



ENERGY STAR[®]

Water Heaters

**Draft 1 Version 3.0
Stakeholder Meeting
April 16, 2014**

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Agenda



- Welcome and Introductions
- ENERGY STAR Program Overview
- Overview of Specification Revision Process
- Drivers for Specification Revision
- Draft 1 Document Discussion
- Timeline and Next Steps

What is ENERGY STAR

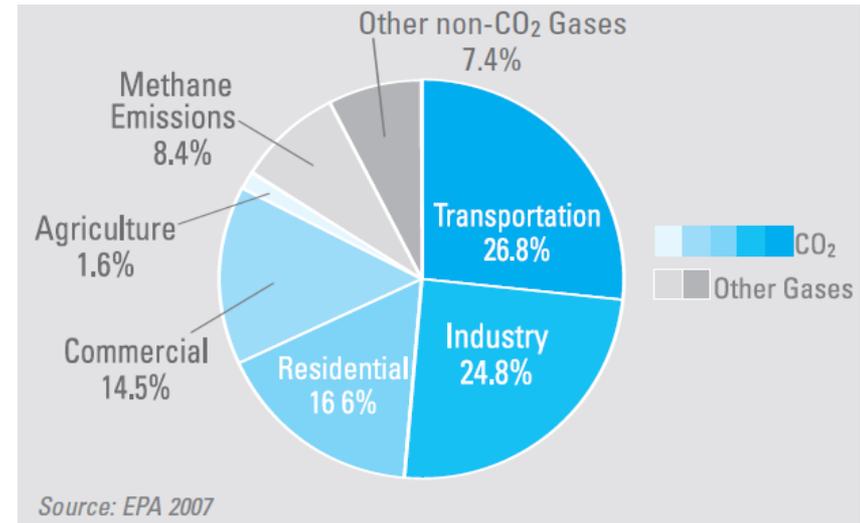


- **ENERGY STAR** is a voluntary government-backed program dedicated to helping individuals protect the environment through superior energy efficiency
- **ENERGY STAR** is the national symbol of energy efficiency, making it easy for consumers and businesses to identify high-quality, energy-efficient 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

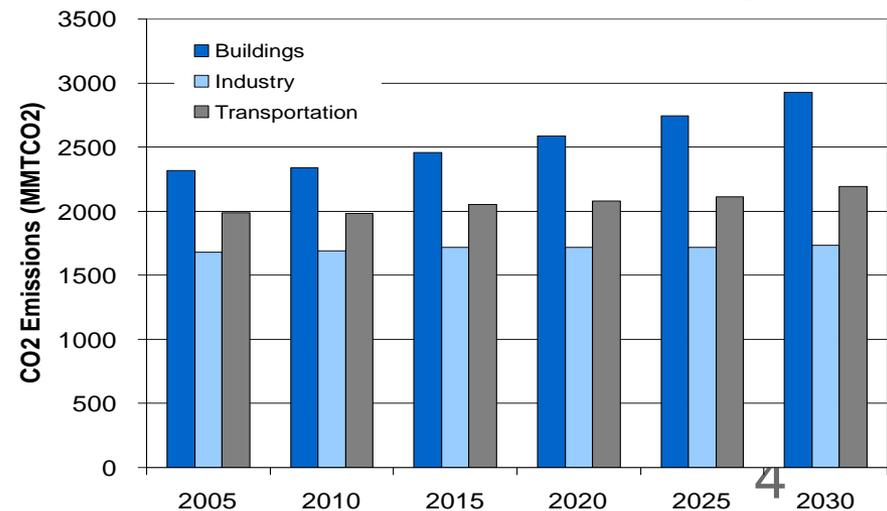
ENERGY STAR



- 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 and Industrial Building Efficiency



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



Lighting
Residential lamps
Residential light fixtures

Home Envelope
Roof products
Windows/Doors

Heating & Cooling
Central AC
Heat pumps
Boilers
Furnaces
Ceiling fans
Room AC
Ventilating fans
Water Heaters

