



ENERGY STAR® Specification Update

Amanda Stevens & Kristen Taddonio, US EPA

Ryan Fogle, D&R International



Learn more at energystar.gov

Agenda



- Introduction
- Specification Updates by Product Category
 - Clothes Washers
 - Dishwashers
 - Room Air Conditioners
 - Refrigerator-Freezers
- Scoping for 2011



Introduction



DOE → EPA Transition



- New challenges and opportunities
 - More products at a faster pace, frequently reviewed
GAO report, Testing and verification upgrades
- Maintaining strong brand is priority
- Memorandum of Understanding explains how ENERGY STAR will prioritize specification revisions



What Triggers a Specification Review?



*“For appliances and other product categories with longer-lived product models specifications will be reviewed for a possible revision at a **minimum of every three years** or once the market share for ENERGY STAR qualifying products reaches **about 35%.**”*



ENERGY STAR's Guiding Principles



ENERGY STAR criteria are designed to balance a varied set of objectives, including:

- Significant energy and/or water savings
- Cost effective
- Energy consumption that can be measured and verified with testing
- Equivalent or enhanced functionality and performance
- Achievable through several technology options; at least one of which is non-proprietary
- Label provides meaningful differentiation



Additional Considerations for Specification Development



Other considerations that may be taken into account include

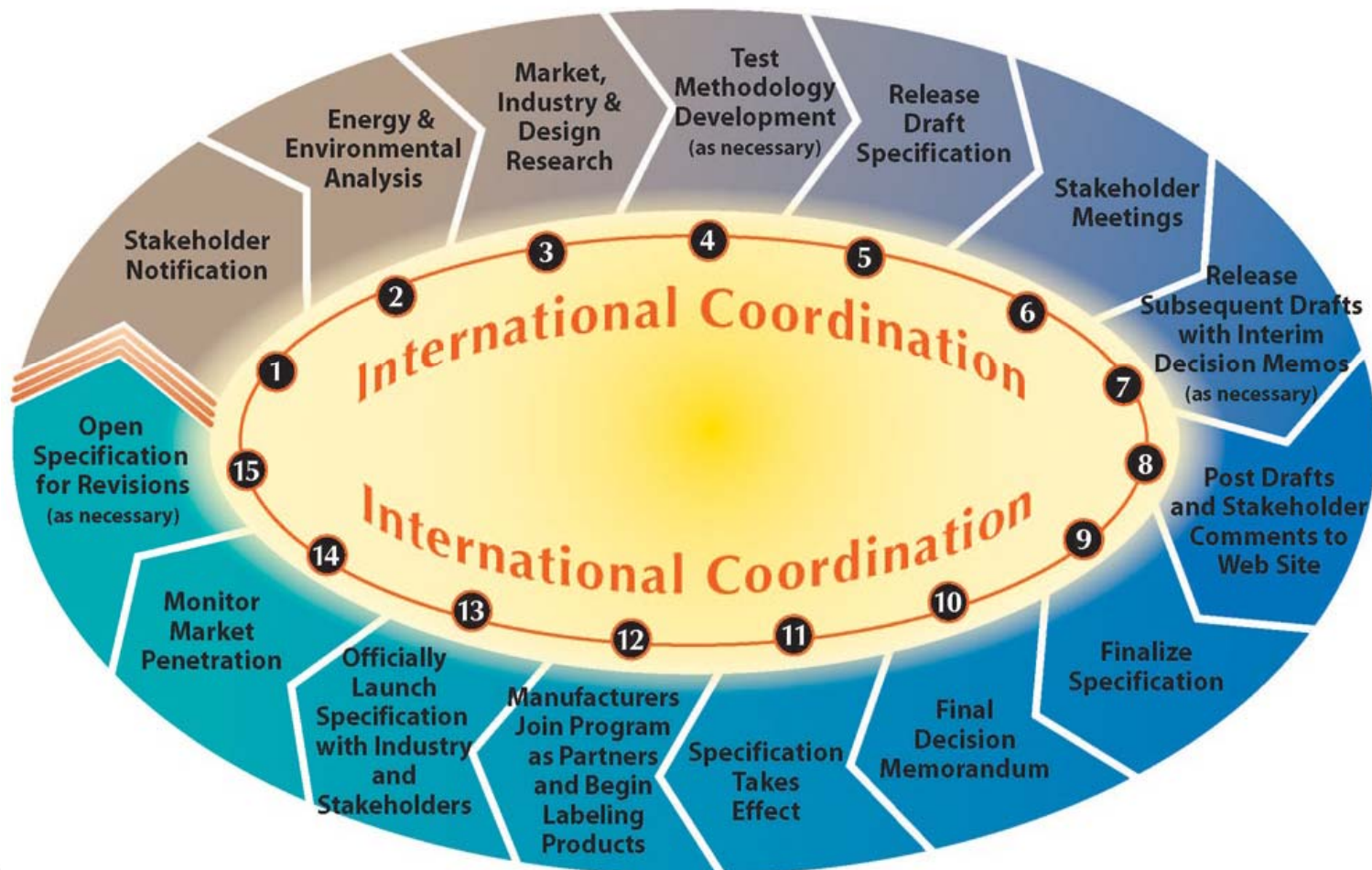
- Changes in federal efficiency standards
- Technological advances in energy efficiency
- Product availability



Specification Development Cycle



Specification Development Cycle





Specification Development Process



- Solicit informal feedback from stakeholders
- Conduct a market and engineering analysis
- Identification of appropriate test procedure(s)
- Analysis of product energy performance data
- Announce proposed ENERGY STAR criteria
- Hold stakeholder meeting
- Evaluate comments/revise proposal
- Finalize criteria



Specification Updates by Product Category



Overview



Clothes Washers

- Revised criteria will take effect January 1, 2011
- Combination washer-dryers tentatively expected to take effect the week of April 1, 2011

Dishwashers

- Criteria under revision; Draft 1 Version 5.0 just released

Room Air Conditioners

- Criteria under review

Refrigerator-freezers

- Criteria under review



Clothes Washers



Combination Washer-Dryers



- ENERGY STAR labels products based on whole-product performance
- A combination (all-in-one) washer-dryer is functionally different from a standard clothes washer
- By including requirements for the drying function, ENERGY STAR will take into account overall efficiency of the unit.



