The Consortium for Energy Efficiency

The Impact of Furnace Efficiency Standard Increases on Efficiency Programs

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Agenda

- Who is CEE?
- What is going on with furnace standards and specifications?
- Bruce Grossman, South Jersey Gas
- Adam Bartini, Energy Trust
- Discussion

Session Guidelines

- Speakers will present for ~20 minutes
- Feel free to interrupt with *clarifying* questions
- Please hold discussion questions for after both speakers complete their prepared comments

We aim to have a rich discussion. As such, all questions are considered valid.

Who is CEE?

A Consortium of Program Administrators

- > 130 members serve all or part of 45 states and 8 provinces
- 86% of the $9.1B* total efficiency budget is managed by members
- 2009 EPA Climate Protection Award recognized CEE member approach

- CEE is a member-driven nonprofit, governed by a Board of Directors from member organizations

* Source: CEE State of the Efficiency Program Industry 2011

By working together binationally, CEE members capture greater savings locally

- Develop approaches to overcome market barriers and reduce the cost of capturing greater energy efficiency savings

- Achieve greater consistency on program offerings
  - Share best practices
  - Seek consensus on high efficiency specifications for program eligibility
  - Partner with industries and trade associations
  - Ensure that ENERGY STAR® serves the collective needs of programs

- Create consistent binational programs required to move markets, members
  - Adopt, voluntarily, approaches into programs
  - Work with industry and other partners on efficiency
  - Increase the availability of high efficiency products

