



Commercial Water Heater Workshop

Joanne O'Donnell
Senior Program Associate
January 12, 2010



Objectives for the Afternoon

▶ Water Heater Test Center Tour

▶ Break

▶ Water Heater Workshop

- FSTC Perspective
- Update from Jim Lutz, Berkeley Lab, on FEMP procurement specification
- CEE Specification Discussion

Water Heater Test Center Tour

◀ Tour from 1pm–2pm

Water Heater Specification Development

Building an initiative for commercial storage
and tankless gas water heaters

How We Got Here

- ▶ Have held several calls to discuss the market and member programs
- ▶ Not much feedback on system design work or applications after initial proposal
- ▶ Beginning with a specification will help to put a stake in the ground

Committee Feedback to Date

- ▶ Agreed that setting two tiers for storage water heaters with the first at condensing is a good approach.
- ▶ More data on incremental cost by firing rate is needed.
- ▶ Initiative should provide guidance on how to include residential tankless water heaters in programs.
- ▶ Inclusion of commercial tankless still needs to be discussed.

Initiative Objectives

- ▶ Increase the number of high efficiency models available
- ▶ Increase the percentage of sales of high efficiency equipment
- ▶ Build a market of sufficient size to help achieve the scale of production that will allow manufacturers to offer high efficiency equipment at an attractive price to consumers and
- ▶ Increase the number of installers, builders, retailers, distributors and wholesalers who promote high efficiency equipment

Initiative Goals

- ▶ High efficiency equipment is included in new construction building design plans by builders and developers
- ▶ High efficiency equipment is requested by building owners
- ▶ High efficiency equipment is promoted and sold to building owners by installers and builders, and
- ▶ High efficiency equipment is available from manufacturers, wholesalers and distributors

Working Towards an Initiative

Key areas of consideration include:

- ▶ Availability
- ▶ Cost Effectiveness
- ▶ Burner size
- ▶ Condensing tankless
- ▶ Volume (tank size)

Number of Models Available by Efficiency

Thermal Efficiency	Number of Storage Models
78	1
80	385
81	1
82	10
83	2
84	10
90	5
91	4
92	4
93	1
94	7
95	31
96	34
97	4
98	4
99	5

- ▶ Of those models registered in the AHRI directory as of October 2009, the majority of product available is 80% TE
- ▶ Higher efficiency models purportedly make up a small fraction of sales

Availability by TE and Btu Input

Thermal Efficiency	Btu Range		
	<i>75,000 - 199,999</i>	<i>200,000- 500,000</i>	<i>500,000+</i>
78 - 85	207	174	21
86 -89	0	0	0
90 -94	16	4	0
95	20	6	0
96	26	6	1
97	0	4	0
98	4	0	0
99	2	0	0

2008 CEE Member Incentives

Efficiency Rating	<i>Commercial Storage</i>	<i>Commercial Tankless</i>
0.61 EF	1	n/a
0.62 EF	11	n/a
0.63 EF	n/a	1
0.708 EF?	n/a	3
0.738 EF?	n/a	3
0.80 EF	n/a	4
0.82 EF	n/a	9
82% TE	4	1
84% TE	1	n/a
85% TE	1	n/a
88% TE	3	n/a
91% TE	4	n/a
92% TE	1	n/a
94% TE	2	n/a
Total	28	21

Incremental Cost - Member Data

Thermal Efficiency	Average Incremental Cost
92	\$1,644
94	\$7,554
95	\$1,249
96	\$4,340
98	\$2,250
“Condensing”	\$2,631

Incremental Cost and Burner Size - Manufacturer Data

<u>Btu input</u>	<u>Cost premium of high efficiency</u>
75,000	30%
100,000	30%
120,000	40%
150,000	40%
199,000	50%
250,000	60%
300,000	90%
400,000	90%
500,000	90%

**How does this information effect where a
program's specification is set?**

Condensing Tankless

- ▶ Should the rebate(s) for tankless commercial be condensing?
 - Is enough information known about tankless condensing to include in a CEE initiative?
 - Do members currently provide rebates for condensing tankless technologies specifically?
- ▶ How should we provide guidance on residential tankless units used in commercial applications?