Combination Washer-Dryers



- Effective December 15, 2010, ENERGY STAR will resume qualifying combination washer-dryers with the following interim test procedure:
- Manufacturers shall test clothes washer energy use in accordance with the test procedures specified under 10 CFR 430 Subpart B Appendix J1.
- Manufacturers shall test clothes dryer energy use in accordance with the final revised test procedure published by DOE pursuant to the Supplemental Notice of Proposed Rulemaking in the *Federal Register* 75 FR 37594-37650 (June 29, 2010).
- January 1: all qualifications will go through a Certification Body



Combination Washer-Dryers



- Additionally, report:
 - Remaining Moisture Content after each wash cycle
 - Water used by dryer (where applicable)
 - Water temperature and pressure
- Needed to assess potential differences among models
- Will be used for EPA analysis only



Combination Washer-Dryers

Next Steps



Week of
February 13,
2011

- ENERGY STAR all-in-one requirements proposed

Week of
February 27,
2011

- Stakeholder call on proposed requirements

Week of March
6, 2011

- Second Draft of Requirements proposed

Week of April 1,
2011

- ENERGY STAR requirements finalized and effective





January 1, 2011 Criteria



- In 2008, DOE announced two new clothes washer criteria
 - The first phase was implemented in July 2009
 - Second phase will be implemented January 1, 2011
- The new ENERGY STAR criteria includes
 - Modified energy factor (MEF) ≥ 2.0
 - Water factor (WF) ≤ 6.0





Effect of 2011 Transition



	2009 Criteria	2011 Criteria
MEF	≥ 1.8	≥ 2.0
WF	≤ 7.5	≤ 6.0

New ENERGY STAR criteria will result in real consumer savings

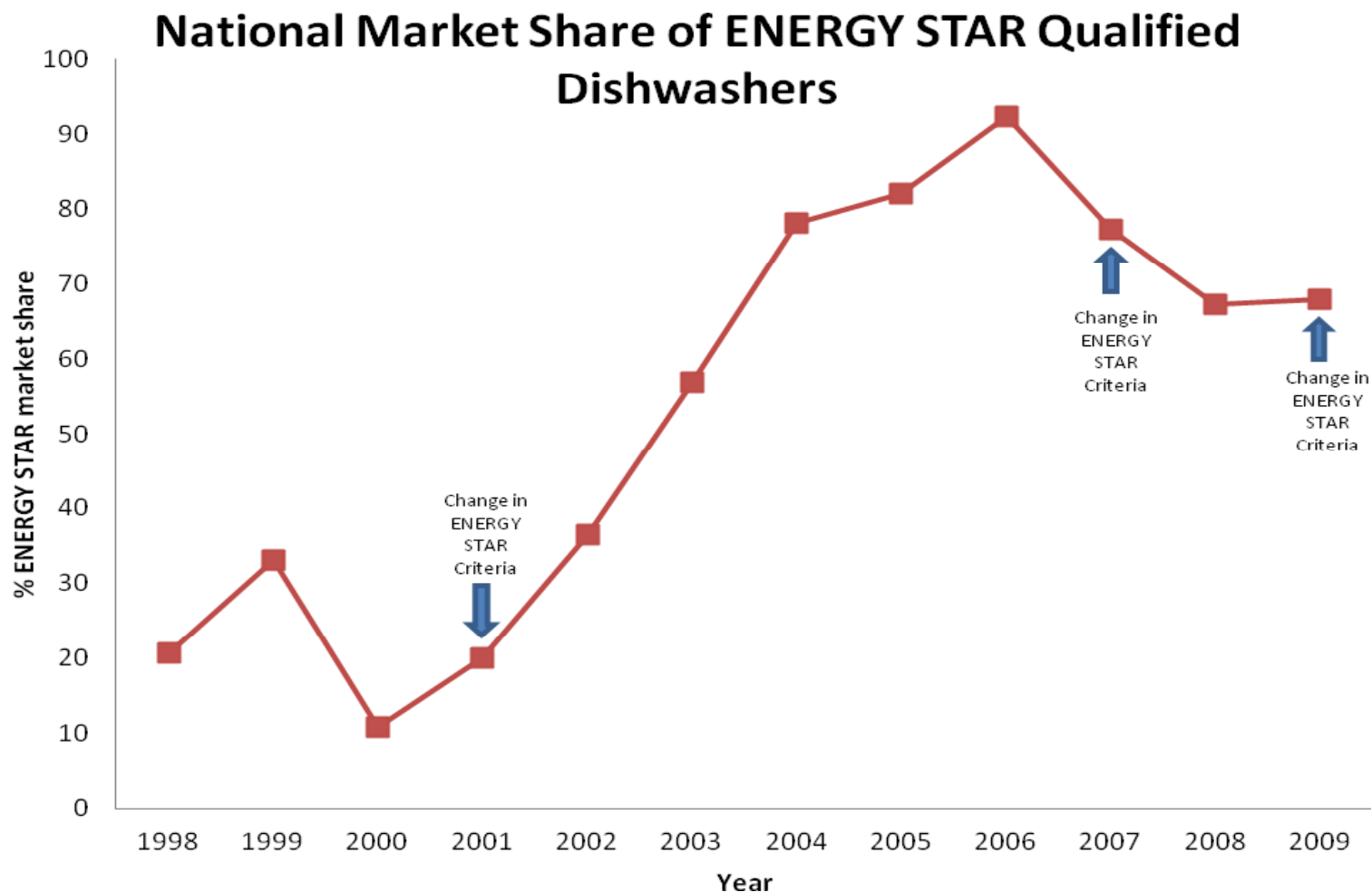
- Annual Energy Savings:
 - 141 kWh
 - 4.5 therms
 - 7,402 gallons of water
- Annual Dollar Savings: \$75.50
- Price Premium Payback: 2 years, 8 months
- Lifetime Savings of a 2011 Clothes Washer: \$830.50



