



ENERGY STAR®

Water Heaters 2.0

Framework document

Stakeholder Webinar

June 22, 2011



Learn more at energystar.gov

This meeting in fact will bridge from the framework document to the first draft of the revised specification. As you have all had a fair amount of time looking at the framework, and as most of us discussed it at the hot water forum in Berkeley, I would like to talk about how we envision the first draft, as a way to focus the discussion on particular questions that we will need to answer before releasing it.

Overview



- Revision drivers
- Technology Neutrality
 - Possible distinctions
 - NAECA vs. EPACT covered Water Heaters
 - Solar Integration
- New product categories

Current Specification



Type	EF	FHR/GPM	Warranty	Safety
Gas storage	.67	67 gallons	6 years	ANSI Z21.10.1/CSA 4.1
Gas tankless	.82	2.5 GPM over 77°F rise	10 years/ 6 years	ANSI Z21.10.1/CSA 4.1 ANSI Z21.10.3/CSA 4.3
Gas condensing	.80	67 gallons	8 years	ANSI Z21.10.1/CSA 4.1
HP WH	2.0	50 gallons	6 years	UL 174 and UL 1995
Solar	.5 SF	--	10/6/2/1 years	OG-300 Certification from the SRCC

- Gas storage: $\leq 75,000$ Btu/hour
- Gas tankless: $\leq 200,000$ Btu/hour, ≤ 1 gal water per 4,000 Btu/hour
- Heat pump: ≤ 24 A at ≤ 250 volts



Revision Drivers



- Technology neutrality
- Specific issues with current specification
 - Solar WH efficiency metric
 - Requirements for gas condensing WH
- Consider inclusion of additional products
 - Add-on heat pump WH
 - Electric tankless WH (for Point of Use)

Technology Neutrality

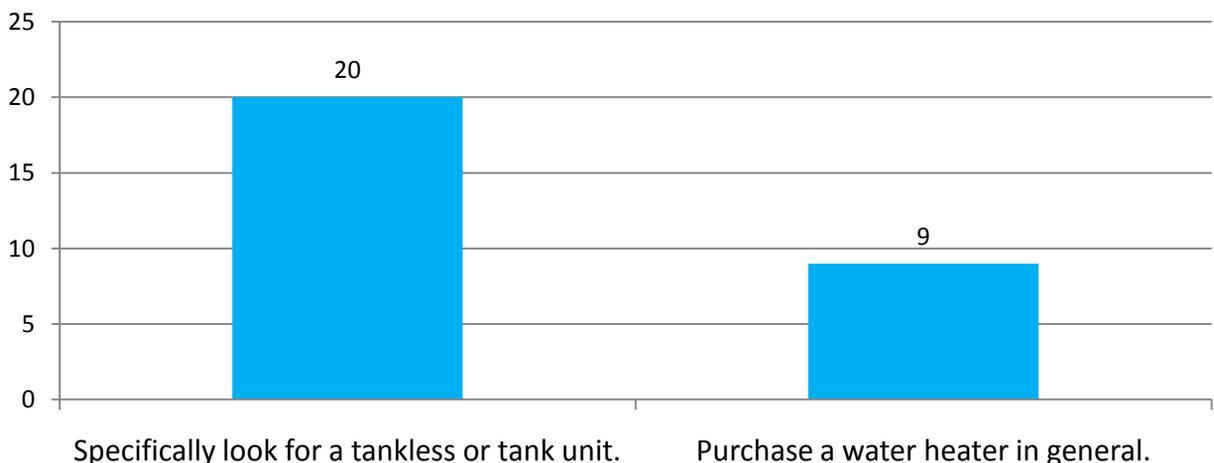


- Maintain distinctions relevant to consumer purchasing decision
 - Fuel Type
 - Whole-Home vs. Point-of-Use
 - After-market devices
- Additional Distinctions to consider
 - Gas condensing vs. gas storage
 - Gas storage vs. gas tankless
- How to fit solar into a technology neutral specification



5

When a consumer purchases a water heater, do they go out to buy specifically a tank or tankless unit or just a water heater in general?



-Results of poll taken during webinar.

Additional Distinctions



- Gas condensing category merged with HE gas storage category
 - Products will have to meet existing HE gas storage requirements.
- “After-market Devices”
 - Add-on heat pumps
 - Solar could fit in here too, potentially
- Whole-home gas storage vs. Whole-home gas tankless.



6

After market devices, as a class, are not something ENERGY STAR generally labels. However, in the case of water heating it represents a significant national opportunity to address the installed base of low-efficiency water heaters. Because water heaters can have very long lifetimes, and because there are after market technologies that are applicable to a wide variety of situations, EPA is considering labeling them.

Ideally, there would be no distinction between whole home gas storage and whole home gas tankless water heaters, because this seems to best reflect how consumers purchase these units. On the other hand, EPA is aware is that the EF requirements for the two categories are currently quite different, and are not sure the time is right to combine them.