CEE members work together and with stakeholders to achieve higher savings

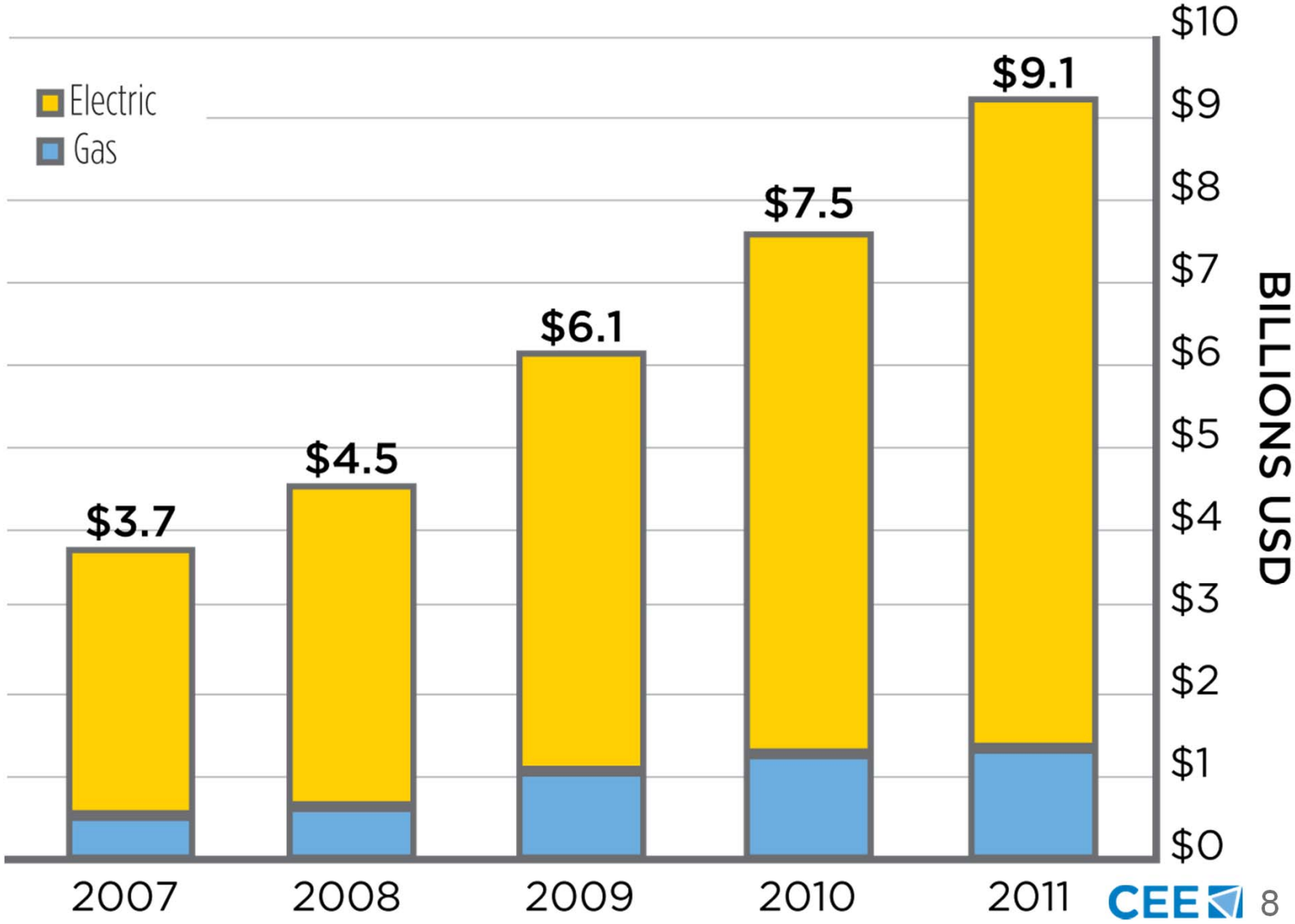
Members

- Efficiency Program Administrators —135 utilities and nonutilities with ratepayer funded programs
- National Program Sponsors —
  - DOE national labs
  - Government energy research agencies
  - National efficiency organizations
  - State and provincial energy offices