Dishwashers



Why are dishwashers under review?





EPA Is Considering Several Issues



- Phosphate-free dishwashing detergents
- Cleaning performance
- AHAM/advocates proposal
- Market factors
- Engineering factors



Impact of Phosphate Ban on Performance



- 16 states have banned phosphates in dishwashing detergent.
- Industry agreed to ban them effective July 1, 2010
- Performance may be negatively affected without the use of phosphates in dishwasher detergent
- Feedback from manufacturing partners indicates that the lack of phosphates in detergent has not had a large effect on cleaning performance





Cleaning Performance Test



EPA is considering including a cleanliness test to ensure ENERGY STAR qualified dishwashers do not sacrifice on performance.

Cleaning performance tests identified:

- AHAM-DW-1-2009
- IEC 60436 3rd Edition (2004 02)
- NSF 184 2003 (Issue 8, Revision 1)
- Consumers Union
- AHAM-DW-1-1992
- Good Housekeeping



AHAM-Advocates Proposal

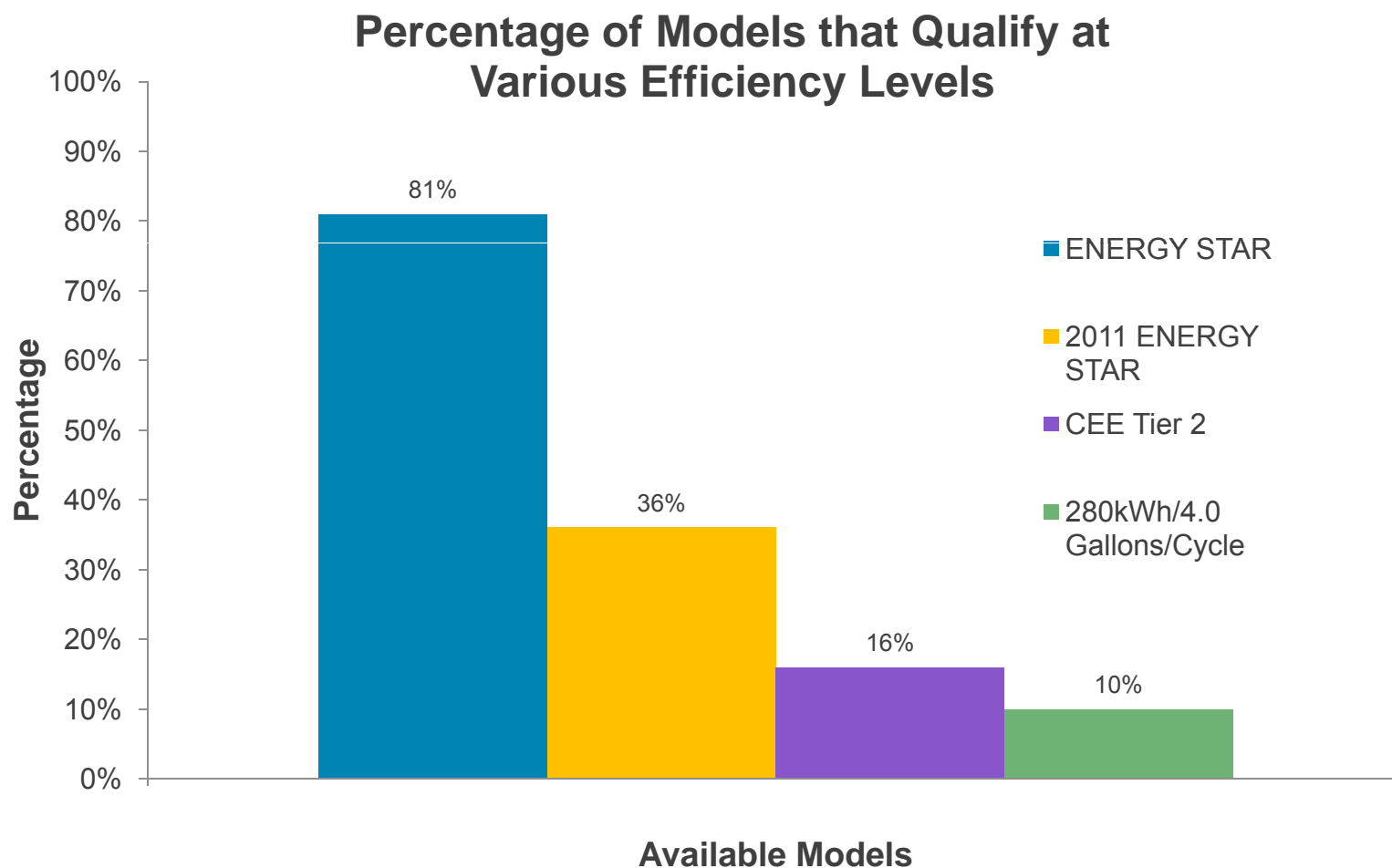


- Proposal jointly submitted to DOE by AHAM and 38 energy and water efficiency advocates proposes new federal standards