Office Equipment
Computers
Monitors
Printers
Copiers
Multi-function Devices
Servers
Storage
UPS

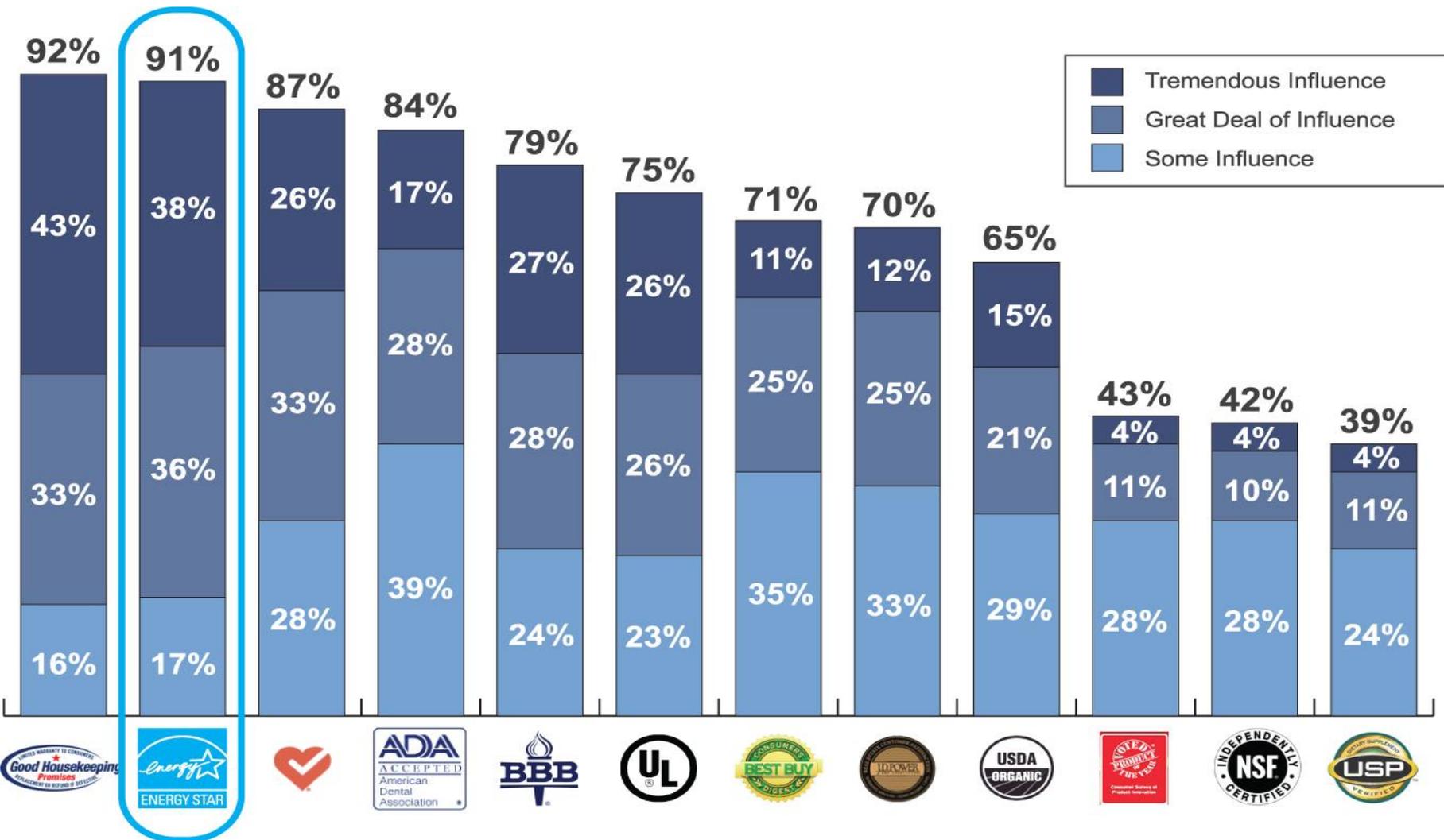
Commercial Food Service
Dishwashers
Refrigerators
Freezers
Ice Machines
Fryers
Steamers
Hot Cabinets
Griddles
Ovens
Vending machines

