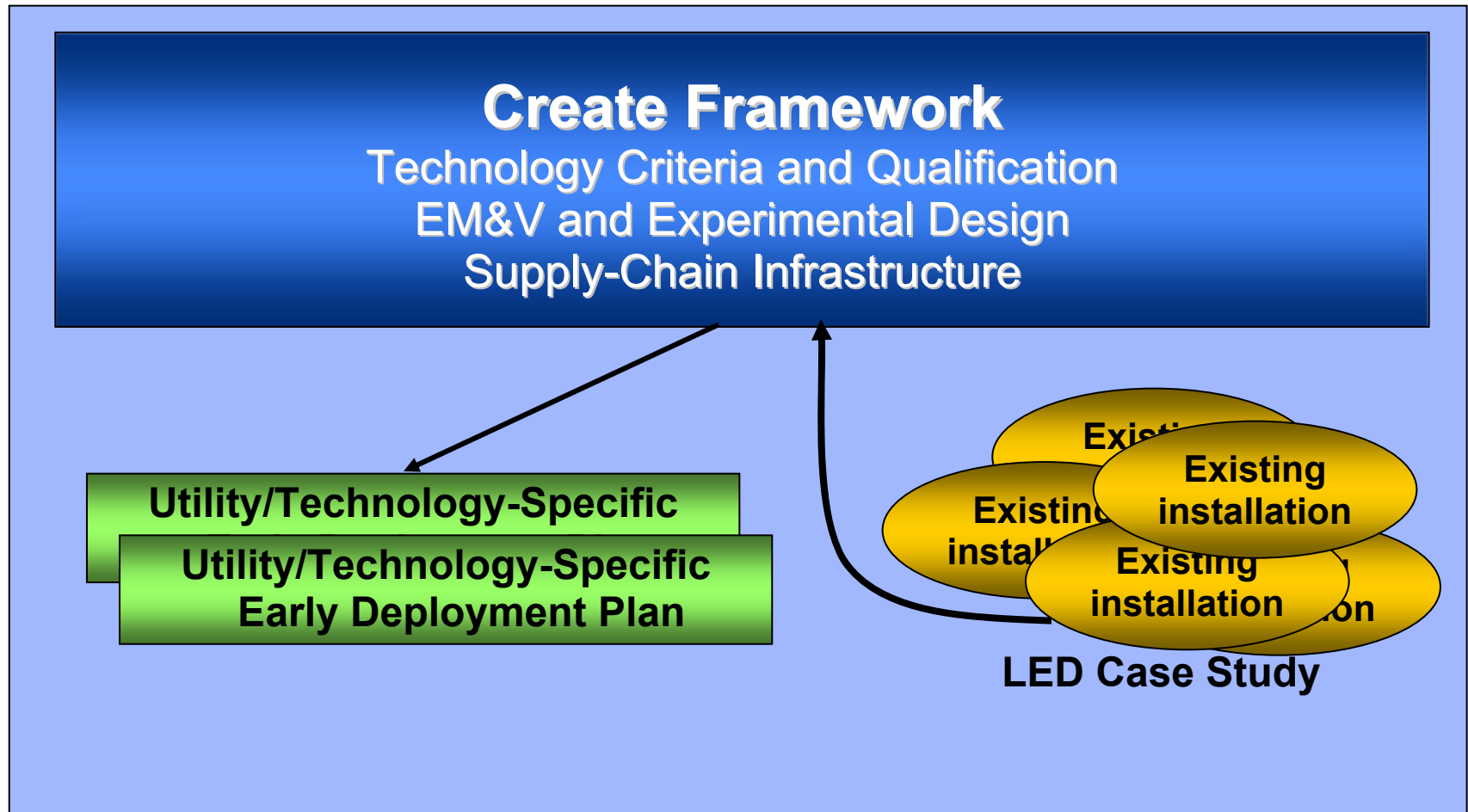


**Goal: Accelerate technologies by 2 to 3 years**



## Coordinated Early Deployments Initiative

# Phase 1: Create Framework & Plan Early Deployments



**Goals: Plan early deployments, recommend Phase 2**

# Benefits of EE Coordinated Early Deployment Initiative

Multi-regional collaborative provides

- Access to national results
- A powerful voice with technology suppliers
- A framework that
  - Minimizes risk of technologies *not ready*
  - Creates scalable projects
- Potential for increased confidence of regulators
- Leveraged funding and expertise