Product Description	Proposed New Standard Effective Jan. 1, 2013
Standard (≥ 8 place settings plus 6 serving pieces)	307 kWh/year
	5.0 gallons/cycle
Compact (< 8 place settings plus 6 serving pieces)	222 kWh/year
	3.5 gallons/cycle



Market Factors – Product Availability





Engineering Analysis



Category	Detail	Unit Efficiency Factor		
		Current ENERGY STAR	2011 ENERGY STAR	280 kWh/year 4 gallons/cycle
Insulation by Location	Cavity-Top & Sides	Yes	Yes	Yes
	Cavity-Back	Yes	Yes	Yes
	Cavity-Bottom	No	No	Yes
	Door	No	Yes	Yes
Water System	# of Main Pump Speeds	3	3	1
	Water Supply Tubing Loc.	Exterior	Exterior	Interior
	Water Meter	No	No	Yes
	Multi-Spray / Diverter Valve	Yes	Yes	No
	Float Switch	Yes	Yes	No
	Sump Pressure Transducer	No	No	No
Sprayers by Cavity Location and Type	Bottom	Plastic 3-Arm	Plastic 3-Arm	Stainless 2-Arm
	Middle	Plastic 2-Arm	Plastic 2-Arm	Stainless 2-Arm
	Top	Plastic 2-Arm	Plastic 2-Arm	None
Heating	Heater Type	Tubular	Tubular	Flow-Through
Controls	Type	Electronic	Electronic	Electronic
	Thermocouple	Yes	Yes	Yes
	Soil Sensor	Yes	Yes	No
	Humidity Sensor	No	No	No
	Vent Technology	Active Door Vent	Fan-Assisted Vent	None



Engineering Analysis



Category	Detail	Unit Efficiency Factor		
		Current ENERGY STAR	2011 ENERGY STAR	280 kWh/year 4 gallons/cycle
Insulation by Location	Cavity-Top & Sides	Yes	Yes	Yes
	Cavity-Back	Yes	Yes	Yes
	Cavity-Bottom	No	No	Yes
	Door	No	Yes	Yes
Water System	# of Main Pump Speeds	3	3	1
	Water Supply Tubing Loc.	Exterior	Exterior	Interior
	Water Meter	No	No	Yes
	Multi-Spray / Diverter Valve	Yes	Yes	No
	Float Switch	Yes	Yes	No
	Sump Pressure Transducer	No	No	No
Sprayers by Cavity Location and Type	Bottom	Plastic 3-Arm	Plastic 3-Arm	Stainless 2-Arm
	Middle	Plastic 2-Arm	Plastic 2-Arm	Stainless 2-Arm
	Top	Plastic 2-Arm	Plastic 2-Arm	None
Heating	Heater Type	Tubular	Tubular	Flow-Through
Controls	Type	Electronic	Electronic	Electronic
	Thermocouple	Yes	Yes	Yes
	Soil Sensor	Yes	Yes	No
	Humidity Sensor	No	No	No
	Vent Technology	Active Door Vent	Fan-Assisted Vent	None



Proposed Criteria – Energy and Water



Product Type	ENERGY STAR Draft 1 Version 5.0 Specification
Standard-Size Dishwashers	≤ 280 kWh/year ≤ 4.0 gallons of water per cycle
Compact Dishwashers	≤ 222 kWh/year ≤ 3.5 gallons of water per cycle



Proposed Criteria – Cleaning Performance



- A cleaning performance requirement will help ensure ENERGY STAR qualified models deliver efficiency with no sacrifice in performance
- Stakeholders are invited to comment on the test procedures noted in the draft specification document
 - AHAM-DW-1-2009
 - IEC 60436 3rd Edition (2004-02)
 - NSF 184 2003 (Issue 8, Revision 1)
 - Consumers Union
 - AHAM-DW-1-1992
 - Good Housekeeping





DW Specification Update – Timeline



Anticipated Schedule for Criteria Update	
October 26, 2010	Stakeholder meeting in Washington D.C. to discuss Draft 1 specification
November 3, 2010	Comment period closes on Draft 1 specification
November 2010	Draft 2 specification proposed; stakeholder meeting or webinar; and comment period.
Early 2011	Final Draft specification proposed; stakeholder meeting or webinar; and comment period.
February 28, 2011	Final specification posted
Fall 2011	Final specification effective



Room Air Conditioners



Why is the RAC specification under review?



