



ENERGY STAR[®]

Boilers

Draft 1 Version 3.0
Stakeholder Meeting
March 18, 2013

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Agenda



- Welcome and Introductions
- ENERGY STAR Program Overview
- Overview of Specification Revision Process
- Reasons Driving Boiler Specification Revision
- Draft 1 Document Discussion
 - Levels
 - Combination Appliances
 - DOE Alignment
- Timeline and Next Steps

What is ENERGY STAR

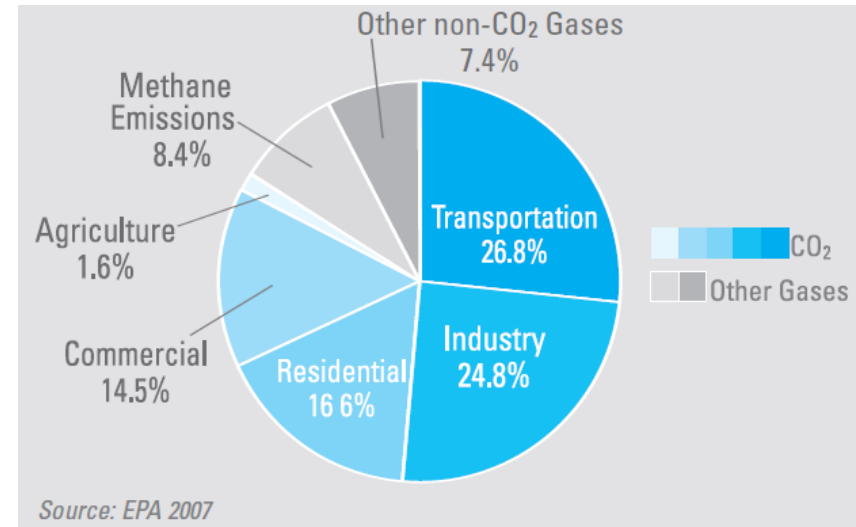


- **ENERGY STAR** is a voluntary government-backed program dedicated to helping individuals protect the environment through superior energy efficiency
- **ENERGY STAR** is the national symbol of energy efficiency, making it easy for consumers and businesses to identify high-quality, energy-efficient products
- **ENERGY STAR** distinguishes what is efficient/better for the environment without sacrificing features or performance
- Products that earn the **ENERGY STAR** meet strict energy performance criteria set by EPA

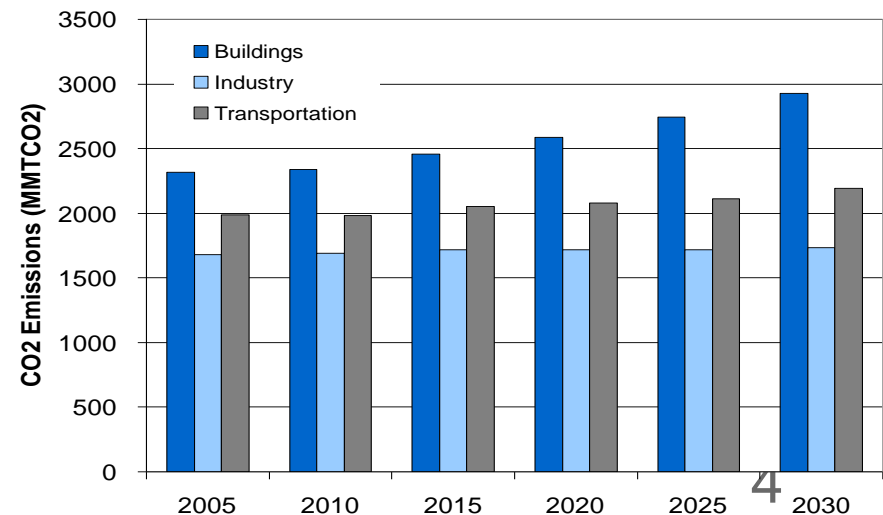
ENERGY STAR



- Started in 1992; voluntary program
- GOAL: Reduce greenhouse gas (GHG) emissions through large win-win-win opportunities with today's energy efficient technologies and practices.
- Provide credible information to buyers
- Work with the marketplace to capitalize on motivations of individuals



