



ENERGY STAR[®]

Residential Refrigerators and Freezers

Draft 1 Version 5.0
Stakeholder Webinar
November 15, 2011

Agenda



Introduction – Welcome/Goals	Amanda Stevens, U.S. EPA
Refrigerators & Freezers Draft 1, Version 5.0: Summary & Discussion	
<ul style="list-style-type: none">- Definitions- Scope- Clarifications on Test Requirements	Ryan Fogle, D&R Int'l
<ul style="list-style-type: none">- Revisions to the Maximum Annual Energy Use- Discussion on Possible V6.0 Levels	Amanda Stevens, U.S. EPA Ryan Fogle, D&R Int'l
<ul style="list-style-type: none">- Proposed “Connected” Functionality	Amanda Stevens, U.S. EPA Doug Frazee, ICF Int'l
<ul style="list-style-type: none">- “Connected” Test Procedure	Ashley Armstrong, U.S. DOE
Conclude & Next Steps	Amanda Stevens, U.S.EPA

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Introduction and Meeting Goals



1. Present proposed Draft 1 Version 5.0 ENERGY STAR Refrigerator and Freezer Requirements.
2. Address questions and facilitate stakeholder discussion on proposal and any related issues.
3. Provide status update on DOE's development of test procedure for "Connected" functionality.
4. Discuss next steps and timeline for Version 5.0 revision.

Refrigerators and Freezers V5.0 Spec Development



- EPA launched specification revision in July 2011
- A Framework document was shared with stakeholders that outlined possible changes for Version 5.0:
 - Changes to the approach of setting maximum annual energy use criteria.
 - Simplified product class structure enabling the program to better differentiate top performers for consumers.
 - Tougher requirements for the very largest products.
 - Possible future requirement around foam blowing agents (many of which are potent GHGs).
 - Considerations on addressing new opportunities from “connected” and “smart grid” functionality.

Highlights: Proposed Draft 1



- **Refrigerators and Refrigerator-Freezers:**
 - Proposed levels recognize best performing side by sides, bottom freezers and top freezers. Functional Adders proposed to provide some additional energy allowance where needed (e.g., through the door ice).
 - Levels become gradually more challenging for largest units.
- **Freezers**
 - Revised level for each of the three types of freezers (e.g., manual and auto defrost upright freezers, chest freezers).
- **Compact Refrigerators**
 - Some revisions proposed; identified levels offer continuity across full-size and compact sizes.
- **“Connected” Product Criteria**
 - Near-term consumer value attributes and future-oriented demand response capabilities; proposed incentive for products meeting connected criteria

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Definitions



- Minor changes made to the following definitions to harmonize with current DOE definitions:
 - Electric Refrigerator
 - Freezer
 - Electric Refrigerator-Freezer
 - Compact refrigerator/refrigerator-freezer/freezer
- The Basic Model definition has also been amended to be consistent with 10 CFR § 430.2.
 - For further explanation on this definition, please refer to DOE's Final Rule:
http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/cce_finalrule_notice.pdf

Scope



- EPA is proposing to formalize its policy of not covering wine refrigerators in the residential refrigeration program.
 - Planning to track future DOE rulemaking on these products; will engage with stakeholders to assess opportunity from expanding ENERGY STAR to cover wine refrigerators.
 - Also, clarifying that all products meeting the technical definition of compact refrigerator or compact refrigerator-freezer would be eligible for ENERGY STAR.
 - Including products marketed as “beverage centers”.
-  – Current FAQ would be revised accordingly.

Test Requirements & Model Numbers



- Formalized current practice of allowing manufacturers to qualify products by using one of two sampling plans:
 1. A representative unit may be selected for testing based on the definition for Basic Model.
 2. Units may be selected for testing per the DOE sampling requirements defined in 10 CFR 429.14.
- Model numbers used for ENERGY STAR qualified product submissions shall be the same as those submitted to FTC and DOE.

Questions/comments on:

- Definitions?
- Scope?
- Test Requirements & Model Numbers?

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Goals for V5.0 Revision Discussed in Framework



1. To better enable consumers to identify the most efficient refrigerators, irrespective of configuration;
2. To address disproportionately high market share for certain configurations; and
3. To address concerns that refrigerators with high absolute energy consumption can qualify for ENERGY STAR.