- High market share
 - 36% (2009 estimate)
- Specification has not been raised since 2001
- Widespread product availability
 - About half of available models are ENERGY STAR qualified





Factors EPA is Considering



- R-22 refrigerant
- AHAM/advocates proposal
- Federal standard
- Market factors
- Engineering factors
- Part-load technology and Smart Technologies

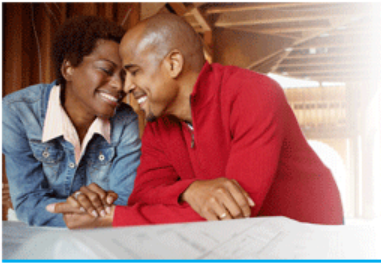


R-22 Refrigerant



- Refrigerant R-22 was phased out beginning January 1, 2010
 - Manufacturers no longer allowed to make RACs with R-22
 - Importation of RACs using R-22 is now illegal
- R-410A is the new refrigerant
- Manufacturers made this transition while maintaining a high market share and product availability





Joint Federal Standard Proposal



- Jointly submitted by AHAM and 38 energy and water efficiency advocates
- Proposes new federal standards to DOE
 - Most proposed levels for RACs are at or above current ENERGY STAR criteria
- Indicates higher levels are technologically and economically feasible





RAC – Federal Standard



DOE is considering amendments to the federal standard for RACs and has already proposed new test procedures.

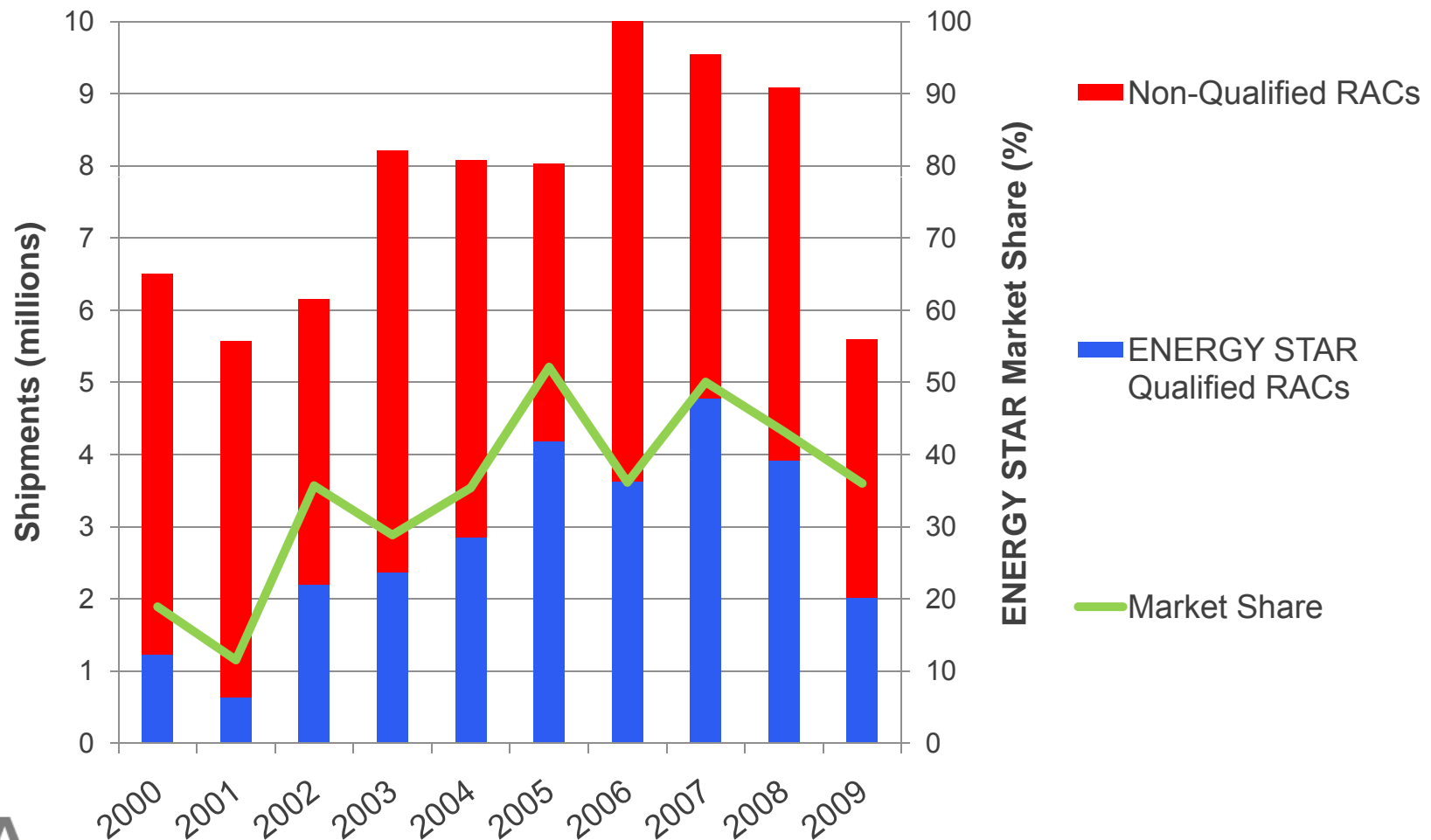
- Proposed new test procedure and standards revisions are based on combined energy efficiency ratio (CEER), which takes standby energy mode use into account