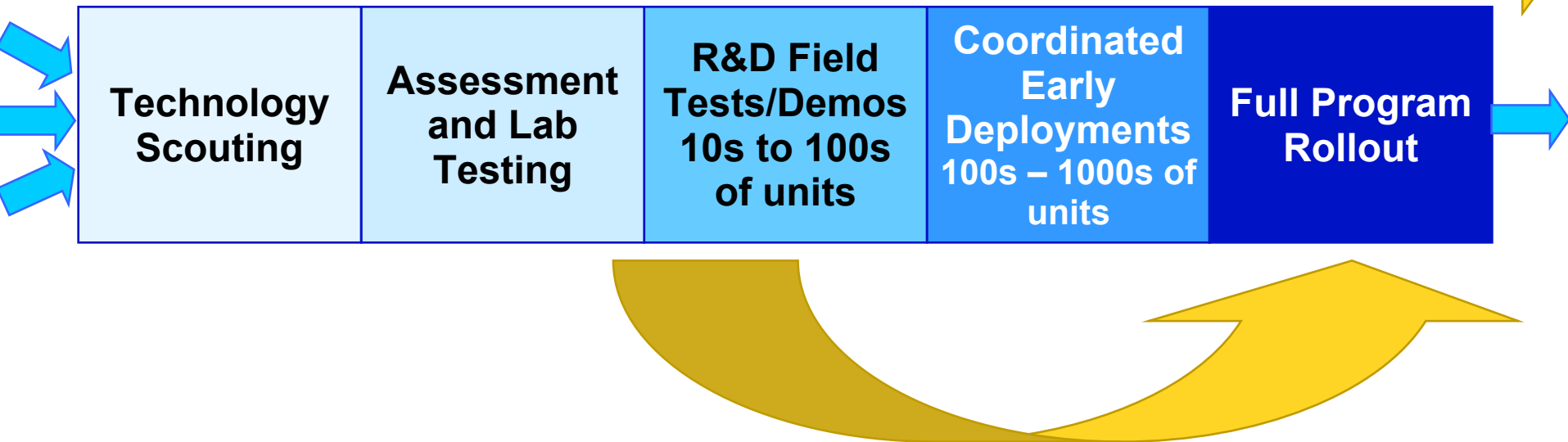
EPRI's established stakeholder relationships provide opportunities for outreach and exchange with stakeholders

- EPRI Energy Efficiency/Smart Grid Public Advisory Group

# The Importance of Technology Readiness Criteria

## EPRI EE Technology Pipeline

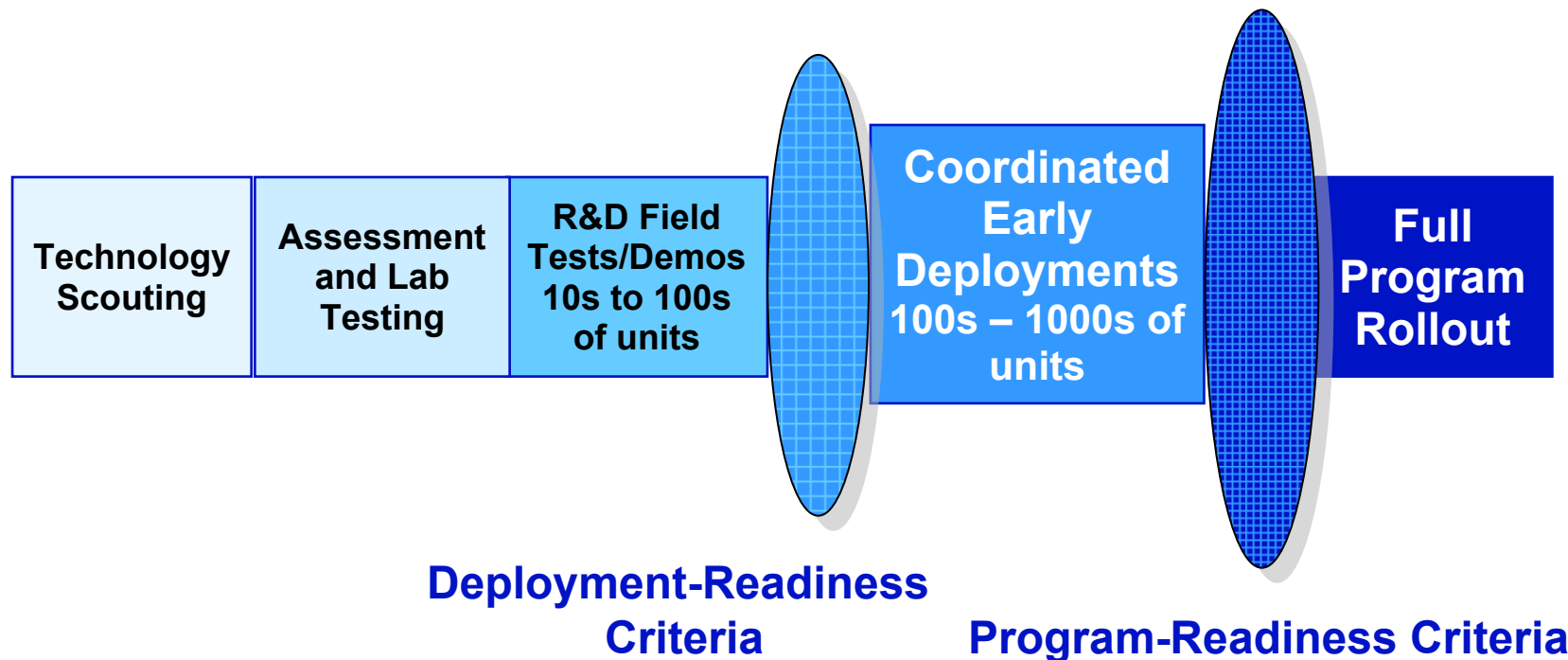
**Accelerating Readiness of Emerging Efficient Technologies**



