



EMERGING TECHNOLOGIES PROGRAM

Overview - ACEEE Hot Water Forum Session 7D

February 24, 2015

4 Case Studies

1. MFR Shared Combo HW Boiler Reset Controller Comparison Field Testing
2. Residential Recirc Pump Home Testing
3. Advanced Residential WH Home Testing
4. Restaurant Dishwasher Gray Water Recycler Field Testing

Definition of Emerging Technologies

- » Commercialized products or equipment
- » Innovative products or efficiency measures
- » Products in early adaptation stage; under utilized
- » New applications
- » New system and holistic approach

ETP 2015 Program Funding Cycle (\$million)

Utility	2013-2014 Program Cycle	2015 Bridge Funding (PD) Proposal	% of Total ETP 2015 Budget	Total EE Budget	% of IOU's EE Budget
SCE	\$21.2	\$6.0	31.1%	\$344.5	1.7%
PG&E	\$11.9	\$10.8	56.0%	\$412.9	2.6%
SDG&E	\$4.2	\$1.3	6.7%	\$120.9	1.1%
SoCalGas	\$2.5	\$1.2	6.2%	\$79.4	1.5%
Total	\$39.8	\$19.3	100.0%	\$957.7	2.0%

- SoCalGas is the only dedicated natural gas utility in CA and, thus, in the best position to provide strong leadership with natural gas emerging technologies.
- SoCalGas ETP funding should at least match average state funding levels (2.0% of total EE expenditures), which would add about \$330,000 per year.

SoCalGas® Challenges

- » SoCalGas is the only gas-only CA IOU
- » Largest gas savings target, but smallest ET budget

	PG&E	SCG
2013 Gas target (MMTherms/yr)	21.0	24.1
2013-2014 Total ET budget (\$MM)	11.9	2.5

- » Vintage gas infrastructure
- » Forecasted lower gas prices mean longer payback times for measures
- » Limited number of end-uses in core markets

Sample EE Measures Delivered by the ET Program

1 of 2

Year of Delivery	Technology	Market Segment	End Use	Annual Savings Th/yr/Unit	Annual Savings kWh/yr/Unit	Estimated Number of Customers	Gas Savings Potential MTh/yr	Elec Savings Potential GWh/yr
2013	i-O-Stat, thermostat retrofit to extend fan run time	Single Family residential	Space Heating & Cooling	12	336	1,802,469	22,260	606
2013	Energyx VFD for water heating pump single service loop	Multifamily residential	Central Water Heating	1,303	261	20,000	26,060	5
2013	Hybrid Condensing Tankless Water Heater	Single Family residential	Water Heating	44	0	720,988	31,572	
2014	Low Oil Energy Star Fryer	Commercial Kitchens	Cooking	645	0	23,100	14,893	
2014	ShowerMinder shower head control	Health Clubs	Water Heating	193	0	500	1,933	
2014	AQ3 Dishwasher Drain Hot Water Recovery	Commercial Kitchens	Dishwashing; Water Heating	723	-408	9,900	7,155	(4)