Volume (Tank Size)

- ▶ Is it important to take tank size into account?
- ▶ Could this be better addressed as part of an applications based approach?
- ▶ Should we consider having different specifications for different tank sizes (such as small, medium and large)?

Where is an appropriate place to set a Tier or Tiers?

**Commercial Gas Storage
≥75,000 Btu/h**

Condensing

≥90 TE

Concentration of Models

95-96% TE

What further information do we need to set a specification?

System Design and Applications

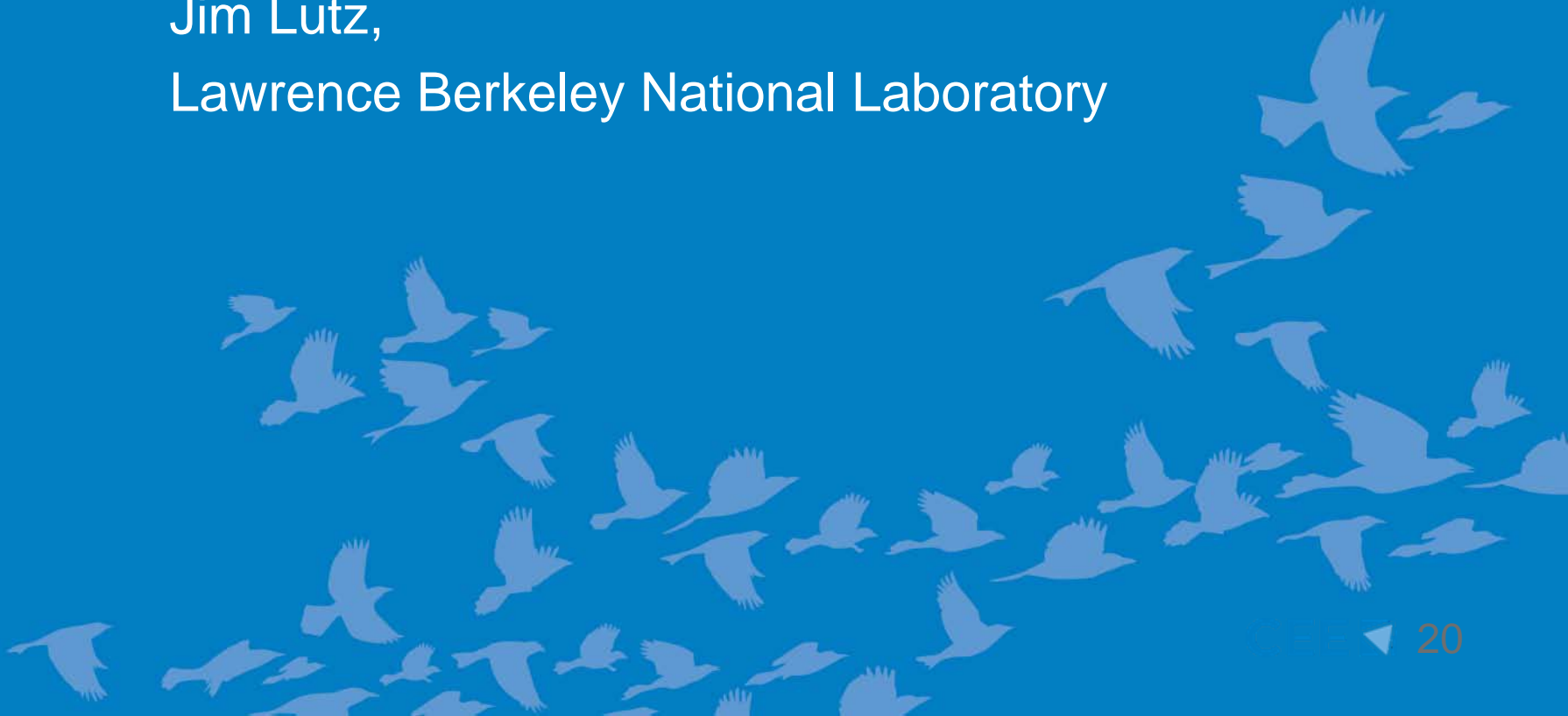
- ▶ Focusing more on these areas once a general specification is set
- ▶ How many members offer rebates by application, such as kitchens, or laundry?
- ▶ What information are you interested in knowing regarding system design energy savings? What work have you done in this area to date?