Draft 1 Version 5.0 Proposal



- EPA is proposing to maintain separate levels for different refrigerator-freezer configurations.
 - Proposal will make it more challenging for larger, more energy consumptive products to attain the ENERGY STAR.
 - Proposal will narrow the difference in energy use among qualified models.
- Enables EPA to better distinguish top performing models while maintaining choice for consumers.
- Proposed effective date: January 1, 2013

Proposed Energy Criteria



- Consistent with the principle of no sacrifice, EPA expressed levels as curves which increase as a function of size.
 - All full-size products continue to be eligible.
 - Levels become gradually more challenging for larger units, while also recognizing there is some additional energy requirement as products become bigger.
- Formula include the base energy use plus any applicable functional adders.
 - Product specific formulas will be presented later in the presentation.

Maximum AEC

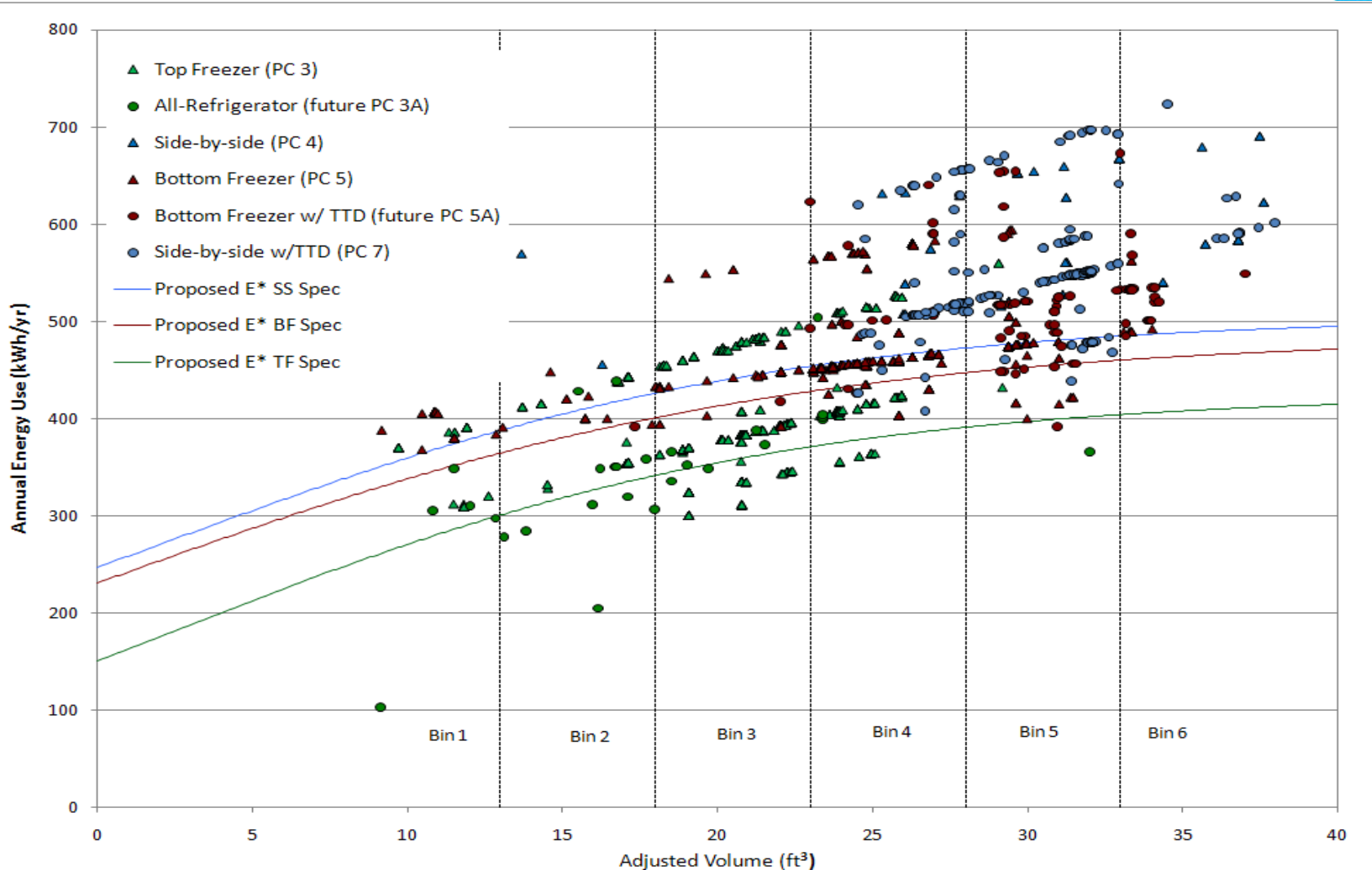
- Annual Energy Consumption (AEC) shall be less than or equal to AEC_{MAX} :