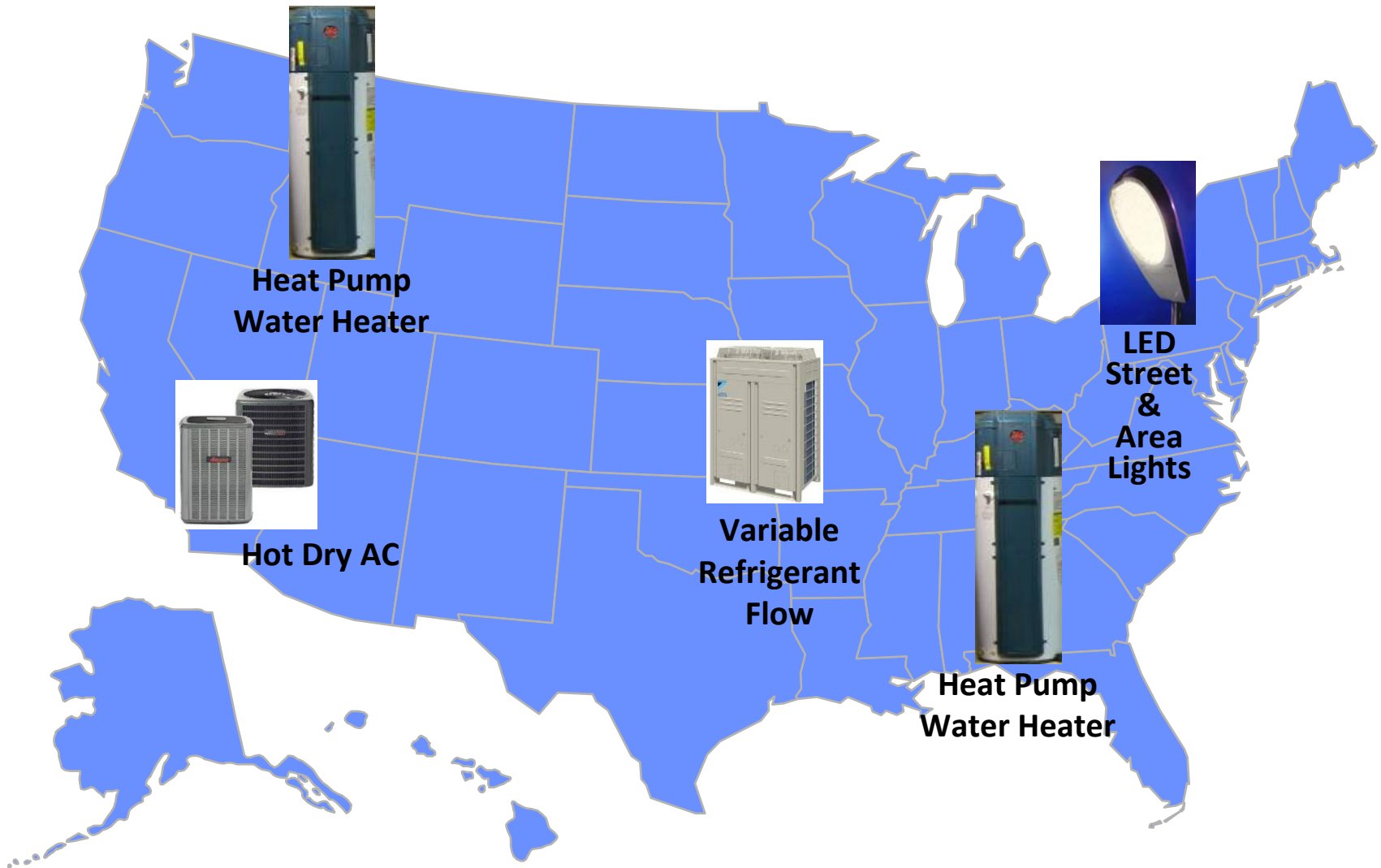
**Could some technologies be ready without deployment step?**