Hybrid Units, NAECA vs. EPACT



- Instantaneous water heater with a small storage tank, >75,000 Btu/hr and > 2 gal
- Outside of NAECA definitions, so no Energy Factor (EF) rating
- EPACT covers <200,000 BTU/hr, so Thermal Efficiency (TE) and Standby Loss (SL) Ratings



Considering combining tank and tankless categories inevitably raises the question of hybrid units, with a small tank, but greater than 2 gallons, and more than 75,000 Btu/hr input rate.

Hybrid Units and ENERGY STAR



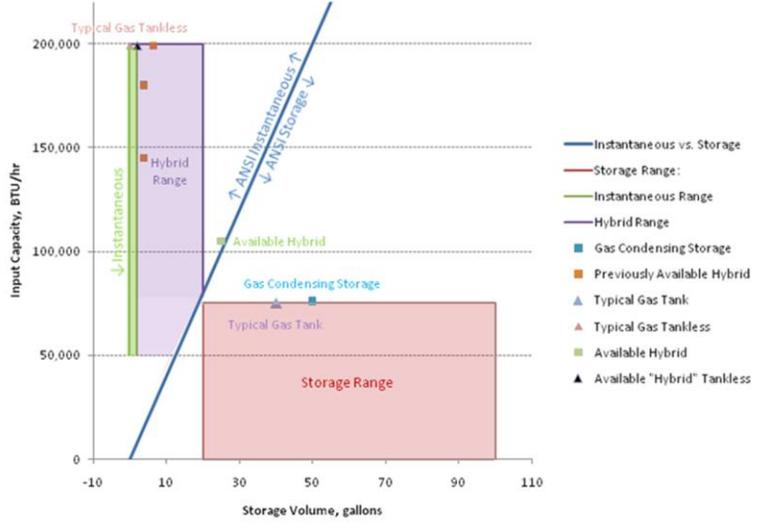
- Currently ENERGY STAR only qualifies based on EF
- However, tankless definition follows ANSI
 - Less than 1 gal storage per 4000 Btu/hr
 - Means 100,000 Btu/hr unit could have a 25 gallon tank
 - Up to 200,000 Btu/hr
- Manufacturers feel unable to make EF claims



Water Heater Domains



Residential Water Heater Domains



NAECA vs. EPACT



- NAECA limits are a proxy for residential
- ENERGY STAR is considering labeling commercial water heaters
- Options for EPACT Water Heaters
 - Manufacturers submit with EF test
 - Spec allows qualification with TE/SL
 - Wait to cover all in commercial spec (2013?)
- Appropriate to include in Tankless?
- Appropriate/equivalent TE and SL levels?

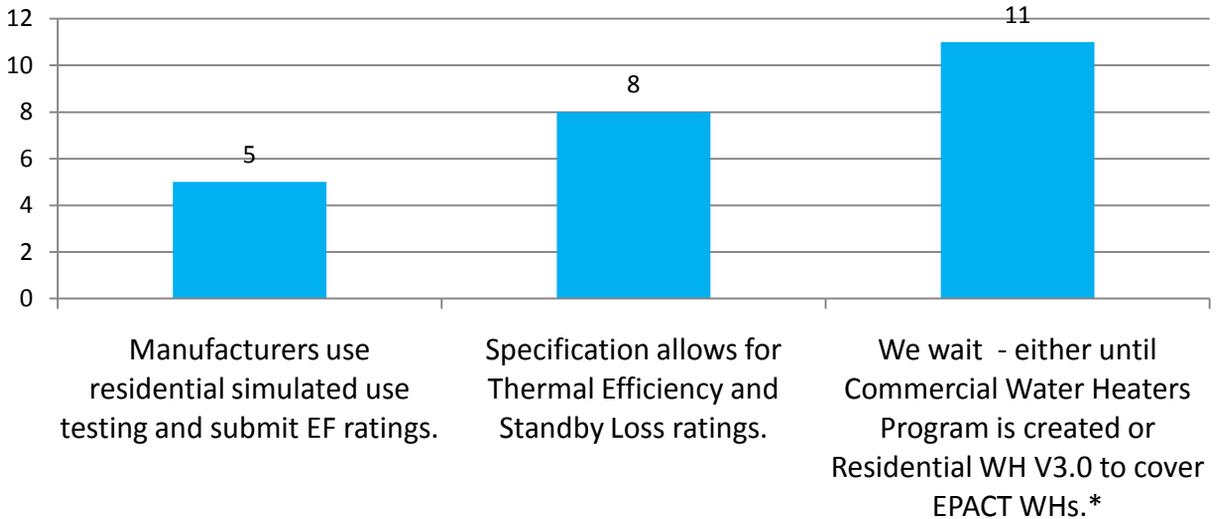


10

There seem to be some good reasons to include all units that are designed and marketed for the residential market to be in a single specification. They are all in play in the same purchasing decision, and have the same expectations for reliability, and similar use patterns. This would all be different for commercial water heaters.

- WHs made for residential use that are covered under NAECA
- Unclear distinction in ANSI standards (don't specifically mention "residential" or "commercial")
- 10 CFR 431 (Commercial Products testing/definitions): Covers products outside scope of 430, and uses phrase "and are industrial equipment" as a designation.