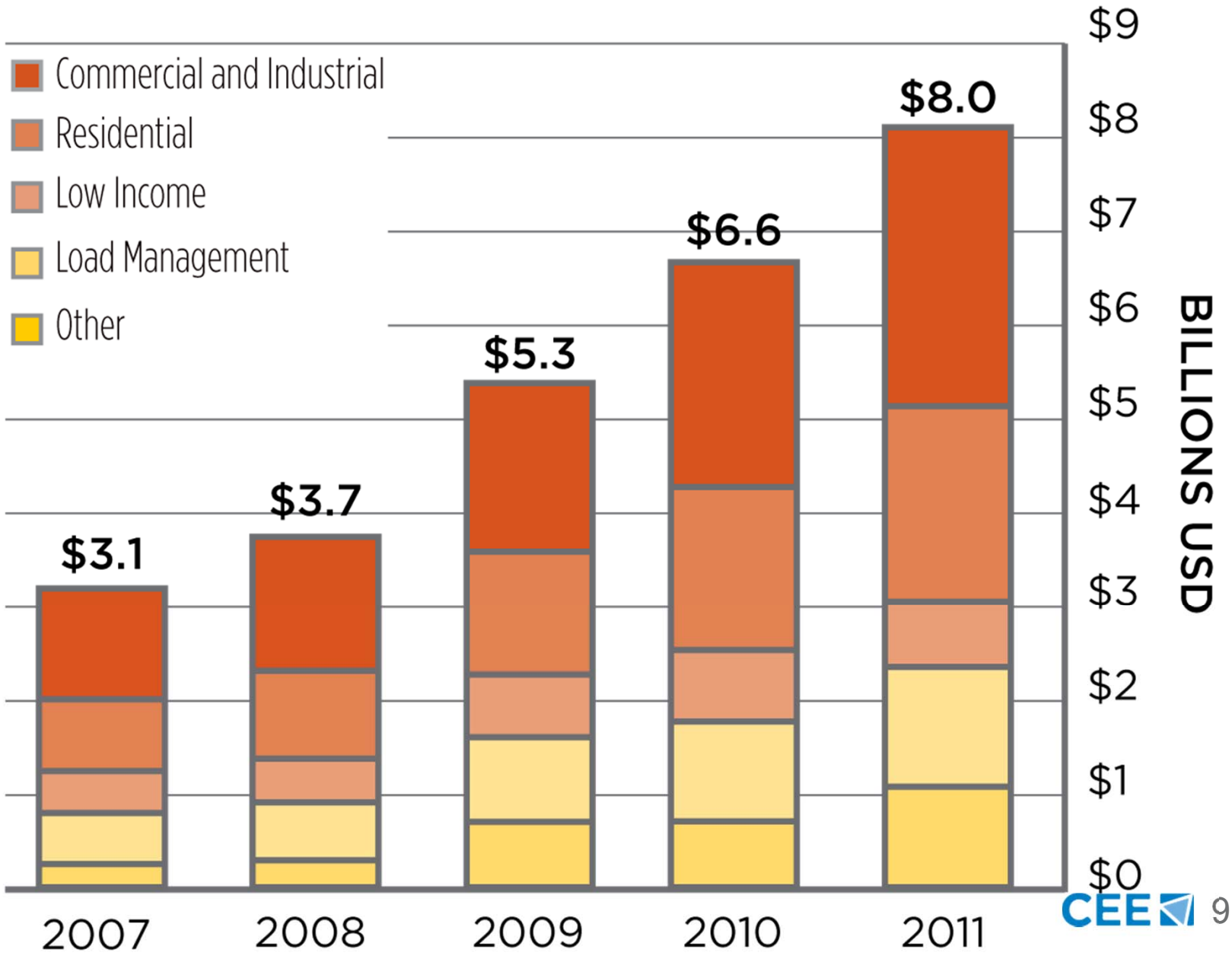
Nonmembers

- Partners
  - DOE, EPA, EPRI, GTI, AGA, IEE
  - Trade associations like AHRI, HARDI, ACCA
- Manufacturers and others are consulted about aspects for programs

US and Canadian Efficiency Program Budgets 2007–2011



US Combined Electric and Gas Program Budgets 2007–2011



What is going on with furnace standards and specifications?

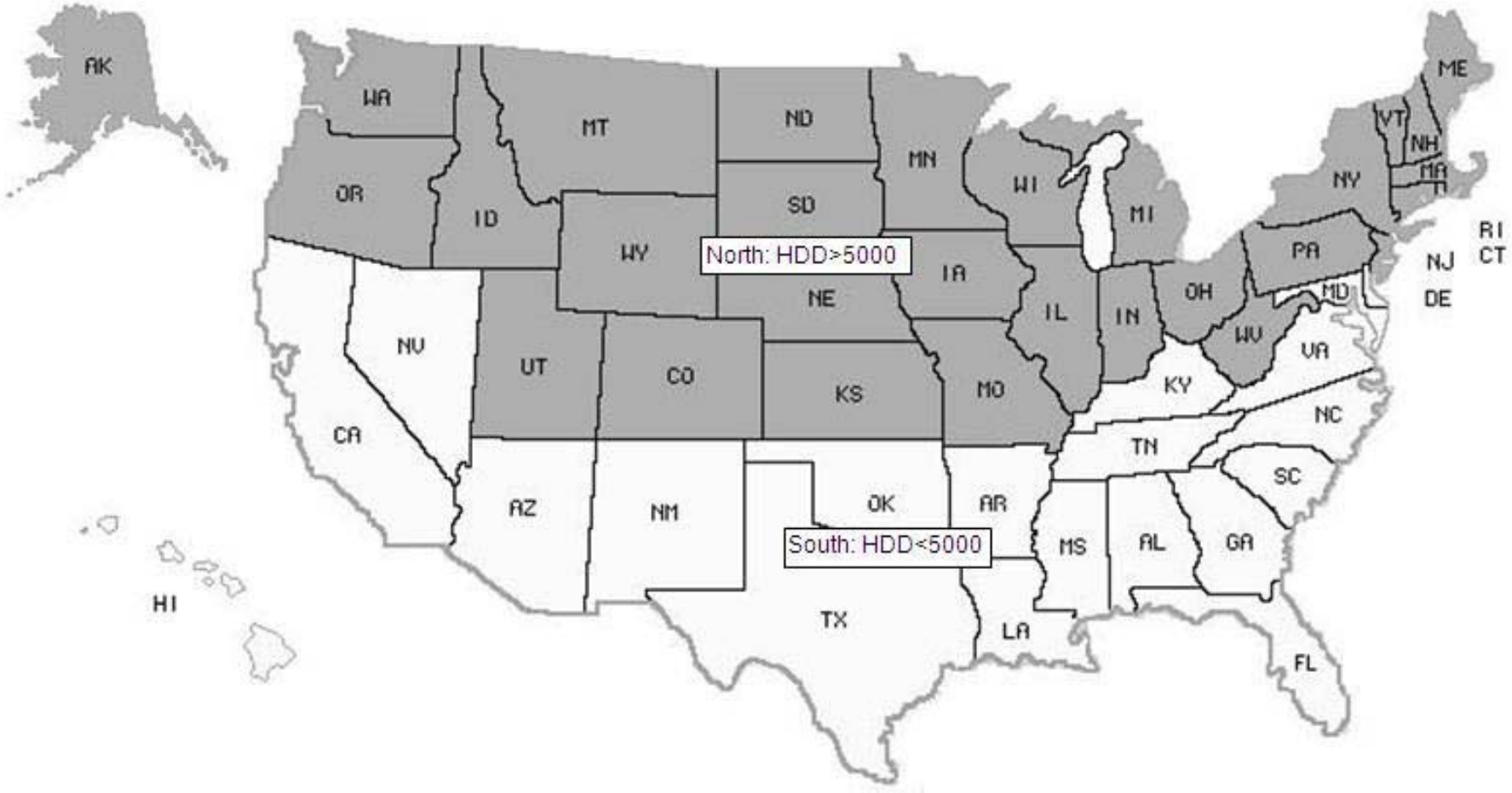
New DOE minimum AFUE standards for gas furnaces, by region