Appliances
Clothes washers
Dishwashers
Refrigerators
Dehumidifiers
Air cleaners
Water coolers

Home Electronics
Battery chargers
Cordless and IP phones
TV
Set Top boxes
Home audio



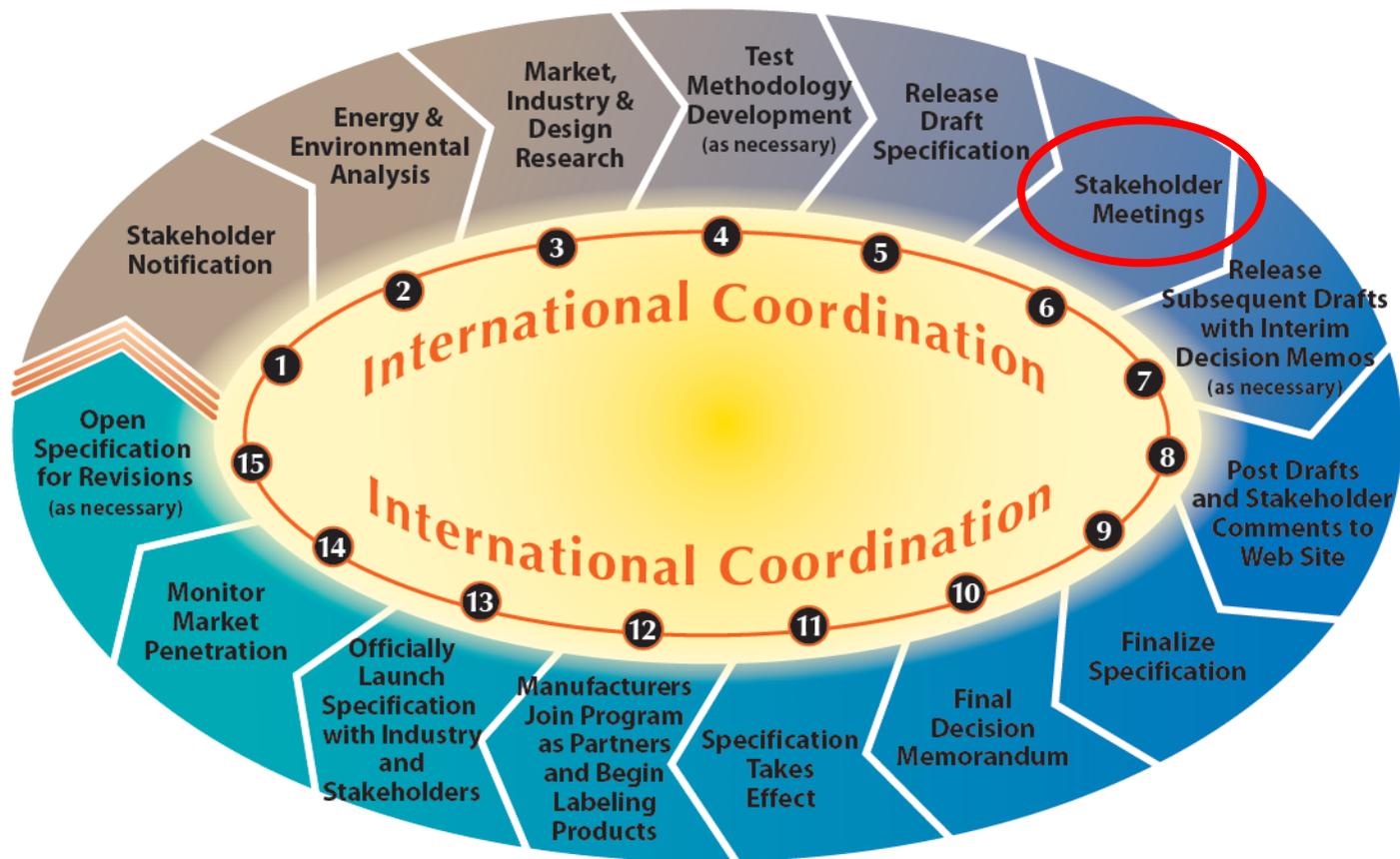
ENERGY STAR is one of the most influential labels in the marketplace