$$AEC_{MAX} = AEC_{BASE} + \sum_{i=1}^n AEC_{ADD_i}$$

Where,

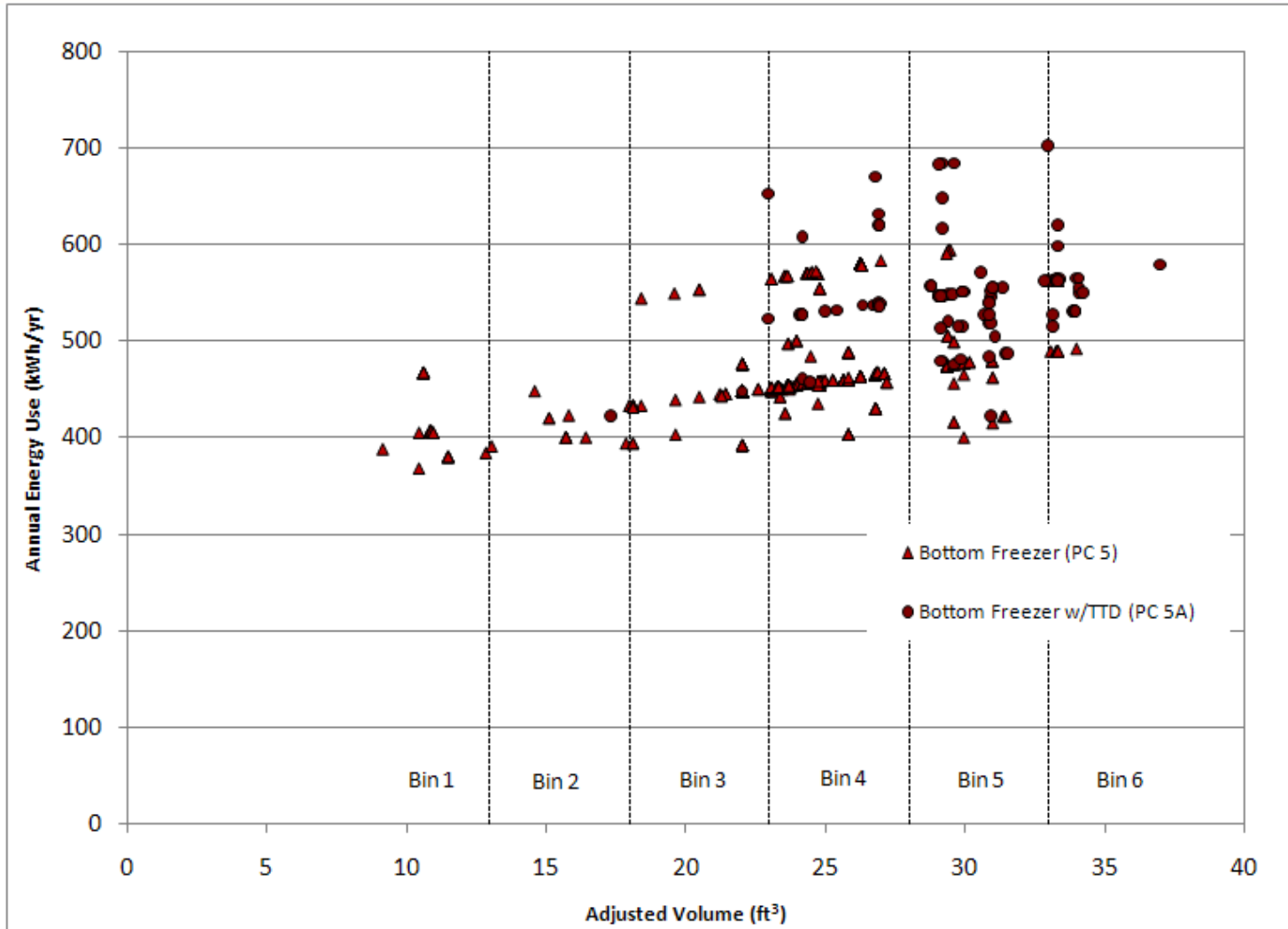
- AEC_{BASE} = annual energy consumption base allowance in Table 1
- AEC_{ADD_i} = annual energy functional adder in Table 2