Projected GHG Emissions from Key Sectors through 2030



Source: AEO 2008

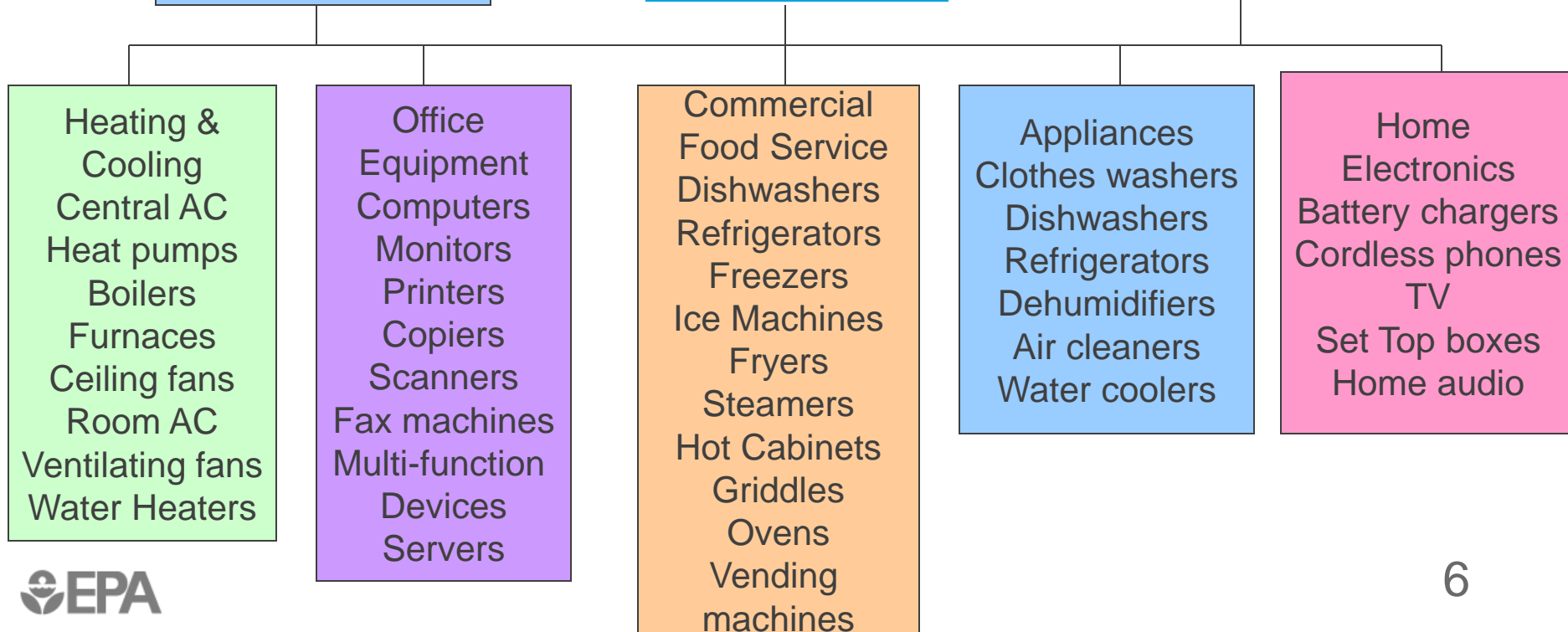
ENERGY STAR Portfolio



- Define and educate on energy/environmental performance through a single designation: ENERGY STAR
 - Product Efficiency
 - New/Existing Home Efficiency
 - Commercial Building Efficiency

