



ENERGY STAR®

Light Commercial HVAC

Draft 1 Version 3.0

Stakeholder Webinar and Discussion

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Agenda

- 1** Introduction
- 2** Scope and Definitions
- 3** Energy Efficiency Criteria
- 4** Review of Test Method
- 5** Next Steps
- 6** Discussion

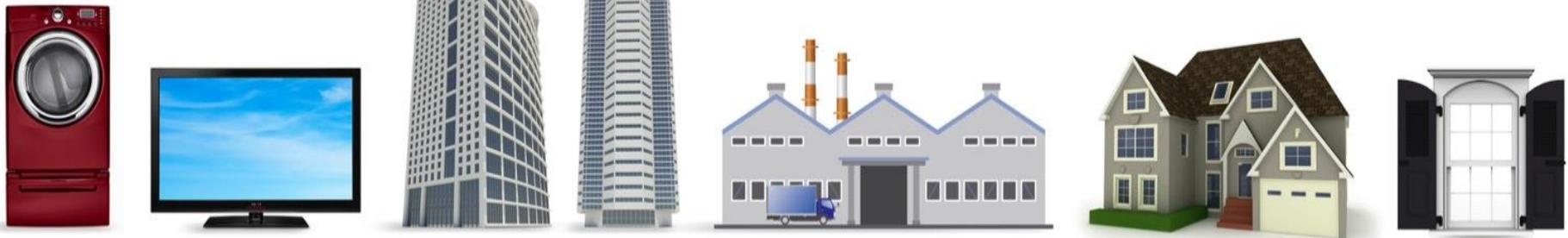


Introduction

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EPA's ENERGY STAR identifies the most energy-efficient **products**, **buildings**, **plants**, and **new homes** – all based on the latest government-backed standards.

Today, every ENERGY STAR label is verified by a rigorous third-party certification process.





ENERGY STAR TODAY

Brand Preference & Loyalty

Of the **87% of households** that recognize the ENERGY STAR label

75% recalled purchasing an ENERGY STAR-labeled product in the past year

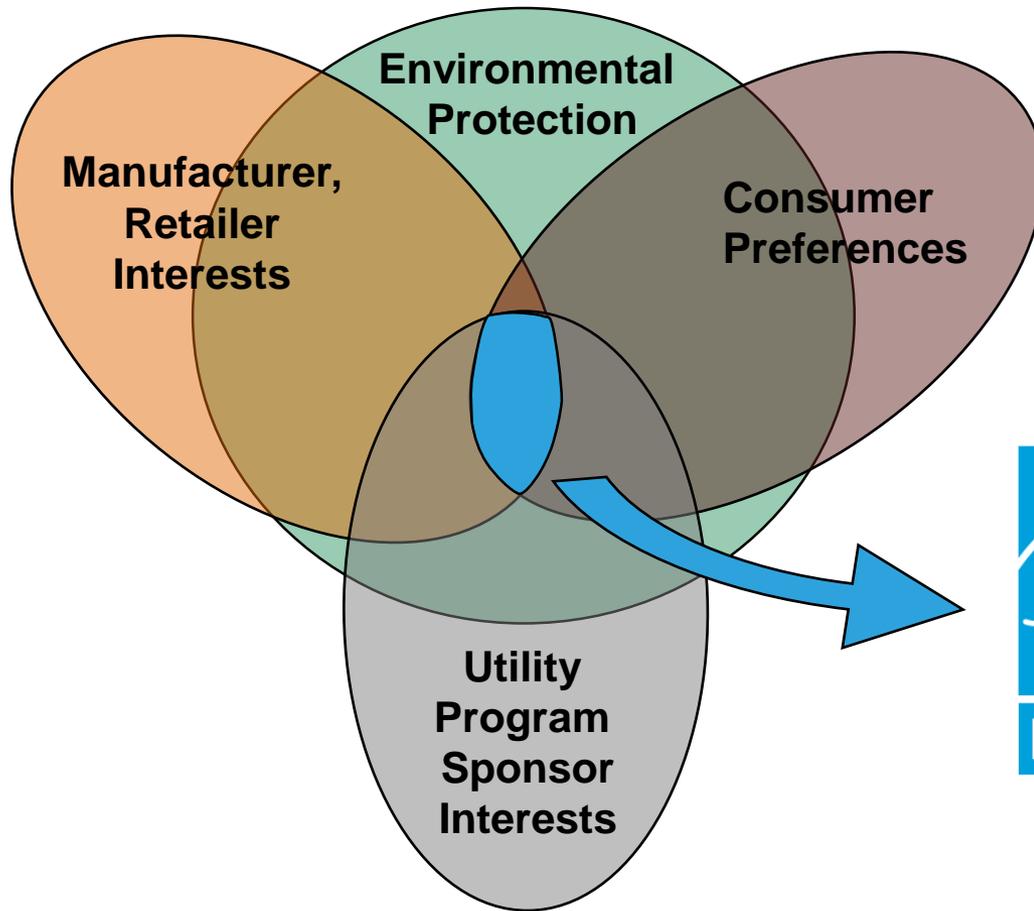
73% said the label **influenced at least one** of their purchase decisions very much or somewhat