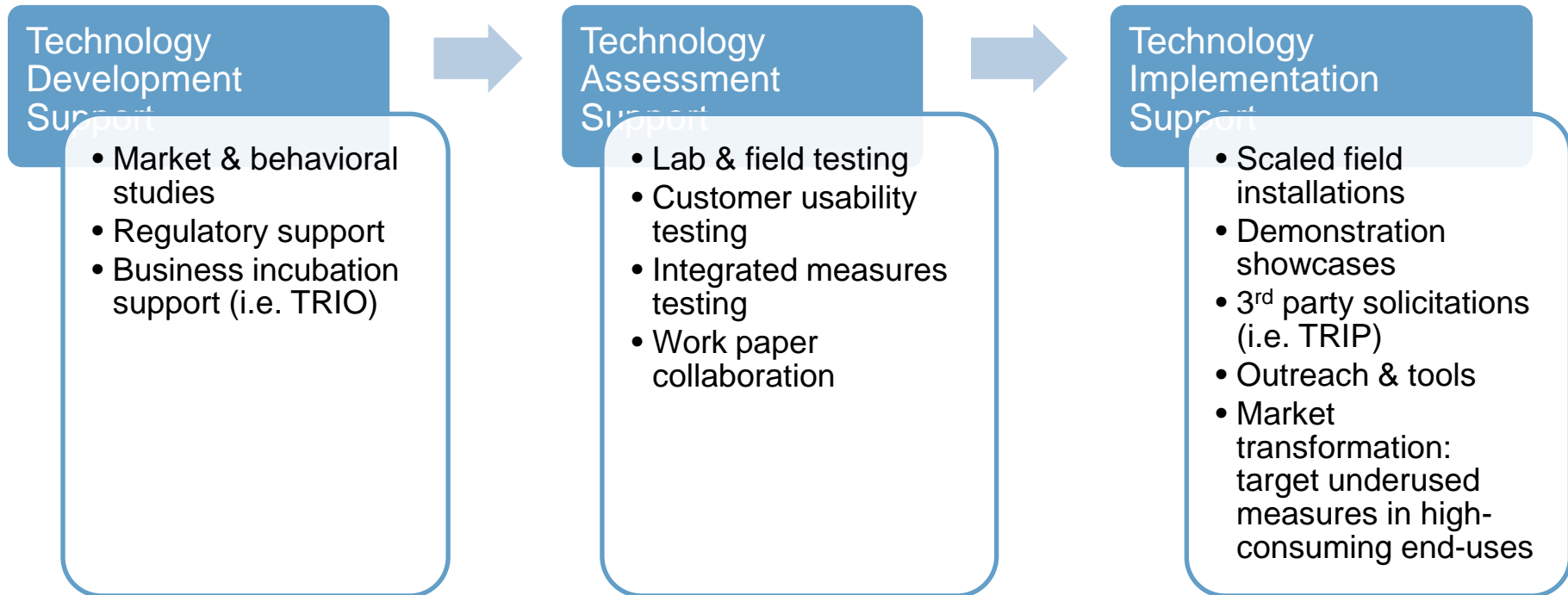
Sample EE Measures Delivered by Emerging Tech Program

2 of 2

Year of Delivery	Technology	Market Segment	End Use	Annual Savings Th/yr/Unit	Annual Savings kWh/yr/Unit	Estimated Number of Customers	Gas Savings Potential MTh/yr	Elec Savings Potential GWh/yr
2015	M2G Space Heating Boiler Controller	Commercial Buildings	Space Heating	159	0	6,179	984	
2015	H2AC Air Conditioner Heat Recovery	Commercial Kitchens	Water Heating & Space Cooling	323	5,371	8,250	2,666	44
2015	Combo System with hydronic space heating by tankless water heater	Single Family residential - New Construction	Space & Water Heating	60	0	3,750	224	
2015	Combo System with hydronic space heating by tankless water heater	Single Family residential - Retrofit	Space & Water Heating	80	0	720,988	57,391	
Total							107,748	652

How Do We Work

ET is working on ~ 40 current/planned projects:



- » Shifting from single widget-based focus to holistic approach
 - Integrated technology testing and demonstration showcasing

Integrated Technology Testing/Showcasing: Example Near-Zero Net Energy (ZNE) Projects

1

LINC Village at Beechwood: Deep retrofit, coordination w/CEC PIER, EPRI, LINC, SCE, & **City of Lancaster**

2

HOA Community Center, the “Resort,” Playa Vista
Micro-CHP, solar PV, high-E pool water heaters, liquid pool cover, green roof, passive ventilation, etc.; master



Integrated Technology Testing/Showcasing: Example Near-Zero Net Energy (ZNE) Projects

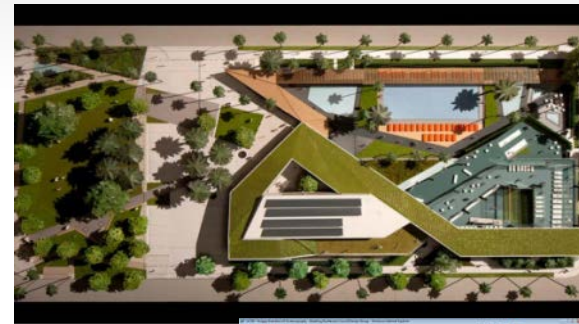
3

Working with A Builder KB Home - Dawn Creek, Lancaster
Integrated tankless water heater, hydronic space heating, drain heat recovery, and natural gas vehicle refill pump, etc.