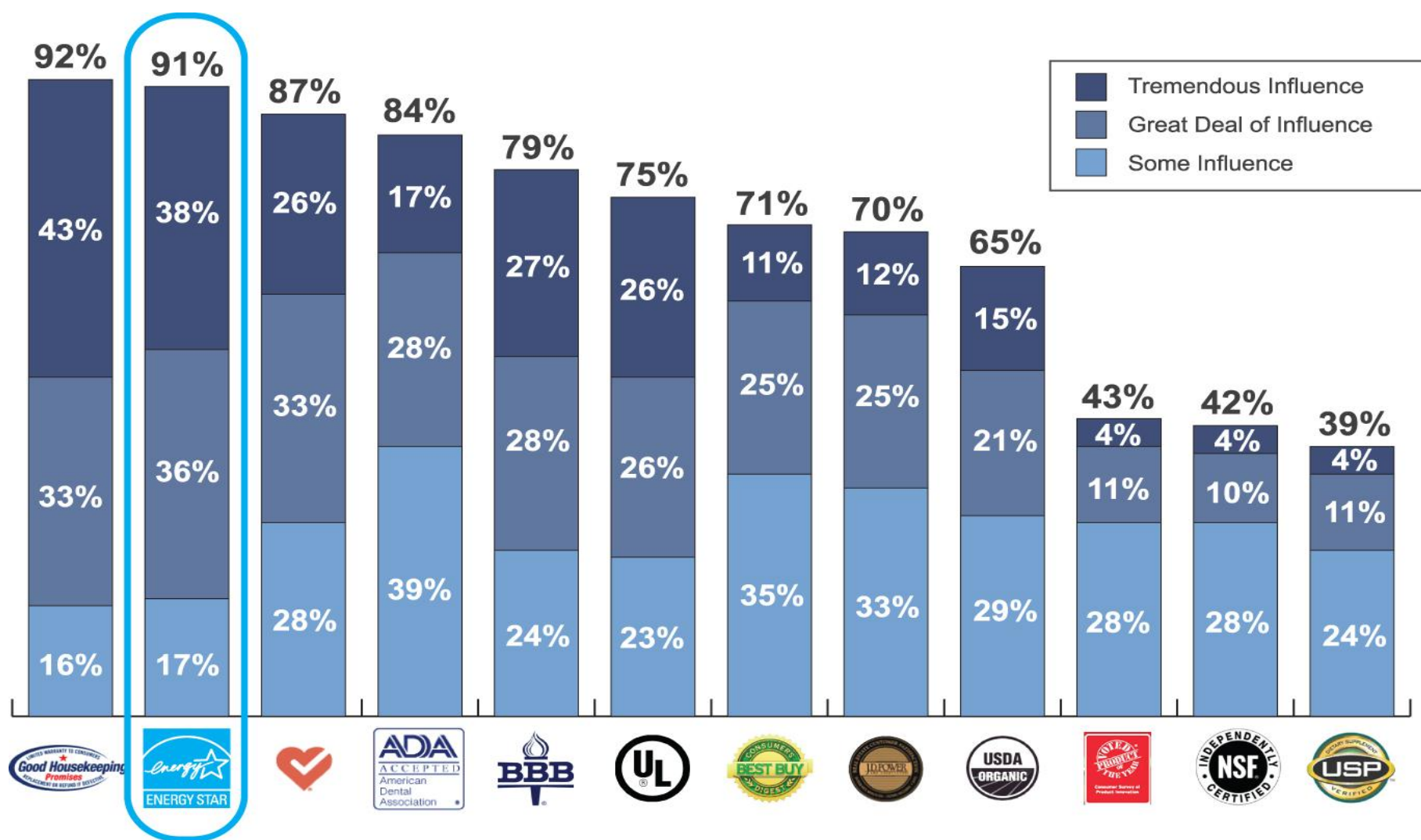


60+ Product Categories Are Covered by ENERGY STAR in the US





ENERGY STAR is one of the most influential labels in the marketplace



Source: Fairfield Research, July 2009

Development Process

Specification Development Cycle



Guiding Principles for When to Revise ENERGY STAR Specifications



- Significant increase in market penetration of ENERGY STAR qualified models
- Change in the Federal minimum efficiency standards
- Technological advancements
- Product availability limitations
- Issues with consumers realizing expected energy savings
- Performance or quality issues
- Issues with test procedures

Important Process Elements

- Consistency
- Transparency
- Inclusiveness
- Responsiveness
- Clarity

ENERGY STAR's Third-Party Certification Process



January 2011: ENERGY STAR Labeled Products Program moved from self certification to third party certification.