U.S. AND CANADIAN MINIMUM STANDARDS (U.S. Effective Date May 1, 2013)	
Region	**New Regulation**
Non-Weatherized Gas Furnaces (NWGF*)	
US South	≥ 80%
US North	≥ 90%
Canada††	≥ 90%
Weatherized Gas Furnaces	
US (All Regions)	81%

* Non-Weatherized Gas Furnaces (NWGF) is how these regulations refer to **the majority of standard indoor residential gas furnaces**. Outdoor (weatherized) and space-constrained (mobile home) furnaces are subject to different AFUE standards and compliance on Jan. 1, 2015

†† These Canadian standards are *already in effect* as of as of Jan. 1 2010. No new furnaces in Canada will be labeled ENERGY STAR until the new standards take effect in 2015

For the first time, the new DOE standards and ENERGY STAR specs for furnaces are *regional*



Discussion

Questions

- What are some steps that your programs are undertaking to address these changes in the near and longer term? Specifically, what approaches will enable programs to pass cost-effectiveness tests and meet increasing savings targets?
- What are the potential longer term scenarios for efficiency programs?
- What alternatives do programs have when flagship measures (e.g. furnaces in residential gas programs) are no longer cost-effective?
- How are programs addressing their regulators on these challenges? Other than those discussed, what other opportunities are programs pursuing to claim credit for codes and standards?
- Are programs considering multiple appliance measures (e.g. incentivizing simultaneous furnace and water heater replacement) or whole homes approaches? If so, what are the major considerations?

Contact

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Backup

ENERGY STAR "Most Efficient" Pilot

- New program to identify & advance highly efficient products in the marketplace
  - Identifies the most efficient products among those that qualify for the ENERGY STAR in particular product categories
  - Product categories selected (and recognition criteria established) to ensure that products demonstrate efficiency performance that is truly **exceptional, inspirational, or leading edge** — consistent with the interests of **environmentally-motivated consumers** and **early adopters**
  - Currently includes **Furnaces** and **Boilers,** Clothes Washers, Refrigerators-Freezers, Central Air Conditioners and Heat Pumps, and Televisions
- Website for Most Efficient Criteria
- **2012 Most Efficient furnace specification: 97% AFUE**