75% were **likely to recommend** ENERGY STAR-labeled products to a friend

30% were extremely likely to recommend ENERGY STAR

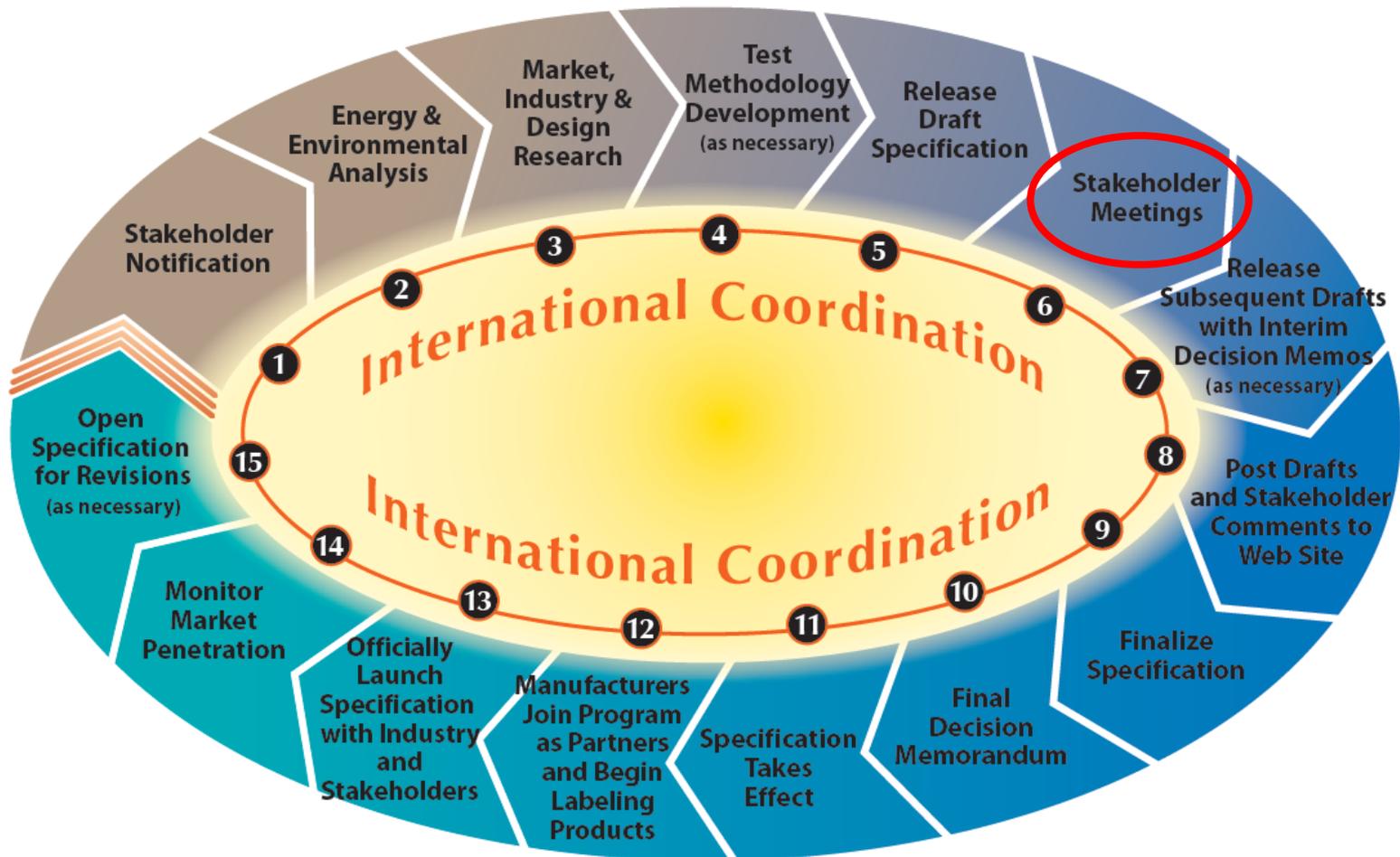


ENERGY STAR's Focus



- Cost-effective
- No sacrifice in performance
- Government backed
- Consumer is Key**