Source: Fairfield Research, July 2009

Development Process

Specification Development Cycle



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

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

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Draft 1 Proposal



- Instantaneous Water Heater Definition
- Performance criteria
 - Energy Factor
 - Standby Loss
- Connected Criteria
- How we will handle the new DOE Test Method for all residential water heaters and certain commercial water heaters, including the new uniform descriptor and definitions

Definition - Instantaneous Gas Water Heater



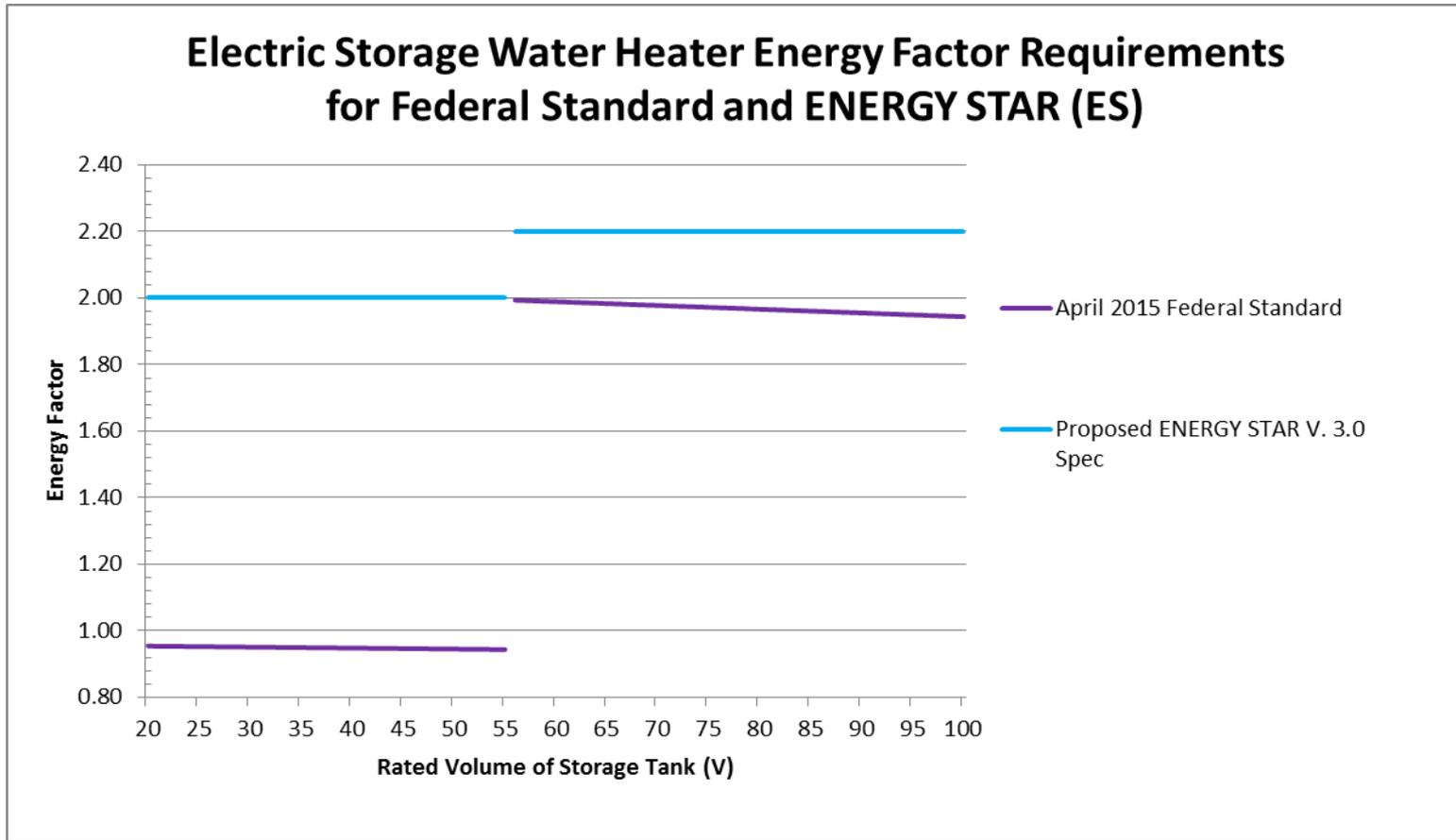
- DOE proposes to expand the test method scope to include gas water heaters between 2 and less than 20 gallons
- In order to include these products in the ENERGY STAR scope, storage capacity limit from the current instantaneous water heater definition is removed.