# Technology Readiness Criteria and Qualification

- Define technology readiness criteria
- Identify early–deployment qualified technologies
- Develop technology-specific program readiness criteria



# Translate Results Across Regions



# LED Case Study

Can LED outdoor lighting technology advance to full program rollout without early deployment program?

- Gather data, analyze and identify gaps
- Make measurements if needed
- Assess, screen technology

Scotty



**Determine pipeline status of LED outdoor lighting**

# Phase 2: Coordinated Deployments

## Phase 1 findings drive Phase 2 deployments

- Implement planned early deployments plus 1 to 3 additional
- Aggregate, evaluate, disseminate results
- Measure results against goal



**Variable Refrigerant Flow**



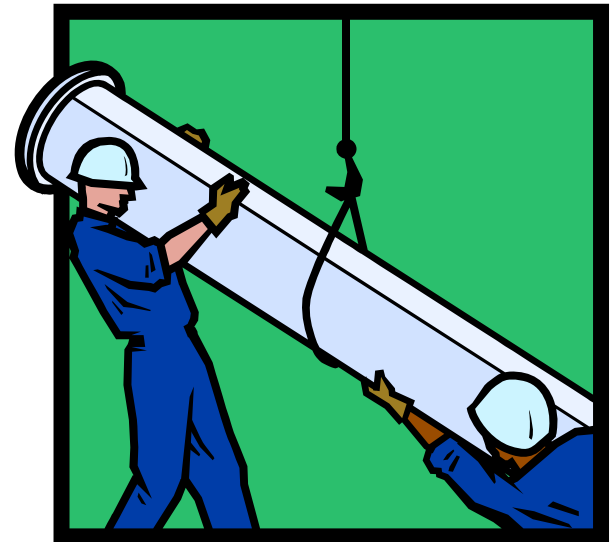
**LED Street &  
Area Lights**



**Heat Pump  
Water Heater**

# Results: EE Technology Pipeline in Place

- Standardized pipeline process
- Technologies in pipeline – you know status
- Technologies ready for programs – in your databases or resource manuals
- Start earning sooner





# Action

- March 28 Participation Meeting
- We invite you to *collaborate* and *engage*



**Together we can improve the pipeline**

# Together...Shaping the Future of Electricity



# Lunch

Reconvene at 1:00 pm



# E Source - ETCC Collaboration Opportunities

Katie Elliot

Product Manager, Technology Assessment Service  
E-Source



# E Source - ETCC Collaboration Opportunities

**Ira Krepchin**  
Director, Research

**Katie Elliott**  
Product Manager, Member Services

# Collaboration Opportunities

## 1. What geographic area or market niche does ETCC want to reach?

- Other utilities and utility commissions
- Partnership organizations like NEEP and NEEA
- Manufacturers, retailers, vendors
- Labs, DOE, EPA...

## 2. What gaps can E Source help fill to meet the ETCC's objectives?

- Certain topical areas
- Education and outreach

## 3. How do we get from here to there?

- Coordination calls, events, newsletters
- Online database



# Ideas?!!