Specification Development Cycle





Important Process Elements

- Consistency
- Transparency
- Inclusiveness
- Responsiveness
- Clarity



Guiding Principles for Specification Development

1. Significant energy savings can be realized on a national basis
2. Product performance can be maintained or enhanced with increased energy efficiency
3. Purchasers recover their investment in increased energy efficiency within a reasonable period of time
4. Energy-efficiency can be achieved through several technologies
5. Product energy consumption and performance can be measured and verified with testing
6. Labeling would effectively differentiate products and be visible for purchasers



Scope and Definitions

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ENERGY STAR Light Commercial HVAC History

- Performance criteria in effect since May 1, 2010
- Current Version 2.2 in effect since January 1, 2011 to align with third party certification program changes
- The market is now ripe for a more stringent ENERGY STAR Light Commercial HVAC specification.



Drivers

- New Federal Minimum Standards
 - January 1, 2017 for less than 65,000 Btu/h 3-phase
 - January 1, 2018 for greater than or equal to 65,000 Btu/h
 - Shift from EER to IEER metric
 - DOE proposed minimum standards are either the same as or more stringent than current ENERGY STAR criteria
- Broad availability
 - In the most commonly sold configurations, 40-50% of models meet ENERGY STAR criteria



Scope - Capacity Range

- At or above 65,000 Btu/h and below 240,000 Btu/h
 - Air-cooled, three-phase, split system, and single package
 - Air-source central air conditioners
 - Air-source heat pumps
 - Gas/electric package units
 - VRF multi-split systems
- Do not include < 65,000 Btu/h due to poor product payback (25 to 30 years)



Drivers to Exclude < 65,000 Btu/hr

- Considered alignment with ENERGY STAR residential levels and/or with CEE Tiers
- Best choice appears to be
 - Split Systems: 15 SEER, 12.5 EER, 8.5 HSPF (ENERGY STAR residential and CEE Tier 1)
 - Single Package: 16 SEER, 12 EER, 8.2 HSPF (CEE Tier 2; Tier 1 provides limited differentiation)
- However, even for this best choice, purchaser would take 25 – 30 years to recover cost
- Slower growing market segment now, per DOE TSD and EPA unit shipment data
- EPA seeks input: *Will costs for more efficient products change quickly in response to DOE standards? Future growth in this size category?*



Definitions

- Updated to maintain consistency with CFR
 - Commercial Package Air-Conditioning and Heating Equipment
 - Central Air Conditioner
 - Heat Pump
 - Energy Efficiency Ratio (EER)
 - Coefficient of Performance (COP)
 - Integrated energy efficiency ratio (IEER)
- Added to maintain consistency with CFR
 - Variable Refrigerant Flow Multi-Split Air Conditioner
 - Variable Refrigerant Flow Multi-Split Heat Pump
- Added Basic Model and removed Product Family definition for consistency with CFR & other ENERGY STAR HVAC specs
- Removed SEER and HSPF definitions in accordance with proposed scope change



Further definition adjustments needed

- Some further updating per discussions with DOE
 - Commercial Package Air-Conditioning and Heating Equipment
 - Central Air Conditioner
 - Heat Pump
 - Gas/electric package unit
 - Basic Model
 - Possibly cooling capacity
- Mostly not changing the meaning, just words to express it
- For Basic Model, intention is to follow DOE practice



Energy Efficiency Criteria

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Notes About Proposed Criteria

- Strive to align with other requirements in the market
 - DOE 2023 standards
 - CEE Tiers
- Balance differentiation (label is meaningful when few products bear it) with product availability (consumers need to be able to find labeled products) and purchaser payback
- Data sources:
 - AHRI certified product directory
 - DOE TSD (w/ASRAC modifications)
 - ENERGY STAR unit shipment data
 - Discussions with manufacturers and other stakeholders
- VRF levels broken out separately at request of manufacturers