Background on Furnace Standards

- **May 2013** DOE new minimum standards for non-weatherized (indoor) furnaces takes effect
- **Feb 2012*:*** ENERGY STAR moved to 95% AFUE for Northern US and remains at 90% AFUE for Southern US
- **Feb 2013:** ENERGY STAR adds furnace cabinet tightness (leakage) to specifications
- **Jan 2015** additional minimum standards take effect:
  - Weatherized (Outdoor) Furnaces
  - Space Constrained (Mobile Home) Furnaces
  - Air Conditioners
  - Heat Pumps

CEE 66

ENERGY STAR for Furnaces Version 3.0 & 4.0; "Most Efficient"

- Version 3.0: new **regional** standards; **effective Feb. 1, 2012**

Region	AFUE		Furnace Fan Efficiency (e)
	Current	Final	
U.S. South	≥ 90%	≥ 90%	≤ 2.0%
U.S. North		≥ 95%	
Canada††	None	≥ 95%	

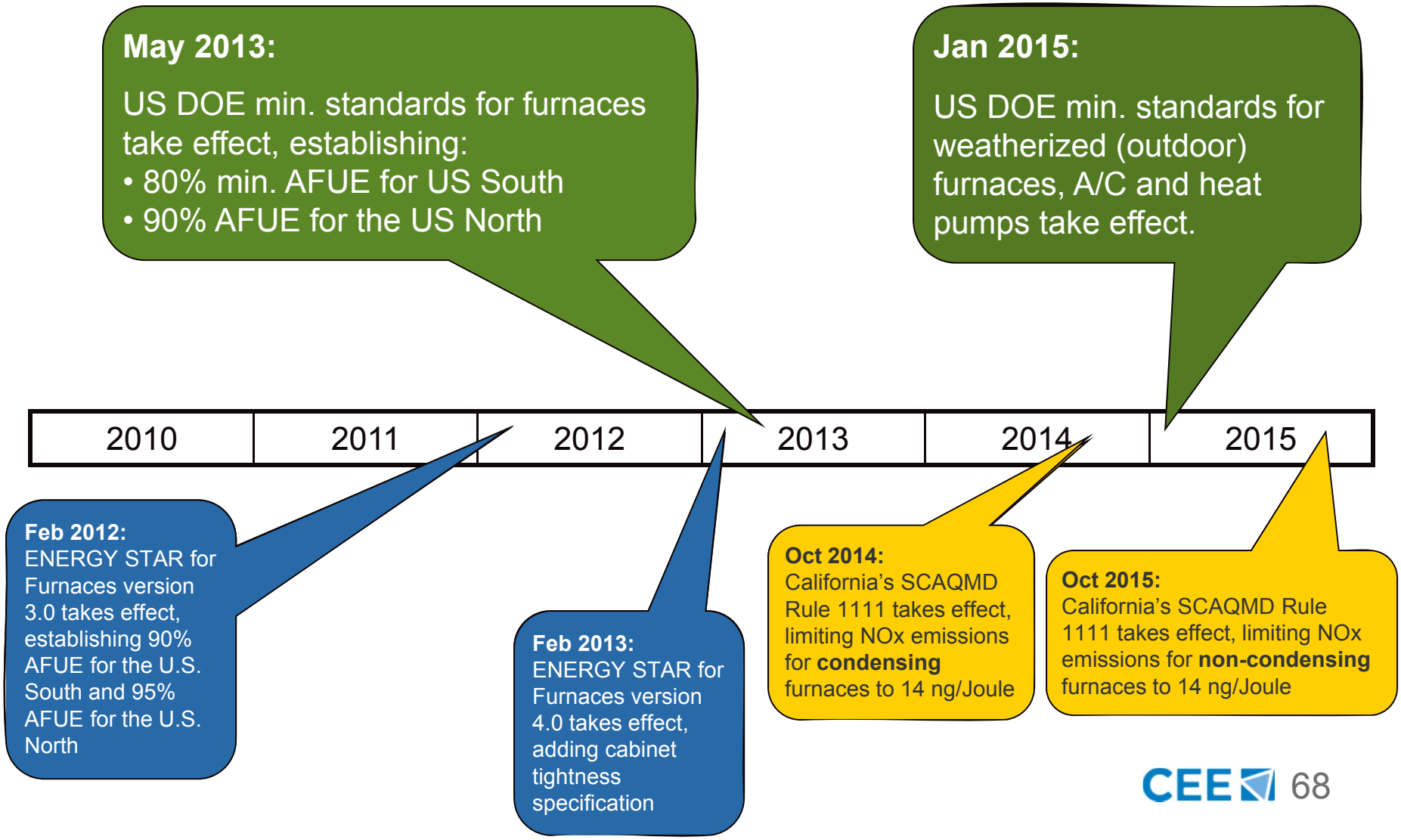
- New regional label for U.S. South:

- Version 4.0: adds new cabinet-leakage specification; **effective Feb. 1, 2013**

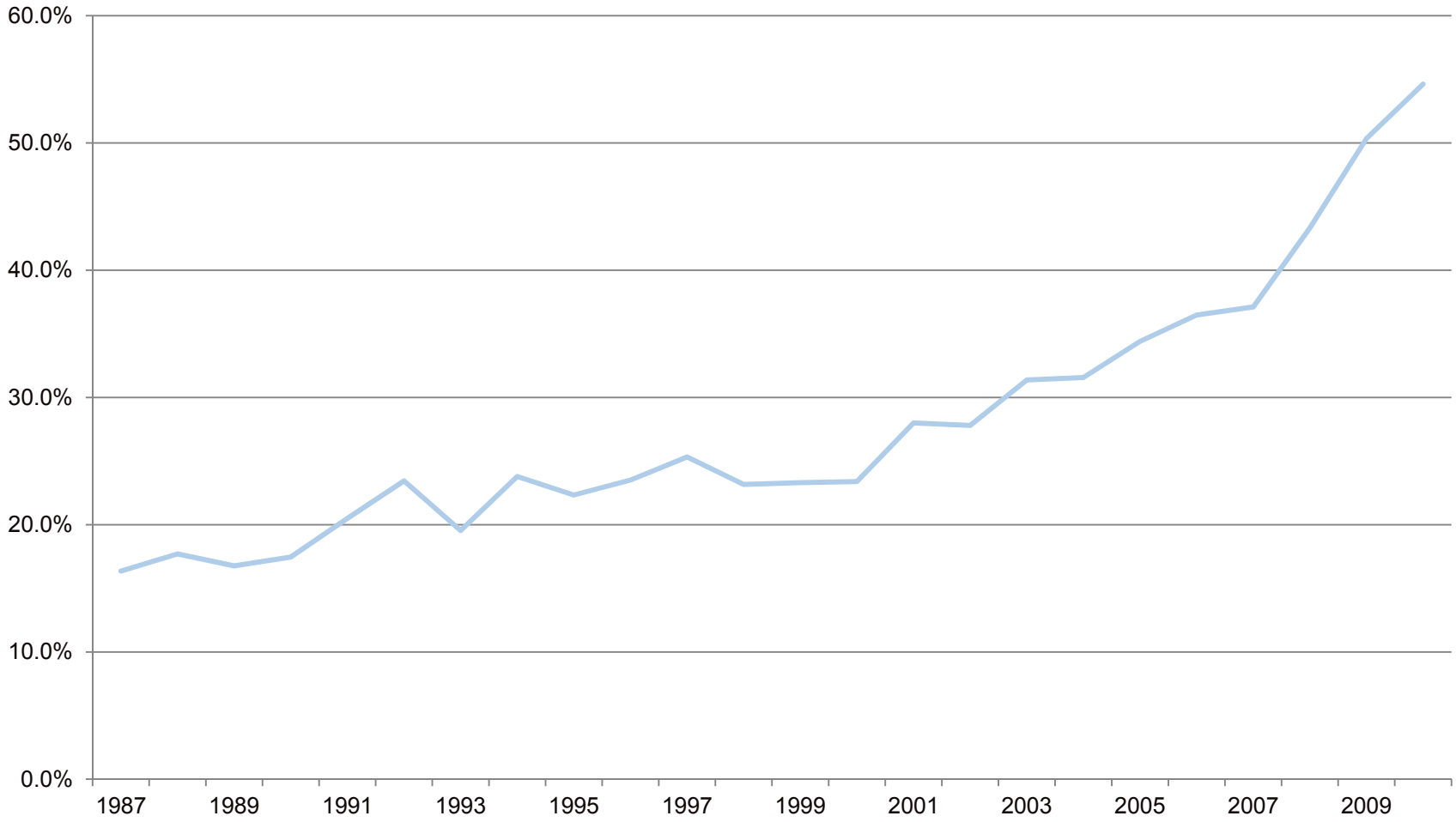
Version 4.0 Additional Specification:	
Air Leakage	Qleak ≤ 2.0%