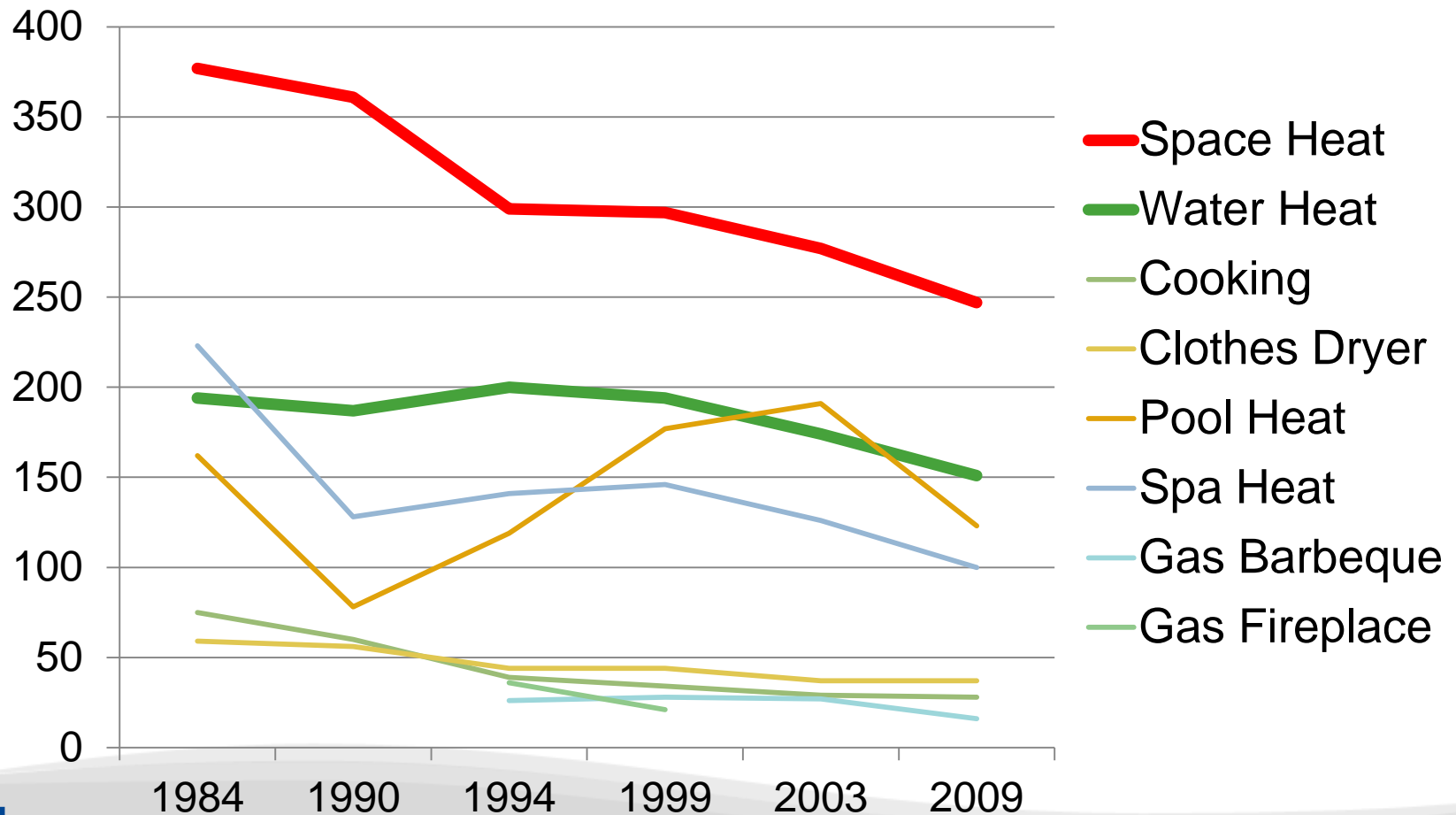


Other SoCalGas ET Partnerships

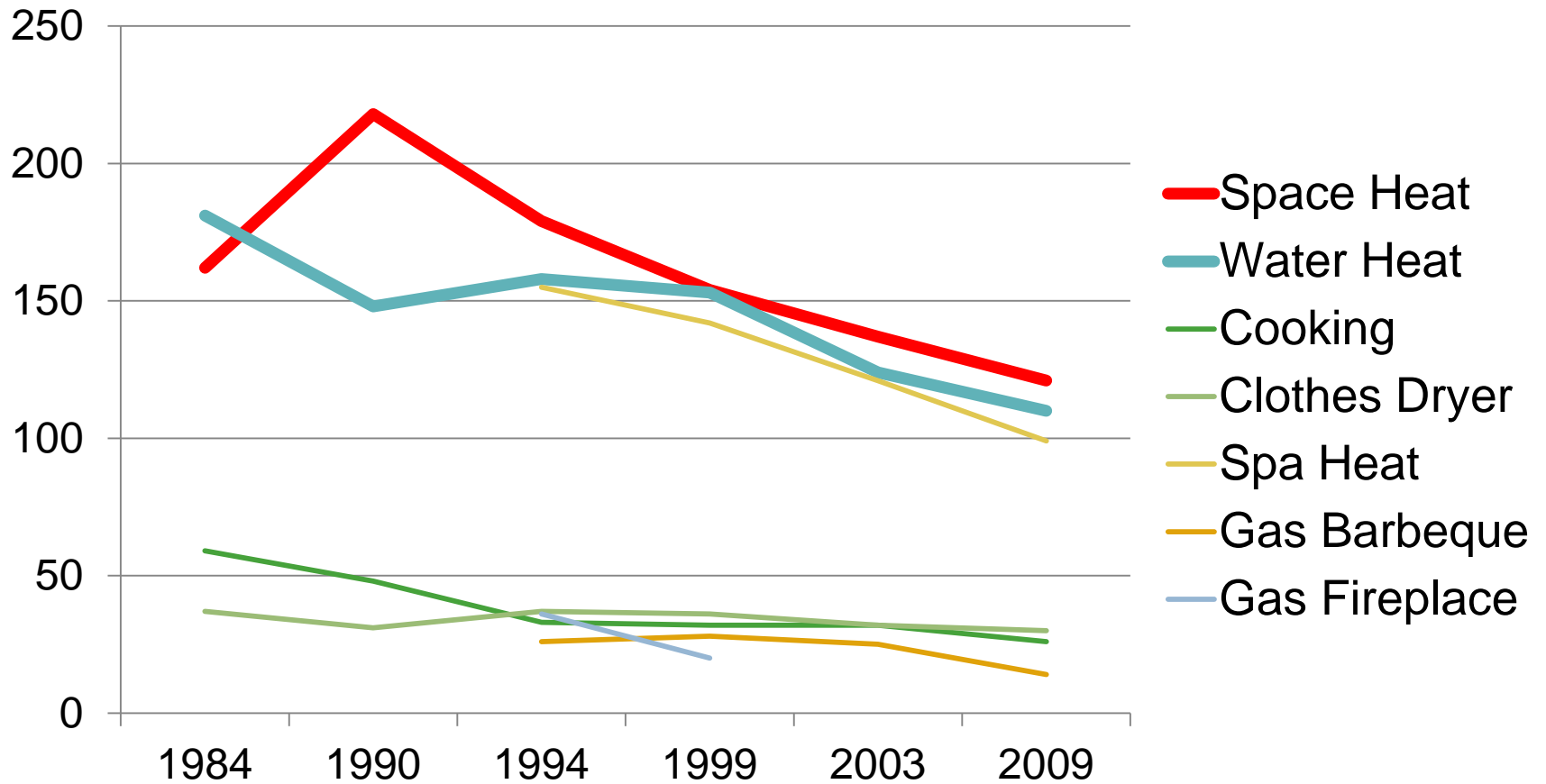
- » LADWP Emerging Technologies Program
 - A \$800,000 charter, reimbursable
 - Joint project development
 - Playa Vista Community Center 2 Energy Use Dashboard
 - Potential – NEST thermostat home tests
- » (Hot) Water & Gas Messaging Study
 - Potential Partner – Glendale W&P
 - Using IT-based analytics & advanced meters' billing data to induce hot water behavioral savings via messaging
- » Smart Gas Home Showcase
 - Found test homes with City of Downey



SoCalGas SFR Gas End Use (Therms/Yr)