Draft 1 Proposed Criteria for Light Commercial AC

Equipment Type	Size Category	Heating Section Type	Minimum Energy Efficiency Criteria
Air-Source Central Air Conditioner	≥65,000 Btu/h – <135,000 Btu/h	Electric Resistance (or None)	12.2 EER; 14.8 IEER
		All other	12.0 EER; 14.6 IEER
Air-Source Central Air Conditioner	≥135,000 Btu/h – <240,000 Btu/h	Electric Resistance (or None)	12.2 EER; 14.2 IEER
		All other	12.0 EER; 14.0 IEER



Draft 1 Proposed Criteria for Light Commercial HP

Equipment Type	Size Category	Heating Section Type	Minimum Energy Efficiency Criteria
Air-Source Heat Pump	≥65,000 Btu/h – <135,000 Btu/h	Electric Resistance (or None)	11.8 EER; 14.1 IEER; 3.4 COP*
		All other	11.6 EER; 13.9 IEER; 3.4 COP*
Air-Source Heat Pump	≥135,000 Btu/h – <240,000 Btu/h	Electric Resistance (or None)	10.9 EER; 13.5 IEER; 3.3 COP*
		All other	10.7 EER; 13.3 IEER; 3.3 COP*

*Note: COP rated at 47° F



Draft 1 Proposed Criteria for Light Commercial VRF Multi-Split Systems

Equipment Type	Size Category	Heating Section Type	Minimum Energy Efficiency Criteria
Air-Source Central Air Conditioner	≥65,000 Btu/h – <135,000 Btu/h	All	20 IEER, 13 EER
Air-Source Central Air Conditioner	≥135,000 Btu/h – <240,000 Btu/h	All	18.5 IEER, 12 EER
Air-Source Heat Pump	≥65,000 Btu/h – <135,000 Btu/h	Without Heat Recovery	20 IEER, 13.0 EER, 3.7 COP*
		With Heat Recovery	19.8 IEER, 12.8 EER, 3.7 COP*
Air-Source Heat Pump	≥135,000 Btu/h – <240,000 Btu/h	Without Heat Recovery	18.5 IEER, 12.0 EER, 3.5 COP*
		With Heat Recovery	18.3 IEER, 11.8 EER, 3.5 COP*



Metrics

- EPA has retained EER requirements
 - Recognize that IEER (now sole DOE requirement) better reflects seasonal energy use in most climates
 - However, strong stakeholder interest remains in EER; still best metric in a few places and for peak demand
- EPA has chosen not to include COP17 requirements
 - Cold climate heating performance important, and COP already measured at 17°F in DOE test, but...
 - Requirement would make COP17 certified rating for ENERGY STAR products – more work, more risk
 - Thus, propose reporting requirement only



Summary of Differentiation and Payback

Size Category	Equipment Type	Heating Section Type	Model %	Payback (yrs)*
≥65,000 Btu/h – <135,000 Btu/h	AC	Electric Resistance (or None)	31%	8.6
		All other	34%	8.6
	HP		17%	7.9
	VRF HP	Without Heat Recovery	23%	8.0
		With Heat Recovery	23%	8.0
≥135,000 Btu/h – <240,000 Btu/h	AC	Electric Resistance (or None)	11%	5.3
		All other	20%	5.3
	HP		13%	4.5
	VRF HP	Without Heat Recovery	25%	4.5
		With Heat Recovery	23%	4.5

*EPA uses simple payback of incremental initial cost divided by annual utility bill savings.



Review of Test Method

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Review of Test Method

- 10 CFR Part 431 Subpart F § 431.96
 - IEER, EER, and COP
- Aligns with DOE test method
 - References all industry test standards in current Version 2.2
- Same data as Version 2.2 – different wording



Updated Sampling Requirements

- Updated for consistency with other ENERGY STAR HVAC categories covered by federal minimum standards.
 - Under multi-sample option, products shall be selected for testing per DOE sampling requirements in 10 CFR Part 429, Subpart B § 429.43.
- Sampling requirements are essentially the same as those of Version 2.2, but now reference basic model definition for certifying additional models



Next Steps

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Next Steps

- Comment deadline 6/9/2016
- Draft Final July 2016
- Final August 2016
- Effective 1/1/2018 (if excludes < 65,000 Btu/h units), otherwise sooner (May 2017?)