Proposed V5.0 Levels for Full-Size Refrigerators and Refrigerator-Freezers

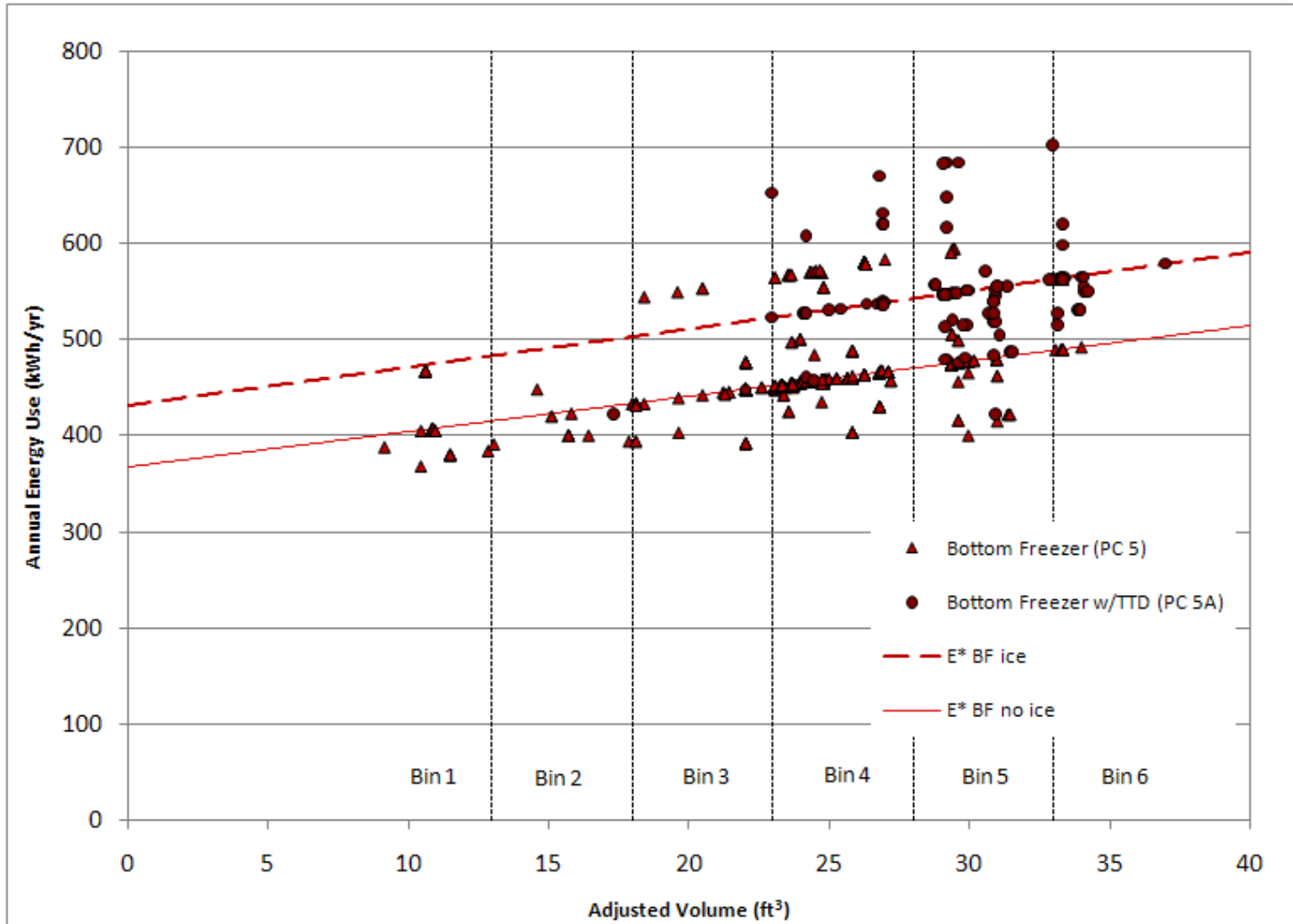


Note: Annual Energy Use of models with through the door ice service have been adjusted by the amount of the proposed functional adder (30kWh/year) in order to convey the models that meet the proposed levels.