SoCalGas MFR Gas End Use (Therms/Yr)



8 Measures to be Delivered in 2013-2014 Cycle (PIP Goal: 2/year)

- ▶ **Energx VFD Controls for MF DHW Systems**

(Savings ~ 17 therms/year/MFR dwelling unit, typically 40 units/controller)



- ▶ **Residential HW Re-circulators**

(Savings ~5-10 therms/year/SFR Home)



- ▶ **i-O-Stat, A HVAC Fan Stop Delay**

(Savings ~0-15 therms/year/SFR Home)



- ▶ **Combo-system, SFR w/GTI, Retrofit or New Construction**

(Savings ~40-100 therms/year/SFR Home)



8 Measures to be Delivered in 2013-2014 Cycle (PIP Goal: 2/year)

- ▶ **M2G, Commercial Space Heating Boiler Reset Controller**
(Savings 0-15%)



Boiler Reset Controller

- ▶ **Hybrid Tankless Water Heater**
(Savings ~ 23 therms/year/SFR Home)



Hybrid Tankless WH

- ▶ **Boiler Reset Controls, Single Loop**
(Savings up to 70 therms/year/MFR dwelling unit, typically)



Boiler Reset Controller

- ▶ **Power-Pipe Shower Drain Heat Recovery**
(Savings estimated to be 30 therms/year/SFR)



Shower Heat Recovery

Market Transformation Projects Requested by EE Program Staff in 2013-2014 Cycle

- ▶ **Lang Stovetop: Demand Control for Restaurants**
(Product Development & Potential Measure; savings ~15% or 30-200 therms/year/unit)
- ▶ **EnergyStar Fryers: Market Transformation Assistance**
(savings ~2,000 therms/year/unit, valued at \$6,000 including oil savings)
- ▶ **Pre-Rinse Spray Valves**
(Validate Savings & Market Constraints; savings ~6 therms & 166 Gallons per valve)
- ▶ **ShowerStart**
(Market Transformation Assistance; estimated savings ~2 therms/year)
- ▶ **High-E Wall Furnaces**
(Validate Savings; estimated savings ~20 therms/year/unit)

Lang Stovetop



EnergyStar fryers



Pre-rinse spray valves

Hi-E Wall furnaces



ShowerStart



Current Residential Projects

- R1 - Smart Gas Home Showcase
- R2 - Energx Fractional HP Recirculation Pump VSD
- R3 - Combination Boiler Reset Controller Performance Test
- R4 - Miniature Gas Meter Evaluation and Appliance HAN Integration
- R5 - Residential Hot Water Circulation and Controls
- R6 - i-O-Stat Efficient Furnace Fan Controller Lab Testing
- R7 - Submetering for MFR Buildings
- R8 - Nest Thermostat Scaled Field Placement
- R9 - Advanced Thermostat Scaled Field Testing with EPRI
- R10 - Testing Compact Furnaces for ZNE Homes
- R11 - Combo System Using Tankless Water Heaters & Hydronic Coils
- R12 - Enovative Hot Water Solutions for Crossflow & Loop Balancing
- R13 - Water-Energy Nexus: Hot Water Analytics
- R14 - LINC Beechwood PIER NZE Demo
- R15 – PowerPipe lab & home testing

Current C&I Projects

- C&I1 - Cypress Wireless Steam Trap Monitoring
- C&I2 - Rheem H₂AC Heat Recovery
- C&I3 - PRSV (Pre-Rinse Spray Valves) Field Test
- C&I4 - Playa Vista Commercial Near-ZNE Showcase
- C&I5 - ENERGY STAR Fryers Scaled Field Placement
- C&I6 - Lang On-demand Stove-top Field Testing
- C&I7 - M2G Scaled Field Placement
- C&I8 - UC Davis WCEC Research of Gas Technologies: Condensing Furnaces in RTU
- C&I9 - UC Davis WCEC Research of Gas Technologies: Gas Engine Driven Heat Pump (GDHP)
- C&I10 - UC Davis WCEC Research of Gas Technologies: Polymer Bead Laundry
- C&I11 - Laundromat of the Future
- C&I12 - AMI-HAN Applications in Light Commercial Segment
- C&I13 – Wahoo AQ3 Water Recycling

Q & A

QUESTIONS?

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