Entities apply to become EPA-recognized laboratories, certification bodies, or accreditation bodies



Manufacturers test products with EPA-recognized laboratory or manufacturer lab (W/SMTL)



EPA-recognized certification body reviews data & certifies performance



EPA lists qualified models on website and partners market as ENERGY STAR qualified

Details available at www.energystar.gov/3rdpartycert

Reasons for Specification Revision



- Current ENERGY STAR Version 2.1 specification has been in place since April 1, 2002
- New Federal minimum efficiency standards took effect in September 2012. The new minimum efficiency levels – gas boilers at 82% AFUE and oil boilers at 84% AFUE – are close to the current ENERGY STAR requirements.
 - Note, the Federal requirements also include design standards in addition to AFUE levels.
- High Market Penetration. In 2011, estimated market penetration of ENERGY STAR qualified boilers reached 46% (gas boilers at 42% and oil boilers at 52%).

Draft 1: Historical Market Share



- 2011 ENERGY STAR Boiler Market Share:
 - Gas – 42%
 - Oil – 52%
- Historically ENERGY STAR Boiler market share has been high, driving the need for a revision

Type	2010	2009	2008	2007	2006
Gas	52%	46%	57%	39%	34%
Oil	61%	62%	62%	61%	67%

Themes and Issues

- What is the potential to raise the levels?
- How to treat combined space heat/domestic hot water appliances?
- Bring into alignment with DOE on definitions, testing, sampling, rounding (as all revisions have done recently).