Discussion

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Discussion

- Open to comments and questions



Written Comments

- In addition to making verbal comments during today's meeting, stakeholders are strongly encouraged to submit written comments and data
- Please send all comments to: LCHVAC@energystar.gov

Comment Deadline

6/9/2016

[Cover Memo](#)
[Specification](#)



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Backup slides



Overall Market Remains Strong, with ~5% Growth

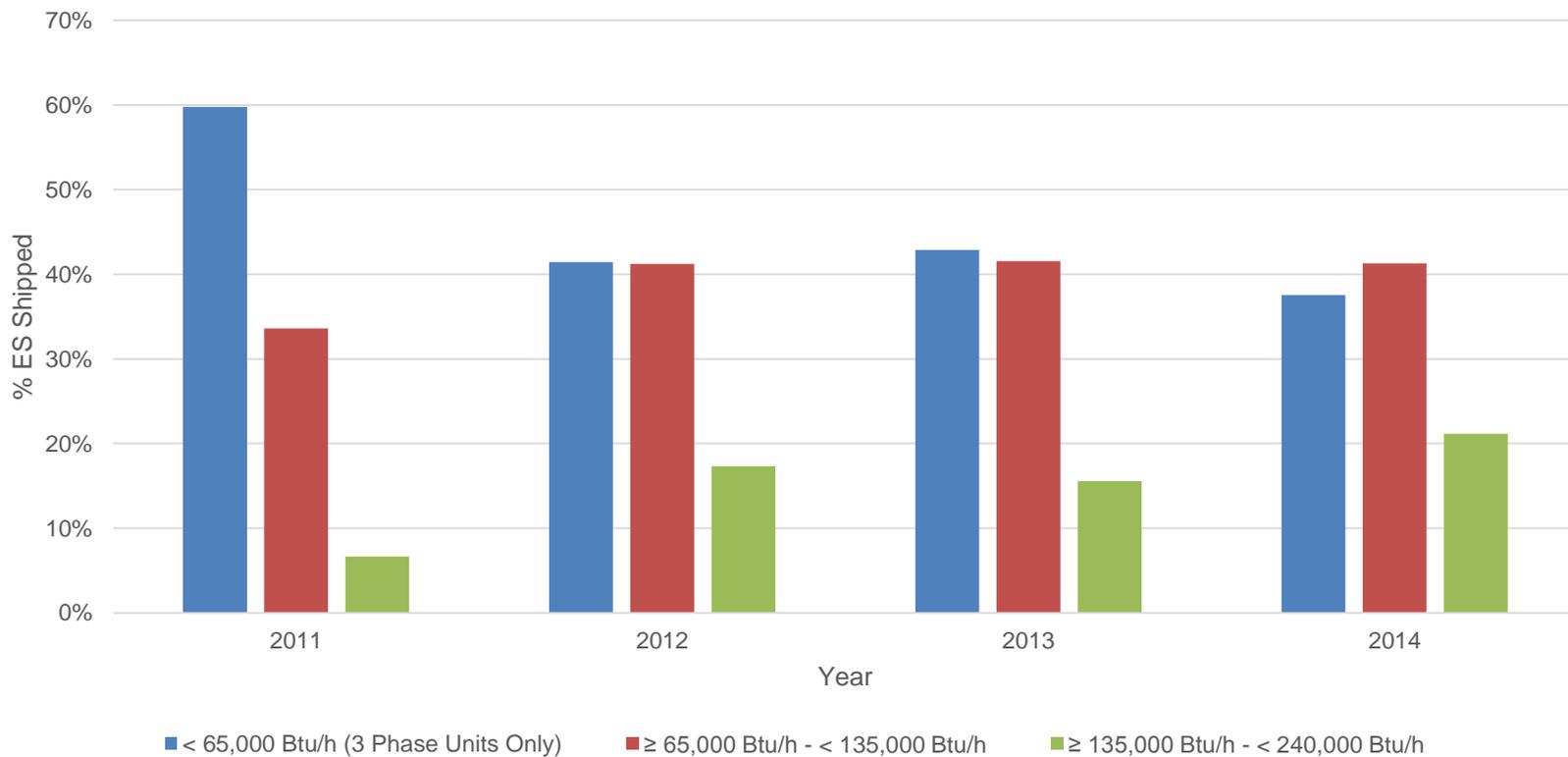


Public AHRI data



Looks Like Mix May be Shifting to Larger Units

ES Shipment Percentage by Size Bins





Supported by DOE Estimates of 1% Growth in this Size Bin

Three Phase <65KBtu/h Shipments, Per DOE TSD