Which of these options is most appropriate for ENERGY STAR coverage of EPACT water heaters?



-Results of poll taken during webinar.

*This response was modified during the discussion to include "waiting until ENERGY STAR for Residential Water Heaters V3.0"

Solar Water Heaters



- How do solar products fit into a technology neutral specification?
 - Within gas and electric storage categories
 - As separate fuel source
 - As aftermarket devices
- Use the SEF metric for efficiency
- Current 0.5 SF requirement
 - With 0.6 EF gas backup tank, $SEF = 1.2$
 - With 0.9 EF electric backup tank, $SEF = 1.8$

Integrating Solar Water Heaters



- Option 1: Include as an option within each respective category
 - Compare SEF to EF directly
- Areas of concern
 - Current efficiency levels comparable to electric (renewable already), but not for gas
 - Results of low SEF requirement for gas?
 - Hot water delivery metric? (FHR, GPM) Can SRCC do this?

Integrating Solar Water Heaters



- Option 2: Treat solar as a separate fuel source
 - May reflect customer purchase decision the best, but
 - Essentially a non-option, because
 - Baseline for comparison of cost and savings would be non-ES solar

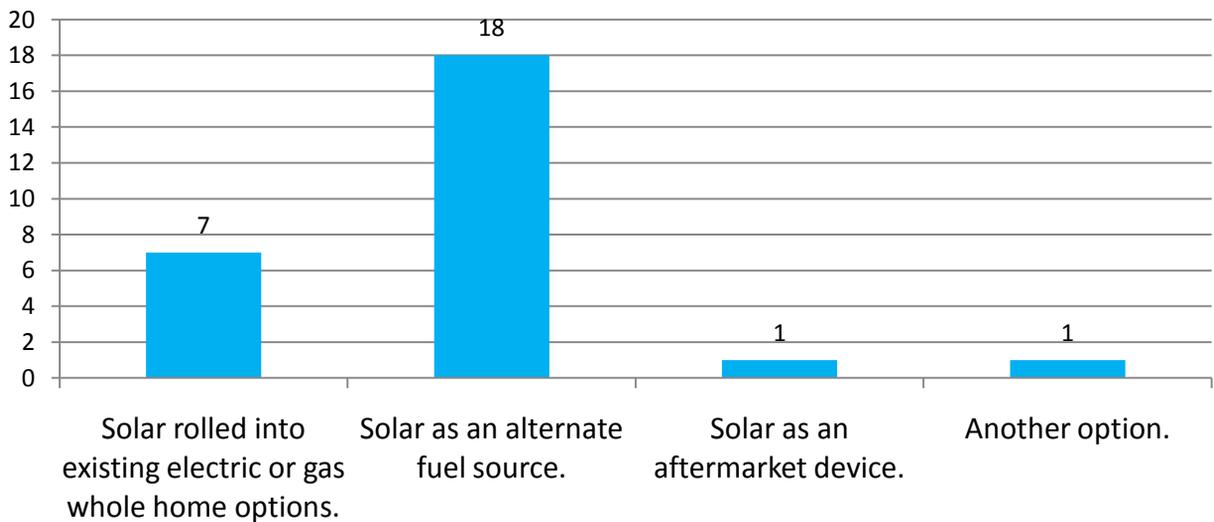
Integrating Solar Water Heaters



- Option 3: Treat as “After-market Device”
 - Currently, only label complete systems including backup system; would switch to labeling only systems w/o tanks
 - Reflects customer purchases? Percentage of solar water heaters sold this way?
 - Still use SEF? At what level?
 - Baseline for cost/savings is no backup
- Any other options?



Which of these solar water heater options makes the most sense to you?



-Results of poll taken during webinar.

New Product Categories



- Point of Use (POU) Electric
- After market devices/Add-On Heat Pump Water Heaters

POU Electric Water Heaters



- How do we distinguish POU from whole home?
- Can products be evaluated using the DOE Test Procedure?
 - EF test only applies to tankless units <12kW
 - Any other technologies? Do they have test methods?
- Hot water delivery measure for this category?
 - GPM? level?



POU Electric Water Heaters



- Additional requirements to consider
 - Maintain temp ± 3 °F at constant flow
 - Adjusts input power for flow rate and temperature
 - Capable for use as booster or alone
 - Allow user to adjust temperature
 - Lead-free per CA AB1953
 - Several power quality requirements
- Only include those with accepted method of verification



Add-on Heat Pump Water Heaters



- Can tank be replaced w/o replacing add-on? No → require warranty on full system
- Does the product require alteration of the tank? Yes → remaining tank warranty assumed by Add-On HP manufacturer
- Covered by DOE method for EF
 - List calculated system EF with several tank EFs.
- Same EF level as integrated heat pump?

Revision Timeline



- June 24th Comment period closes
- July 2011 Draft 1, comment period, webinar
- Sep. 2011 Draft 2, comment period
- Nov. 2011 Draft Final, comment period
- Dec. 2011 Final specification published
- Sep. 2012 Effective date

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