RAC Shipments and ENERGY STAR Market Share



Room Air Conditioner Shipments and ENERGY STAR Market Share





Market Share By Category



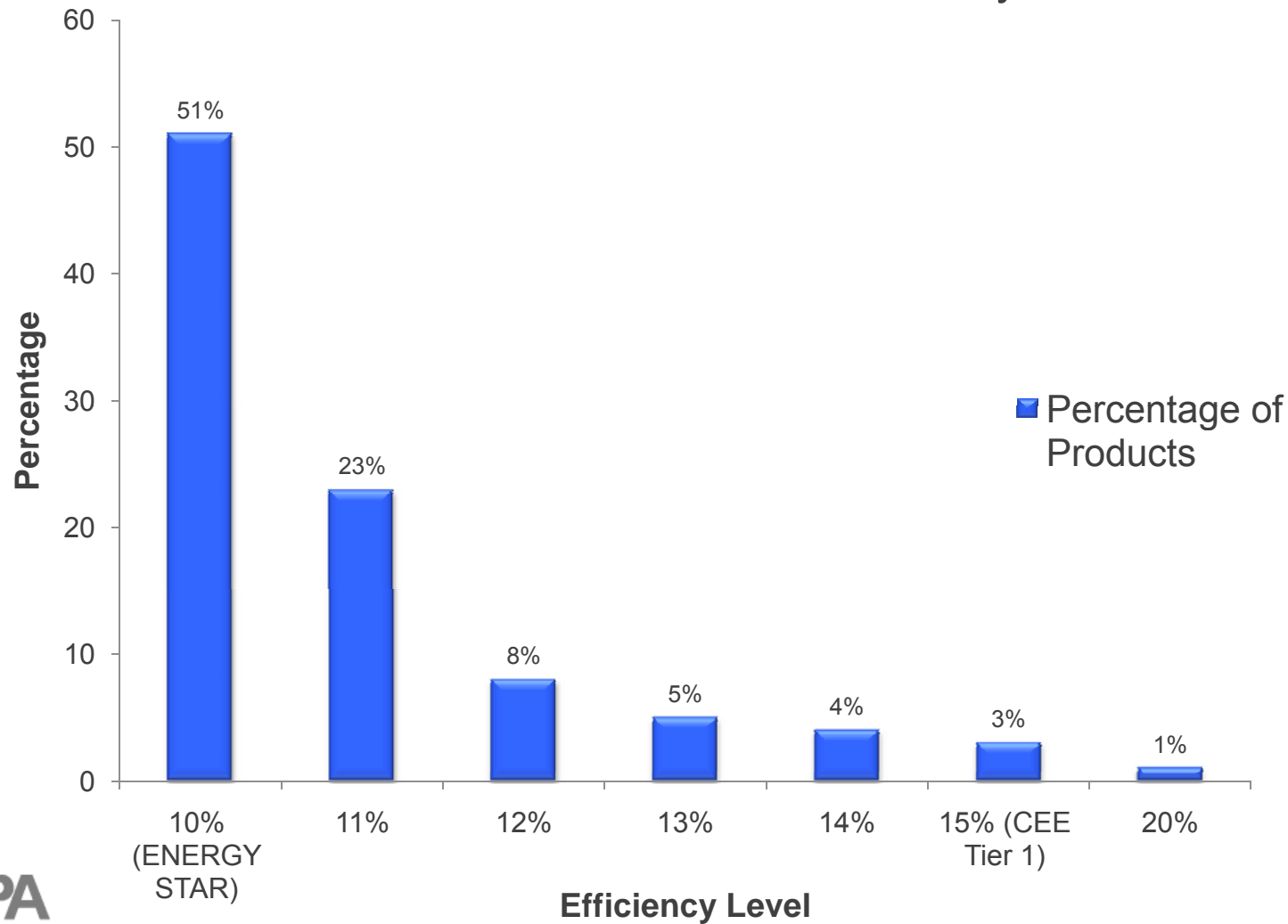
Product Class	Market Share (%)
Traditional RACs	
Less than 6,000 Btu/hr	30.68
6,000 to 7,999 Btu/hr	18.01
8,000 to 13,999 Btu/hr	33.35
14,000 to 19,999 Btu/hr	4.84
20,000 Btu/hr or more	2.83
Without reverse cycle and without louvered sides	
Less than 7,999 Btu/hr	0.40
8,000 to 13,999 Btu/hr	7.96
14,000 Btu/hr or more	0.30
With reverse cycle	
With louvered sides	0.90
Without louvered sides	0.25
Casement	
Casement only/casement slider	0.47



RAC Availability



Total RAC Product Availability





RAC Design Options



Design	Cost-Effective?	Already in Use?	Effect on Consumer	Other Notes
Increased depth of coil	No	Yes	Heavier Unit, higher costs	This has a practical limit; each row of coils has a lower efficiency than the previous row
Subcooler addition to condenser coil	Yes	Yes	Unknown	Low impact on efficiency
More efficient indoor blowers	Unknown	Unknown	Noise	Space Restrictions
More efficient outdoor fans	Unknown	Unknown	Noise	Space Restrictions
More efficient fan motors	No	Unknown	Noise	
Switching power supply	No	Unknown	Unknown	Results in approximately 50% savings in standby power; greater complexity





Part-Load Technology & “Smart” Technology



Q. Is part-load technology being considered for the new RAC criteria?

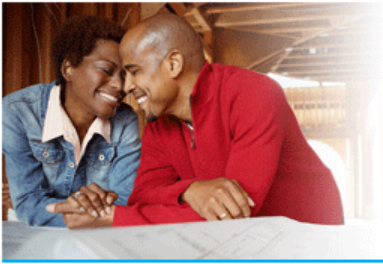
A. EPA is not planning to pursue part-load technology for RACs at this time due to lack of test procedure

Q. Will “smart” technologies be implemented in the future ENERGY STAR criteria for RACs?

A. EPA encourages discussion on opportunities for encouraging “smarter” appliances.



Check out session later today, *On the Horizon: New Opportunities for Appliance Energy Savings*, for discussion on “smart” technologies including Smart Grid.