Performance Criteria Proposal



Water Heater Type	Performance Criteria (Changes in Blue)
Electric \leq 55 gallons	EF \geq 2.0
Electric $>$ 55 gallons	EF \geq 2.2
Gas Storage \leq 55 gallons	EF \geq 0.67
Gas Storage $>$ 55 gallons	EF \geq 0.80
Gas Instantaneous	EF \geq 0.90
Light Duty EPACT Covered Gas WH	TE \geq 0.90; Standby loss \leq 1647 btu/hr \times (TE - 0.75)

Electric Storage Summary

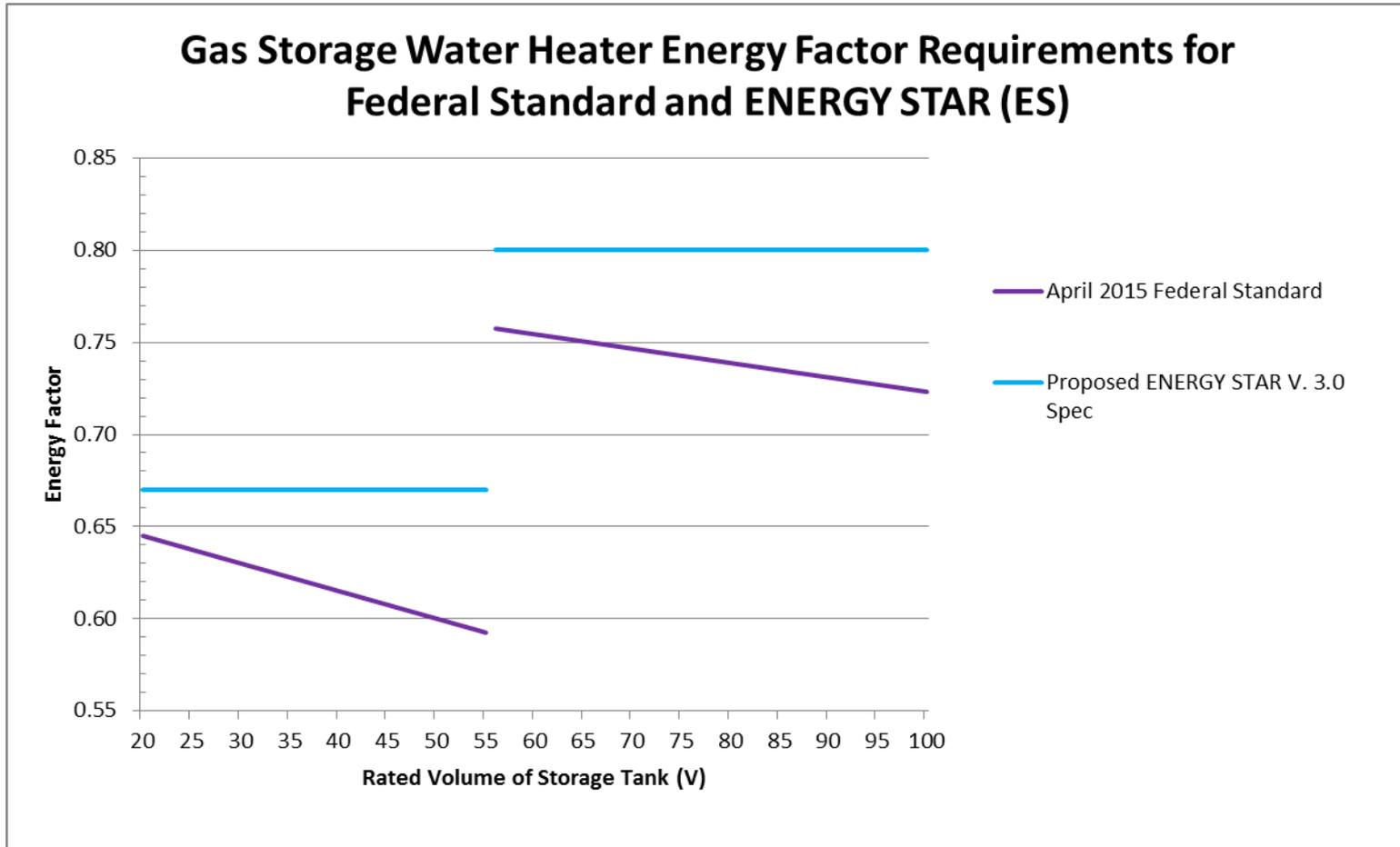


Electric Storage Performance Criteria Proposal



- For ≤ 55 gallon, no change in criteria
 - Significant energy savings still available at this level in comparison to the upcoming federal standards
- For > 55 gallon, revised from 2.0 to 2.2 EF
 - 2015 DOE levels close to ENERGY STAR, driving the need for revision
 - Increase in level does not significantly effect consumer choice of certified products
 - Per the AHRI certified product directory, 55 gal units are all above 2.2 EF
 - Expect product mix to shift to higher efficiency in response to the new Federal standards
- Discussion: how do stakeholders expect market to change in response to new Federal standards?