Next Steps for Initiative Development

1. Incorporate feedback into the initiative description
2. Members will be encouraged to provide feedback on the draft initiative as soon as it is available
3. Committee call in 2d quarter to discuss the draft initiative for commercial water heating
4. Hoping to have a specification to put before the CEE Board by the June CEE Meeting

FEMP Procurement Process for Commercial Water Heating

Jim Lutz,
Lawrence Berkeley National Laboratory



Contact

Joanne O'Donnell

Senior Program Associate

617-337-9271

jodonnell@cee1.org

Extra Slides

Major Applications

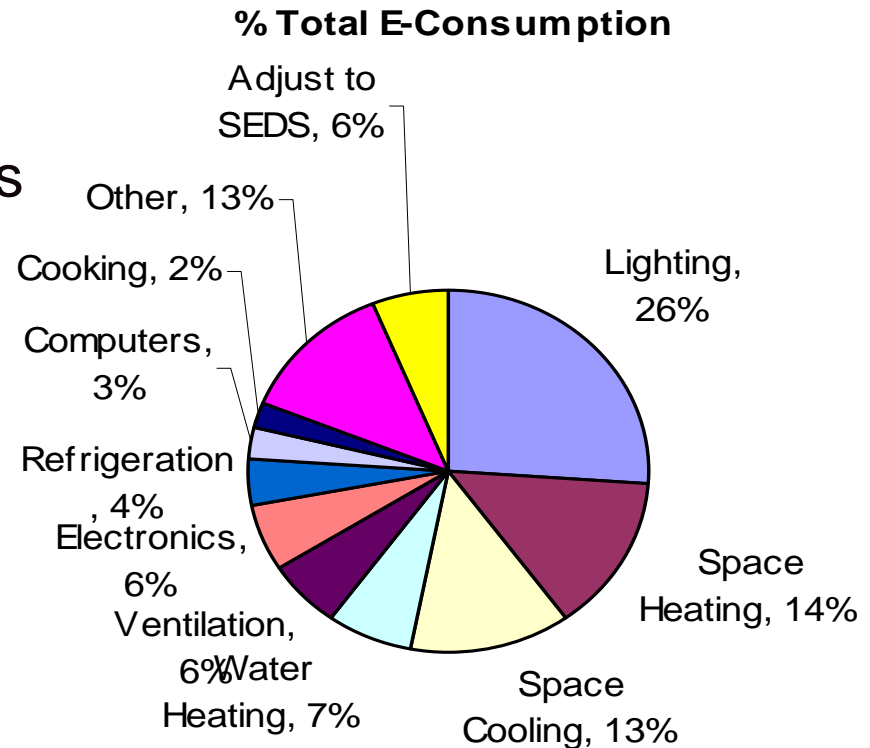
- ▶ CBECs recently published updated data on residential and commercial energy usage by water heater fuel type and application
- ▶ Based on this data, there are four main areas of savings opportunities:
 - Lodging (124 trillion Btu/y)
 - Health care (74 trillion Btu/y)
 - Food service (56 trillion Btu/y)
 - Education (37 trillion Btu/y)