Levels

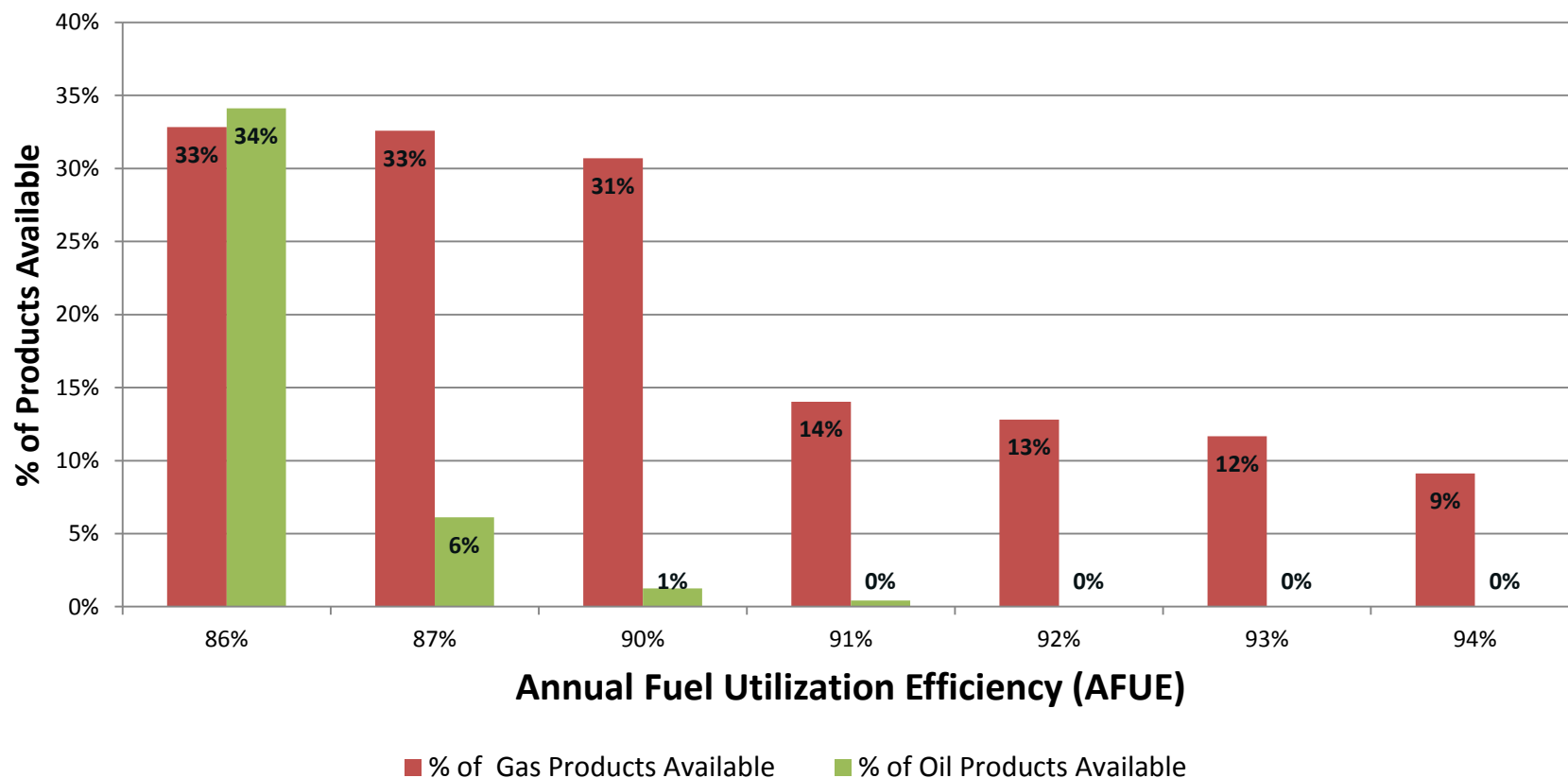


- Model availability: there are higher efficiency models available
- Condensing considerations
 - Near condensing as expensive as condensing
 - Near condensing has a small safety risk
 - Claims that condensing installation illegal in some jurisdictions
 - May not operate as condensing due to high return water temp

Levels: Product Availability



Boiler Product Availability - AHRI Directory 3/11/2013



*Total number of Active Gas Products = 1218

**Total number of Active Oil Products = 718

Levels: Cost Effectiveness

- Gas Boilers $\geq 90\%$ AFUE
 - Payback dependent on details of installation
 - In many scenarios, condensing units are cost effective
 - Contractors to provide guidance to homeowners based on application
- Oil Boilers $\geq 87\%$ AFUE
 - Similar to gas payback due to relatively high cost of oil
 - Just under “near-condensing”

Draft 1: Qualification Criteria – Proposed Levels



Boiler Type	AFUE
Gas	90.0%
Oil	87.0%

Q 1: Are there concerns of boilers shutting down due to condensate pipe freeze in cold climates? If yes, what requirements can EPA adopt to avoid condensing boilers from freezing during extreme cold winters in the north?

Q 2: What measures can EPA take to ensure consumers achieve maximum savings from their ENERGY STAR boiler?

Combination Appliances

- About 1/3 of boiler installations
- Additional load can make high efficiency appliance more cost effective
- Some can be tested under 10CFR430 Subpart B, Appendix N
- Others can be tested under ASHRAE 124, but even most that can, aren't
 - Not a Federal test method, not DOE validated
- For some designs, idle loss in non-heat seasons can be very significant

Combination appliance architectures



- Storage boiler
 - Instantaneous boiler
 - Indirect coil and tank
 - Secondary instantaneous heat exchanger
- Any system with a storage boiler has idle loss in non-heating season(s)
- Tank or tankless WH with hydronic coil matched with a blower

Q 3: Which cannot be tested under current Federal test methods?

CA Decisions

- DOE to develop idle loss test (for next revision)
- Drop use of CAafue for version 3.0
 - Definitions: CAafue removed
 - Requirements: Option to use CAafue removed

Q 4: Does removal of the CAafue metric inadvertently exclude any of the currently qualified ENERGY STAR boilers?

DOE Alignment: Definitions



- The following definitions have been revised to harmonize with the Federal regulations (10 CFR Parts 430.2 and 430.23):
 - Residential Boiler - A self-contained fuel burning appliance, with input less than 300,000 Btu and operating at or below 160 psig water pressure and 250° F water temperature, to supply low pressure steam or hot water for space heating applications.
 - Annual Fuel Utilization Efficiency - The ratio of annual output energy to annual input energy, which includes any non-heating season pilot input loss and, for gas or oil-fired furnaces or boilers, does not include electric energy.
 - Basic Model - All units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.

DOE Alignment: Test Methods

- AFUE – Federal test method for Boilers, 10 CFR part 430 Subpart B, Appendix N
- CAafue - Test method removed
- Idle Loss - DOE plans to initiate the development of an idle loss test procedure later in 2013.

Q 5: Are there any existing test methods on idle loss that DOE should consider?

Specification Development Timeline



- Feb. 26, 2013 Draft 1 released
- Mar. 18, 2013 Stakeholder Webinar
- Mar. 26, 2013 Draft 1 comment period closes
- May 2013 Draft Final published
- Jun. 2013 Draft Final comment period
- Jul. 2013 Final published
- If a second draft is needed before the draft final, the process is expected to finish in October instead.

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Questions?



Thank You