Next Steps...



- EPA is assessing criteria options
- Timing
 - Expectation is to release a Draft 1 spec by the end of October 2010
 - EPA aims to get new criteria in place for 2012 cooling season



Refrigerators-Freezers



Current Levels



Product Type	Current ENERGY STAR Level	Notes
Full-Size Refrigerators & Refrigerator-Freezers	20% less energy than NAECA	Criteria as of April 28, 2008
Full-Size Freezers	10% less energy than NAECA	Criteria as of January 1, 2003
Compact Refrigerators, Refrigerator-Freezers, and Freezers	20% less energy than NAECA	Criteria as of January 1, 2003



Motivation for Review



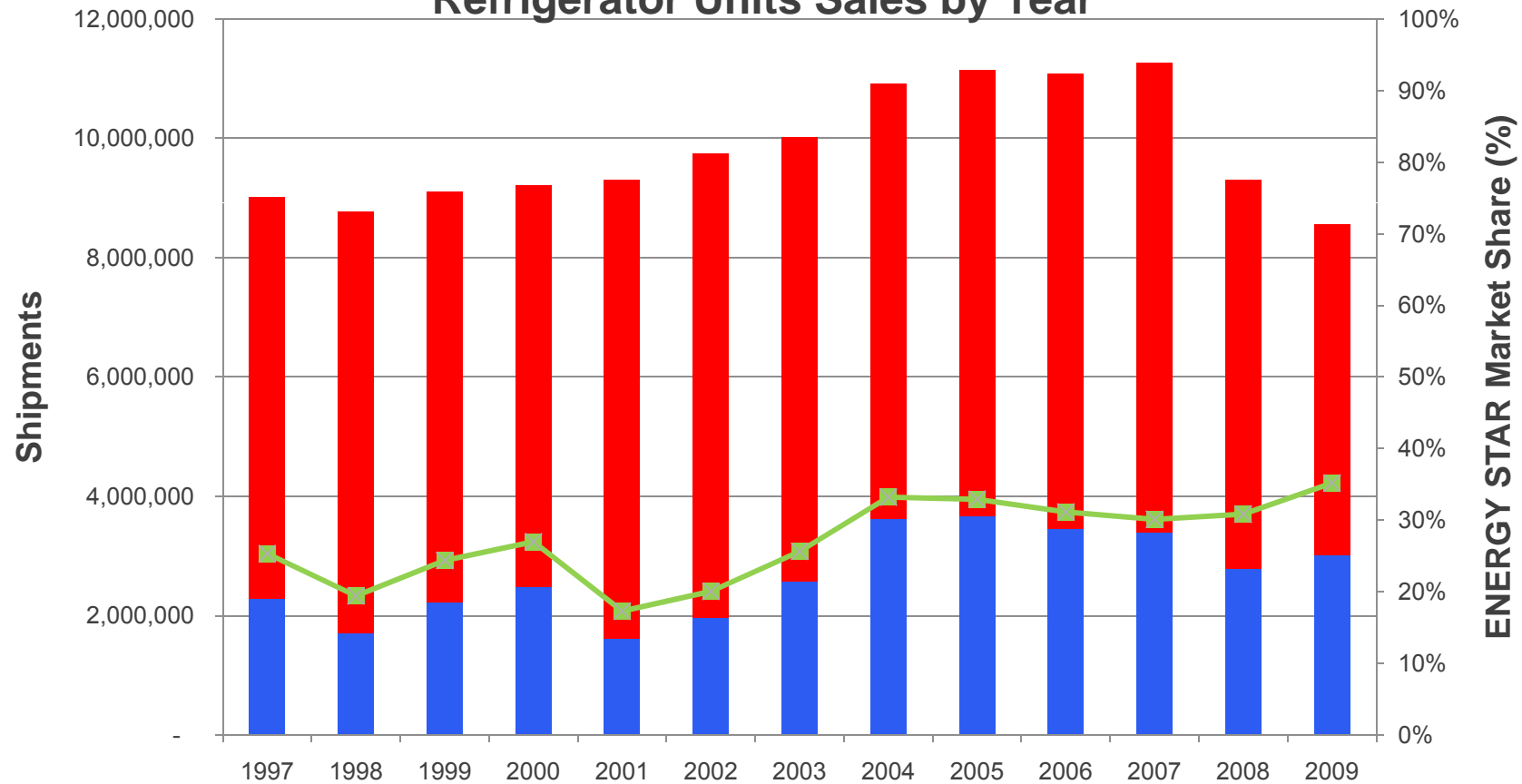
- Current spec is due for an update
 - MOU calls for reviews, at a minimum, every 3 years
- High market share
 - Currently 35%
- Widespread product availability at higher efficiencies
- Updates to Federal test procedure and standards
- Concerns over the absolute energy consumption of units and comparison between product classes