Energy Savings Potential

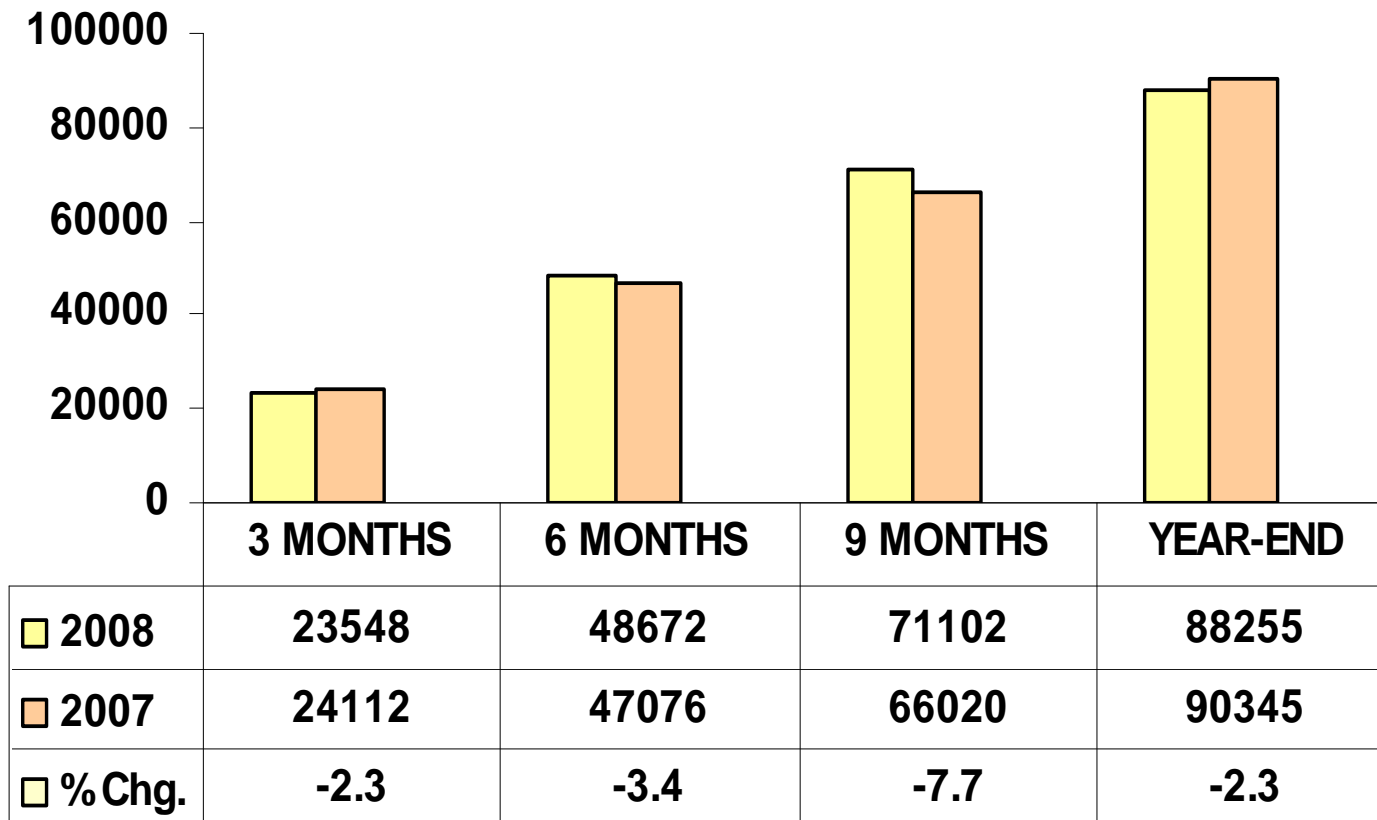
- ▶ In 2008, commercial gas water heater shipments totaled 88,255 units.
- ▶ If 5 percent of shipments were converted to 92 percent TE units, 847,248 therms per year would be saved
- ▶ If 50 percent were converted to 92 percent TE units, 8,472,480 therms per year would be saved

Commercial Energy Use

- ▶ 1.2 Quads or 7% of commercial energy use
- ▶ Natural gas water heating is ~ 3.2% of commercial energy use
- ▶ 8.2 million metric tons of carbon equivalent, which could be equated to the annual carbon dioxide emissions from 1.5 million passenger cars



2008 Gas Water Heater Shipments



2005 Shipments & Estimated Market Share

2005 Total Shipments	82,521
A.O. Smith & State Industries	48 percent
Rheem	23 percent
Bradford White	17 percent
American Water Heater Co.	6 percent
American Standard	2 percent
Others	4 percent

Market Barriers

- ▶ Installation Challenges
- ▶ High First Cost
- ▶ Facility owners unaware of their building's daily hot water demand
- ▶ Facility owner or manager unaware of the benefits of high efficiency
- ▶ Supply chain unaware of the benefits of offering high efficiency