



# **ENERGY STAR<sup>®</sup>**

## **Water Heaters**

**Draft 2 Version 2.0**  
**Stakeholder Meeting**  
**November 10, 2011**

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# Webinar Goals

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- Highlight key changes from Draft 1.
- Solicit stakeholder feedback on proposal and outstanding issues.
- Address stakeholder questions about process and/or changes.
- Identify next steps and timeline.

# Key Areas for Discussion

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- Whole-home Electric
  - UL certification concern
  - Additional requirements, warranty, metrics
- POU Electric Units
  - Binary label in a complex market
  - Scope, revised requirements, metric for small tank heaters
- Whole home gas: Warranty
- Solar Water Heaters (reprise)

# Revision Drivers

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- Technology Neutrality
- Specific small issues with specification
- Opportunity to capture greater energy savings by expanding scope

# Technology Neutrality

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- Product Categories
  - Distinguished by Fuel Source
    - Electric
    - Gas
    - Solar
  - Further Distinguished by Use
    - Whole-home
    - Point-of-Use (POU)
- Distinctions also affected by test methods

# Proposal Summary



Fuel	Product type	Requirements
Electric	Whole home storage	EF $\geq$ 2.0 FHR $\geq$ 50 GPH
	Point of use	EF $\geq$ .97, low flow rate $>$ .5 GPM
Gas	Whole home storage	EF $\geq$ .67, FHR $\geq$ 67 GPH
	Whole home tankless	EF $\geq$ .82, GPM $\geq$ 2.5
Solar	Electric or gas backup	SF $\geq$ .5

# Whole-home Electric



- UL certification concern
  - Stakeholder commented that UL safety certification of original tank voided when add-on heat pump attached
  - Initially, UL confirmed this
  - At manufacturers requests, certifiers are examining the installation more carefully
  - EPA reaching out to other stakeholders with experience in installations

# Whole-home Electric cont'd



- Added requirements for all heat pumps
  - Audible alert of blocked condensate drain
  - Reporting of lower compressor cutoff temp
- Warranty Requirement for add-on
  - Manufacturers should be responsible only for their own equipment
  - Consumers made aware of the warranty conditions through warning statement

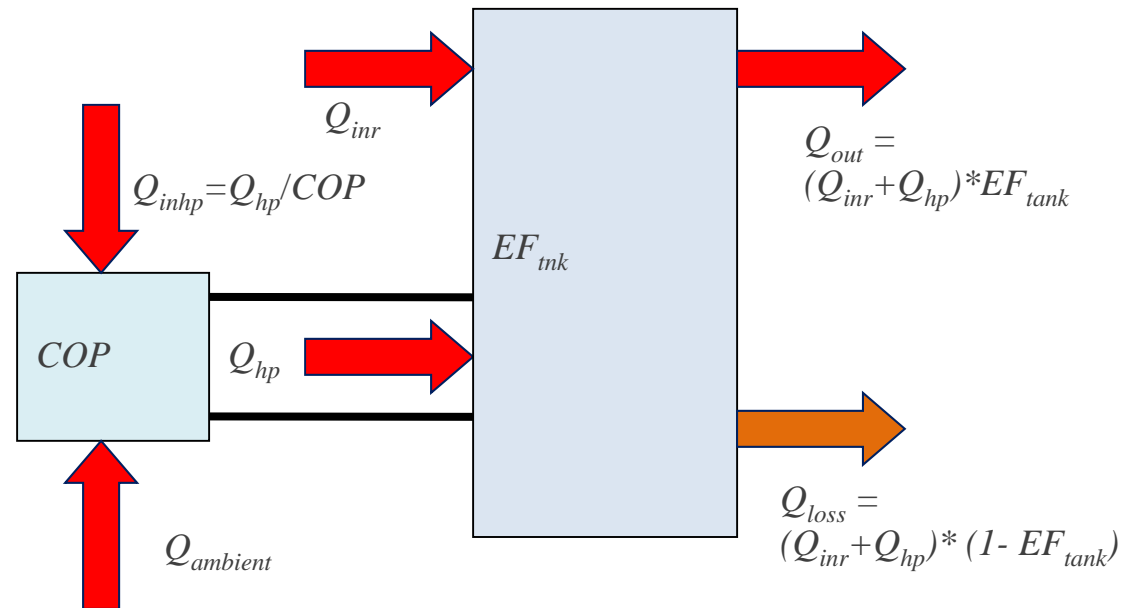


# Whole-home Electric cont'd



- Retained 2.0 EF requirement for add-ons in this Draft
- Considering EF improvement metric
  - Recognizes the energy savings of add-ons
  - Additional consumer information
  - But, actual EF improvement will depend on use pattern and climate
  - EF still reported, perhaps requirement is lower