Gas Storage Summary

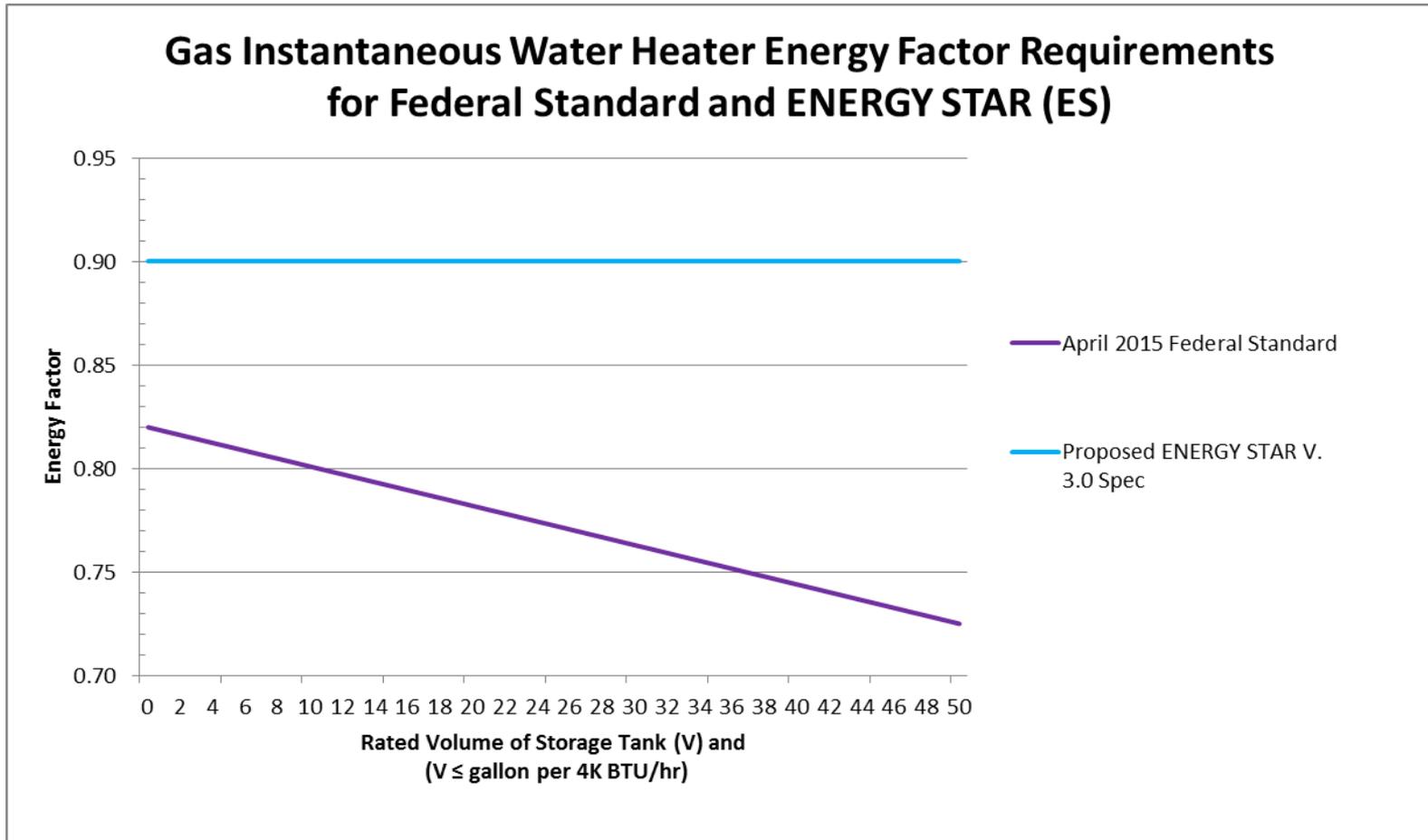


Gas Storage Performance Criteria Proposal



- For ≤ 55 gallon, no change in criteria
 - Per AHRI directory, about 30% of ≤ 55 g models meet 0.67 EF
 - Market penetration indicates certification mark will continue to differentiate efficient products, even after the new Federal standard is in place
- For > 55 gallon, revised from 0.67 to 0.80 EF
 - No products currently available in the market that meet even 2015 DOE level
 - EPA judgement on level based on light duty EPACT units available for sale; compete with residential
- Discussion: expected market reaction to new Federal standards?

Gas Instantaneous Summary



Gas Instantaneous Performance Criteria Proposal



- Revised from 0.82 to 0.90 EF
- Current technology: condensing system
- Cost effective compared to 0.82 EF instantaneous WH. Enable consumers to recoup up-front costs quickly
- Strong product differentiation between standard and high energy efficiency products
- Considerable product available providing a wide range of consumer choice

Performance Criteria Proposal



- Light Duty EPACT Gas water heaters:
 - Retain Thermal Efficiency requirement
 - Tighten standby loss requirement
 - Level playing field with gas storage water heaters >55 gallons (expected to be competing for same application) meeting the proposed EF requirement
 - Estimated annual energy use roughly the same as that of similar products, such as gas storage water heaters >55 gallons

Connected Criteria



- Consumers can purchase connected water heaters today
- For V3.0 EPA has proposed optional connected criteria for electric water heaters, only
 - Lack of utility interest & need for gas Demand Response (DR)
 - Very low electrical consumption for even power vent gas water heaters

Connected Criteria

- General Approach



- High-level / largely non-prescriptive
 - Open Standards / Open Access
 - Remote access to user setting & controls
 - Operational status reporting
 - Demand Response (DR)
 - Information to installers & consumers
- Consistent with EPA requirements for residential appliances and pool pumps
 - Provide immediate consumer value
 - Also provide DR capability for when programs are in place

Connected Criteria

- Open Standards Are:



- Included in the Smart Grid Interoperability Panel (SGIP) Catalog of Standards, and/or
- Included in the National Institute of Standards and Technology (NIST) Smart Grid framework Tables 4-1 and 4-2, and/or
- Adopted by the American National Standards Institute (ANSI) or another well-established international standards

Connected Criteria

- Open Standards/Open Access



- On-premises open standards / access
 - Open standards for all communication layers
 - Applicable to all optional connected criterion
- Available Application Programming Interface (API) or Interface Control Document (ICD)
- If a compliant, standards-based modular communication port is included, the product need not ship with a compatible module.
- Discussion: Plans to include standards-based modular communications? Problems with open access?

Connected Criteria

- Remote Management



- Connected WH must be capable of responding to remote requests for:
 - Operational mode control (e.g. heat-pump only, hybrid, high demand, electric-only, vacation)
 - Water temperature setting
 - On/Off, if controllable on the product itself
- Discussion: savings opportunities for connected water heater integration and energy management?

Connected Criteria

- Operational Status Reporting



- Connected WH must be capable of reporting the following:
 - Operational status (e.g. heat-pump active/standby electric heating active/standby)
 - Operational mode (e.g. heat-pump only, hybrid, high demand, electric-only, vacation)
 - Water temperature setting

Connected Criteria

- Demand Response



- Connected WH must be capable of providing near-term or scheduled load reductions
- Consumer able to override DR participation without limitation
- Discussion: Potential types and magnitude of responses for HP water heaters?
- Discussion: Need to report opt-out or overrides?

Connected Criteria - Information to Installers and Consumers



- Ensures point of purchase understanding by both consumers and installers as to what additional
 - Hardware,
 - Software,
 - Services, and/or
 - Configurationis required in order to activate the product's connected features.

Connected Criteria – Demonstration of Compliance



- Certification Body (CB) evaluates compliance for all optional connected criteria
- Compliance is determined through:
 - Examination of the product
 - Examination of product documentation

New DOE Test Method and Metric: Impact on ENERGY STAR



- Proposal includes products in the current scope of Light Duty EPACT Gas WH in EPA spec. EPA will consider matching the scope when the test method is final.
- Allows inclusion of gas water heaters between 2 to 20 gallons.
- EPA will follow the crosswalk also developed by DOE, allowing Version 3.0 criteria to remain in place for near-term
- EPA does not anticipate a full revision will be needed to adjust specification for the new descriptor and method.
- Longer term impact on WH market – prospects for revision based on new descriptor in 2016?

Specification Development Timeline



- Apr. 2, 2014 Draft 1 released
 - Apr. 16, 2014 Stakeholder Webinar
 - Apr. 30, 2014 Draft 1 comment period closes
 - Jun. 2014 Draft Final published
 - Jul. 2014 Final published
- Goal → April 16, 2015, Version 3 effective
- ASAP Spec actions to incorporate crosswalk (if any)

Contact Information



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Questions, Discussion



Thank You



Learn more at energystar.gov

New DOE Test Method



- Ongoing federal test method rulemaking impacts all residential and certain commercial water heaters with residential applications.
- Some of the changes include:
 - Expansion of scope to include gas water heaters between 2 to 20 gal and commercial water heaters. DOE Draft Test method defines commercial water heaters as any gas-fired, electric, oil storage, or instantaneous commercial water heater that meets the following conditions:
 - For models requiring electricity, uses single-phase external power supply
 - Is not capable of delivering hot water at temperatures of 180° F or above; and
 - Does not bear a Code Symbol Stamp signifying compliance with the requirements of the ASME Boiler and Pressure Vessel Code.
 - Establish a uniform descriptor that can be applied to both residential and commercial water heaters
 - Use of multiple draw patterns for testing water heaters, based on FHR or max GPM - (1) Point-of-use; (2) low; (3) medium; and (4) high
 - Remove the maximum input ratings for gas-fired (75,000 Btu/h), electric (12 Kw), and the minimum input rating for gas instantaneous water heaters (50,000 Btu/h)