* ENERGY STAR is a voluntary EPA labeling program that establishes specifications for energy-efficient products, and grants qualified higher-efficiency products an "ENERGY STAR" label

Timeline for Residential Furnace Efficiency Specifications



Tremendous Growth in Shipments of 90%+ AFUE Furnaces in the US



Source: AHRI

Residential Furnace Detail

Product class	National Standards	Northern Region Standards
Non-weatherized gas	AFUE = 80%	AFUE = 90%
Mobile home gas	AFUE = 80%	AFUE = 90%
Non-weatherized oil-fired	AFUE = 83%	AFUE = 83%
Weatherized gas	AFUE = 81%	AFUE = 81%
Mobile home oil-fired	AFUE = 75%	AFUE = 75%
Weatherized oil-fired	AFUE = 78%	AFUE = 78%
Electric	AFUE = 78%	AFUE = 78%

Incremental cost data from Technical Support Documents (1)

Simulation Results NATIONAL - 10000 samples									AEO 2010 - Reference Case	
		Average LCC Results							Payback Results	
Level	Description	Installed Price	Lifetime Oper. Cost*	LCC	LCC Savings	Net Cost	No Impact	Net Benefit	Median	Average
NWGF										
0	80% AFUE - Increased HX Area	$1,786	$9,551	$11,337						
1	90% AFUE - Condensing Design	$2,357	$8,621	$10,978	$87	25%	52%	22%	15.8	33.6
2	92% AFUE - Increased HX Area	$2,419	$8,456	$10,875	$136	26%	42%	32%	11.9	28.2
3	95% AFUE - Increased HX Area	$2,564	$8,220	$10,785	$205	36%	17%	47%	11.7	24.2
4	98% AFUE - Max Tech	$2,830	$8,114	$10,944	$46	64%	0%	35%	20.1	44.2
MHGF										
0	80% AFUE - Increased HX Area	$1,432	$11,749	$13,181						
1	90% AFUE - Condensing Design	$2,040	$10,712	$12,753	$388	44%	10%	47%	10.5	17.9
2	92% AFUE - Increased HX Area	$2,248	$10,503	$12,751	$389	47%	8%	46%	11.6	19.2
3	96% AFUE - Max Tech	$2,540	$10,110	$12,650	$486	50%	4%	47%	11.9	19.2
OF										
0	82% AFUE - Increased HX Area	$3,008	$30,287	$33,295						
1	83% AFUE - Increased HX Area	$3,157	$29,946	$33,103	$15	10%	58%	32%	1.0	23.9
2	84% AFUE - Increased HX Area	$3,394	$29,613	$33,007	-$13	24%	39%	37%	1.9	33.8
3	85% AFUE - Increased HX Area	$3,622	$29,287	$32,909	-$18	35%	33%	32%	19.8	33.5
4	97% AFUE - Max Tech	$4,810	$27,809	$32,619	$272	51%	1%	48%	18.2	48.2

Incremental cost data from Technical Support Documents (2)