# Energy Factor Multiplier (EFM)



$$Q_{inr} = \alpha \cdot Q_{hp}$$

$$EF_{sys} = \frac{Q_{out}}{Q_{inr} + Q_{hp}} = EF_{tnk} \frac{(\alpha + 1)}{\alpha + 1/COP}$$

$$EFM = \frac{(\alpha + 1)}{\alpha + 1/COP}$$

# Energy Factor Multiplier (EFM)



Percent saved on water heating as a function of how much of the heating the heat pump supplies, and its COP in situ

		COP			
		4.0	3.0	2.5	2.0
% water heating energy supplied by the heat pump	10%	39%	35%	32%	26%
	50%	50%	44%	40%	33%
	80%	63%	56%	50%	42%
	90%	68%	61%	55%	45%
	95%	71%	63%	57%	48%
	100%	75%	67%	60%	50%

# 3 POU Electric Use Cases

- Many stakeholders commented on payback
- Since there is no differentiation among POU heaters, consider alternate solutions

## 1. New construction

- ENERGY STAR central heat pump saves more energy than two resistance POU units

## 2. Home addition/remodeling

- Complex set of questions regarding when POU heater is a good solution
- How often do additions reflect added hot water needs (e.g. extra person) anyway?

# 3 POU Electric Use Cases



- 3. Improve HW delivery to existing, distant fixture
  - Takes some of the HW load off central WH
  - May save energy or cost energy, depending on...
    - EF of central heater
    - Length and insulation of pipes
    - Usage pattern at fixture; percent of hot water use
  - For payback, cost of installation (labor and materials) significant and also dependent on many factors
  - Purchase decision is complicated as well by other options for addressing poor HW delivery
  - Does a binary label like ENERGY STAR actually leave consumers better informed in this case?

# POU Electric: Scope



- Physical dimension requirement
  - “Table-top water heaters” definition may not be appropriate for POU
  - Capacity requirement:  $< 20\text{G}$
- Pending legislation
  - Legislative action required to allow  $< 25\text{kW}$  to be included under the EF test method
  - This has been accounted for in the specification

# POU Electric Requirements



- No booster requirement
  - Most installations do not need it
  - Consumers can see if unit has this function
- Warranty changed to  $\geq 6$  yrs on heat exchanger, 1 year on parts
- Metric for small tank style POU
  - EF test method in process at DOE
  - Developing TE test method would delay revision

# Whole-home Gas



- Includes high efficiency gas storage and gas condensing water heaters
- $EF \geq 0.67$ 
  - Level to be re-examined during the next revision V3.0
- Warranty changed to 6 years
  - Needed to reconcile varying warranties in previous categories
  - 6 years sufficient assurance of product quality



# Labeling Solar Water Heaters



- Some feedback from stakeholder groups, but not much
- Feedback from manufacturers about how labels is used in sales
- Investigating how utilities use the solar water heating program
  - Additional information needed
  - USH2O survey: preliminary results

# USH20 survey prelim results



- Of 18 EE program sponsors and implementers...
- Only 18% required ES qualification, and
- Only 35% thought their programs would be effected by label not being available, BUT
- 70% thought ES qualification was a useful requirement, and
- 88% thought ES should continue labeling

# USH2O Survey Prelim Results



- Some see indirect effect on programs
- Primary advantages mentioned:
  - Normalizes solar HW as a consumer product
  - Gives general assurance of quality/reliability
- Some felt ES potential to effect market was not fully realized; in particular that standardization could be useful
- Some mentioned climate specific needs

# Key SWH Questions

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- Do utilities rely on ENERGY STAR for their solar water heating programs?
- Market changed since the ENERGY STAR program took effect?
  - More sales? More confidence in SWH?
- Does ENERGY STAR change consumers' performance or payback expectations?
  - Are expectations met? If not, market impact?

# Other SWH Programs



- **Federal Incentives/Policies for Renewables & Efficiency**
  - Residential Energy Conservation Subsidy Exclusion
    - Subsidies provided to customers by public utilities are non-taxable.
  - Residential Renewable Energy Tax Credit
    - Up to 30% tax credit on solar water heaters. Expires 12/31/2016.
  - Energy-Efficient Mortgages (EEM)
    - FHA backed homeowner EEM.
  - Energy Standards for Public Buildings
    - Requires adopting renewable technologies such as solar water heaters for public buildings.

# Revision Timeline



- Nov. 10<sup>th</sup> Stakeholder meeting at ENERGY STAR Partner Meeting
- Dec. 2, 2011 Draft 2 comment period closes
- Jan. 2012 Draft final, comment period
- Jan. 2012 Final specification published
- Nov. 1, 2012 Effective date

# Contact information

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