Refrigerator Market Share



**ENERGY STAR Market Share and
Refrigerator Units Sales by Year**



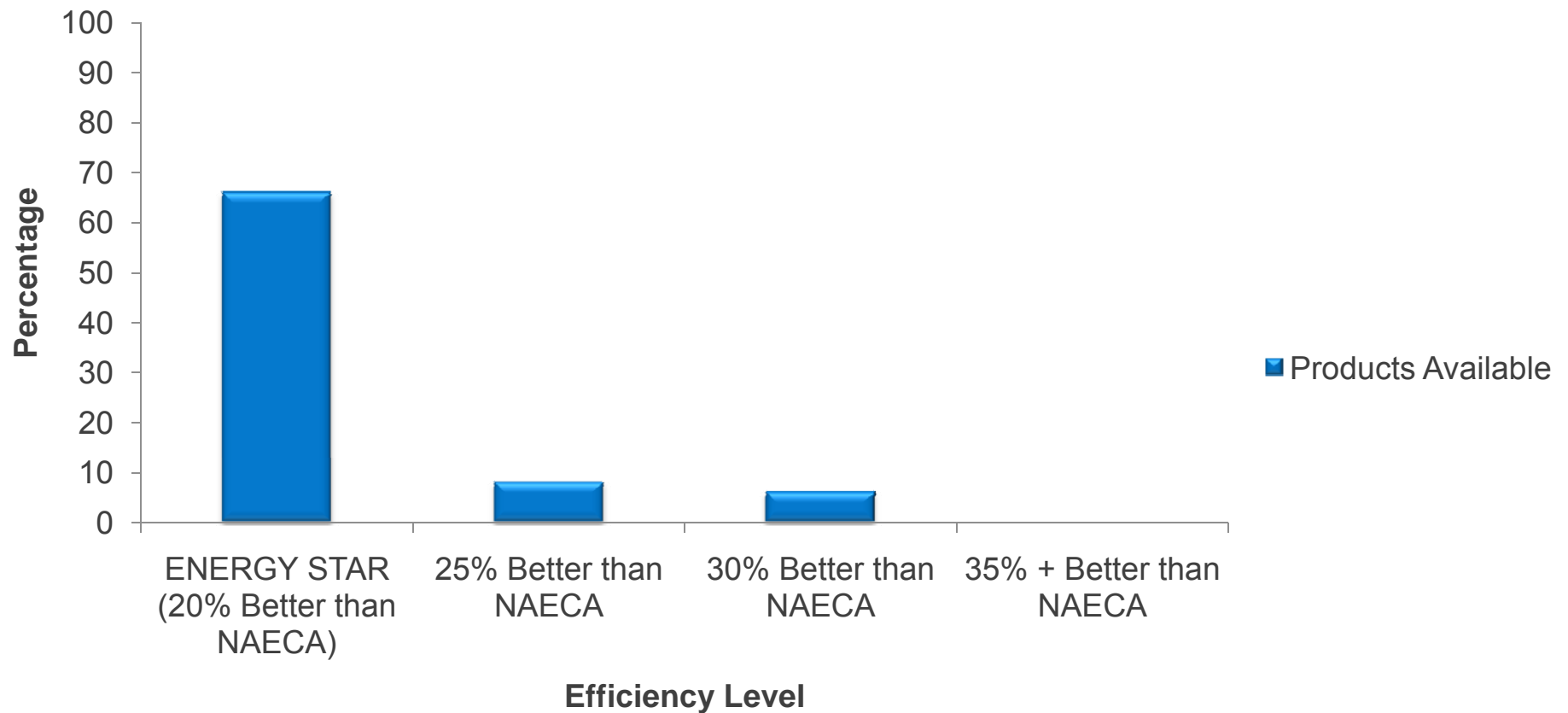
■ ENERGY STAR Qualified Shipments ■ Standard Shipments
—■— ENERGY STAR Market Share



Product Availability



Full-Size Refrigerators and Refrigerator-Freezers Available in 2010





Test Procedure Revisions



- DOE is in process of amending the federal test procedure for refrigeration products
 - First stage will try to eliminate ambiguities, clarify DOE interpretations, and account for the de facto product classes created through waiver process.
 - Second stage will try to improve harmonization with international standards, test repeatability, better reflect actual energy consumption, and incorporate the updated AHAM Standard HRF-1-2008.
 - Changes to compartment temperature settings and volume calculations will increase tested energy consumption
 - Address automatic icemaker energy use -- use 84 kWh/yr as interim value.



Updates to Federal Standards



- DOE has proposed new Federal standards for 2014
 - 20-25% for full-size refrigerator-freezers, refrigerators
 - 20-30% for full-size freezers
 - 10-25% for compact refrigerators, refrigerator-freezers, and freezers
- AHAM-Advocates Joint Proposal included recommendations for manufacturer tax credits for Refrigerators and Freezers:

Tax Credit Amount	Manufactured In	Percent Better
\$150	2011, 2012, 2013	30%
\$200	2011, 2012, 2013	35%



Other Considerations



- Addressing vulnerabilities created by criteria that are based on relative efficiency
 - Certain configurations are allowed to use substantially more energy, per cubic foot, than others.
 - ENERGY STAR is recognizing the most efficient units in a product class, not most efficiency units, overall.
 - Refrigerators are allowed to have a high absolute energy consumption, and still qualify for ENERGY STAR
 - *“For product categories with large variations in product size (with impacts on energy use), overall limits for energy use may be incorporated into ENERGY STAR specifications.”*
- Opportunities to improve the life-cycle performance

P23

-www.energystar.gov/mou



Next Steps...



- EPA is assessing criteria options
- **Timing**
 - EPA plans to begin revision in late 2010
 - Expectation is to finalize a new spec in 2011



Scoping for 2011



Anticipated 2011 Scoping



- Ranges
- PTACs
- Dryers
- Countertop Appliances

Stay Tuned!



Questions?



- Kristen Taddonio
Taddonio.Kristen@epamail.epa.gov
- Amanda Stevens
Stevens.Amanda@epamail.epa.gov
- Ryan Fogle
rfogle@drintl.com