Simulation Results NATIONAL - Replacements										AEO 2010 - Reference Case
		Average LCC Results							Payback Results	
Level	Description	Installed Price	Lifetime Oper. Cost*	LCC	LCC Savings	Net Cost	No Impact	Net Benefit	Median	Average
NWGF										
0	80% AFUE - Increased HX Area	$1,590	$9,441	$11,031						
1	90% AFUE - Condensing Design	$2,357	$8,522	$10,879	-$11	31%	52%	17%	21.1	41.6
2	92% AFUE - Increased HX Area	$2,417	$8,358	$10,774	$39	32%	42%	27%	15.3	34.3
3	95% AFUE - Increased HX Area	$2,556	$8,125	$10,681	$111	41%	17%	42%	13.0	27.5
4	98% AFUE - Max Tech	$2,802	$8,017	$10,819	-$26	67%	0%	32%	20.7	45.4
MHGF										
0	80% AFUE - Increased HX Area	$1,216	$11,552	$12,768						
1	90% AFUE - Condensing Design	$1,870	$10,516	$12,387	$258	46%	9%	37%	11.8	19.8
2	92% AFUE - Increased HX Area	$2,097	$10,309	$12,407	$224	50%	7%	36%	13.0	21.7
3	96% AFUE - Max Tech	$2,385	$9,920	$12,305	$294	52%	3%	37%	13.0	21.2
OF										
0	82% AFUE - Increased HX Area	$2,846	$30,279	$33,124						
1	83% AFUE - Increased HX Area	$2,986	$29,937	$32,924	$10	10%	58%	32%	0.9	24.6
2	84% AFUE - Increased HX Area	$3,253	$29,604	$32,858	-$48	27%	39%	35%	2.0	37.0
3	85% AFUE - Increased HX Area	$3,509	$29,279	$32,788	-$79	38%	33%	29%	22.5	37.0
4	97% AFUE - Max Tech	$4,828	$27,807	$32,635	$75	55%	1%	44%	20.0	52.7

Incremental cost data from Technical Support Documents 3

Simulation Results NATIONAL - New Construction										AEO 2010 - Reference Case
		Average LCC Results							Payback Results	
Level	Description	Installed Price	Lifetime Oper. Cost*	LCC	LCC Savings	Net Cost	No Impact	Net Benefit	Median	Average
NWGF										
0	80% AFUE - Increased HX Area	$2,374	$9,885	$12,259						
1	90% AFUE - Condensing Design	$2,355	$8,922	$11,277	$383	7%	53%	40%	0.0	9.0
2	92% AFUE - Increased HX Area	$2,425	$8,751	$11,176	$429	9%	42%	49%	3.7	9.5
3	95% AFUE - Increased HX Area	$2,589	$8,508	$11,097	$487	21%	17%	62%	8.4	14.3
4	98% AFUE - Max Tech	$2,913	$8,408	$11,320	$264	55%	1%	44%	18.2	40.4
MHGF										
0	80% AFUE - Increased HX Area	$2,727	$20,743	$23,470						
1	90% AFUE - Condensing Design	$3,621	$18,879	$22,500	$877	37%	10%	53%	9.3	15.9
2	92% AFUE - Increased HX Area	$3,928	$18,512	$22,439	$933	40%	8%	52%	10.1	16.7
3	96% AFUE - Max Tech	$4,424	$17,822	$22,247	$1,119	43%	4%	53%	10.9	17.2
OF										
0	82% AFUE - Increased HX Area	$4,471	$30,362	$34,832						
1	83% AFUE - Increased HX Area	$4,690	$30,021	$34,711	$60	12%	57%	31%	12.6	17.4
2	84% AFUE - Increased HX Area	$4,659	$29,689	$34,348	$297	3%	39%	58%	1.4	5.0
3	85% AFUE - Increased HX Area	$4,637	$29,364	$34,000	$540	1%	33%	66%	0.9	2.4
4	97% AFUE - Max Tech	$4,646	$27,829	$32,475	$2,041	12%	1%	87%	0.0	7.1

All dollar values are in 2009 $ * discounted and summed over lifetime of equipment