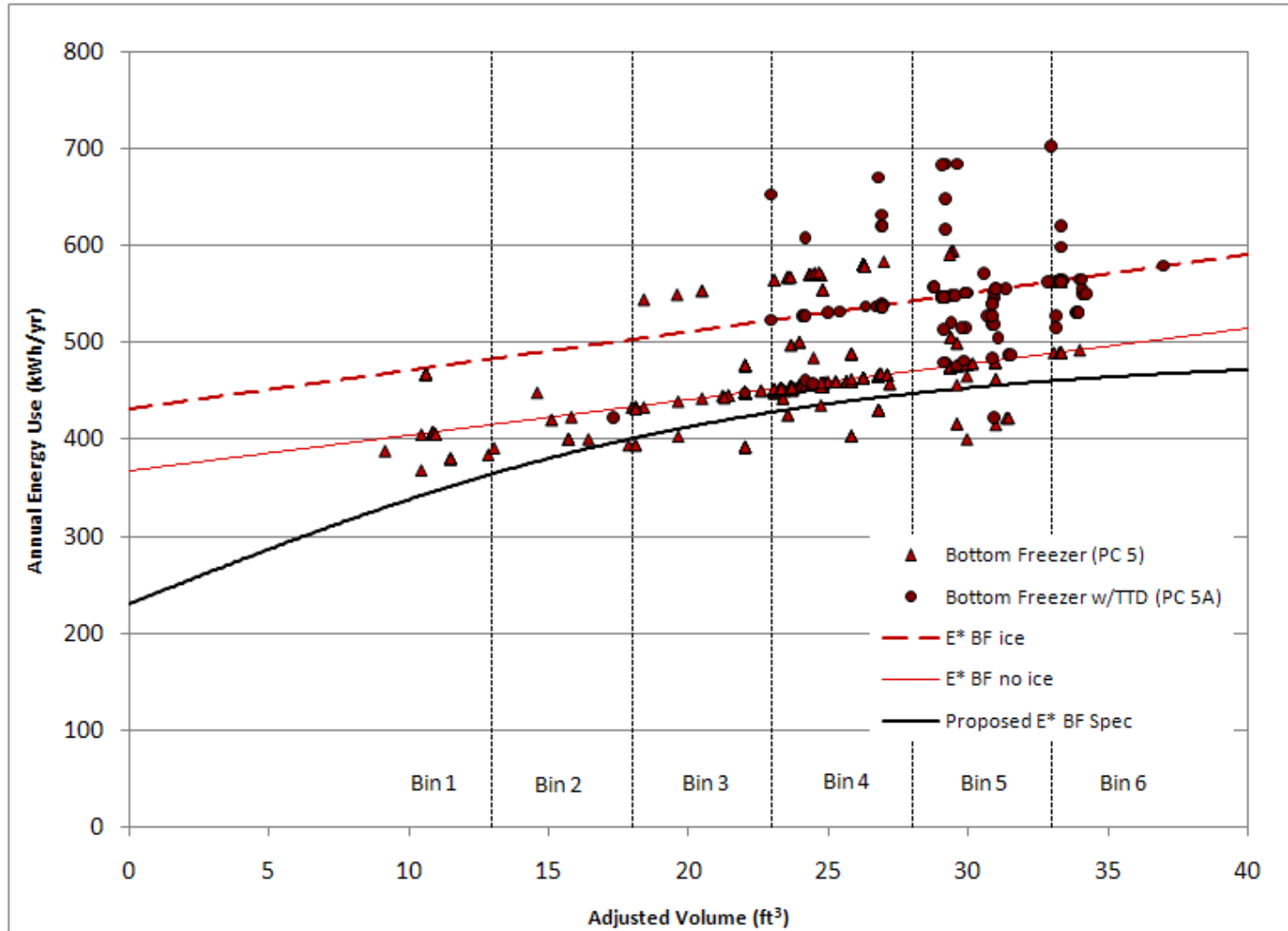
Example: Bottom Freezers



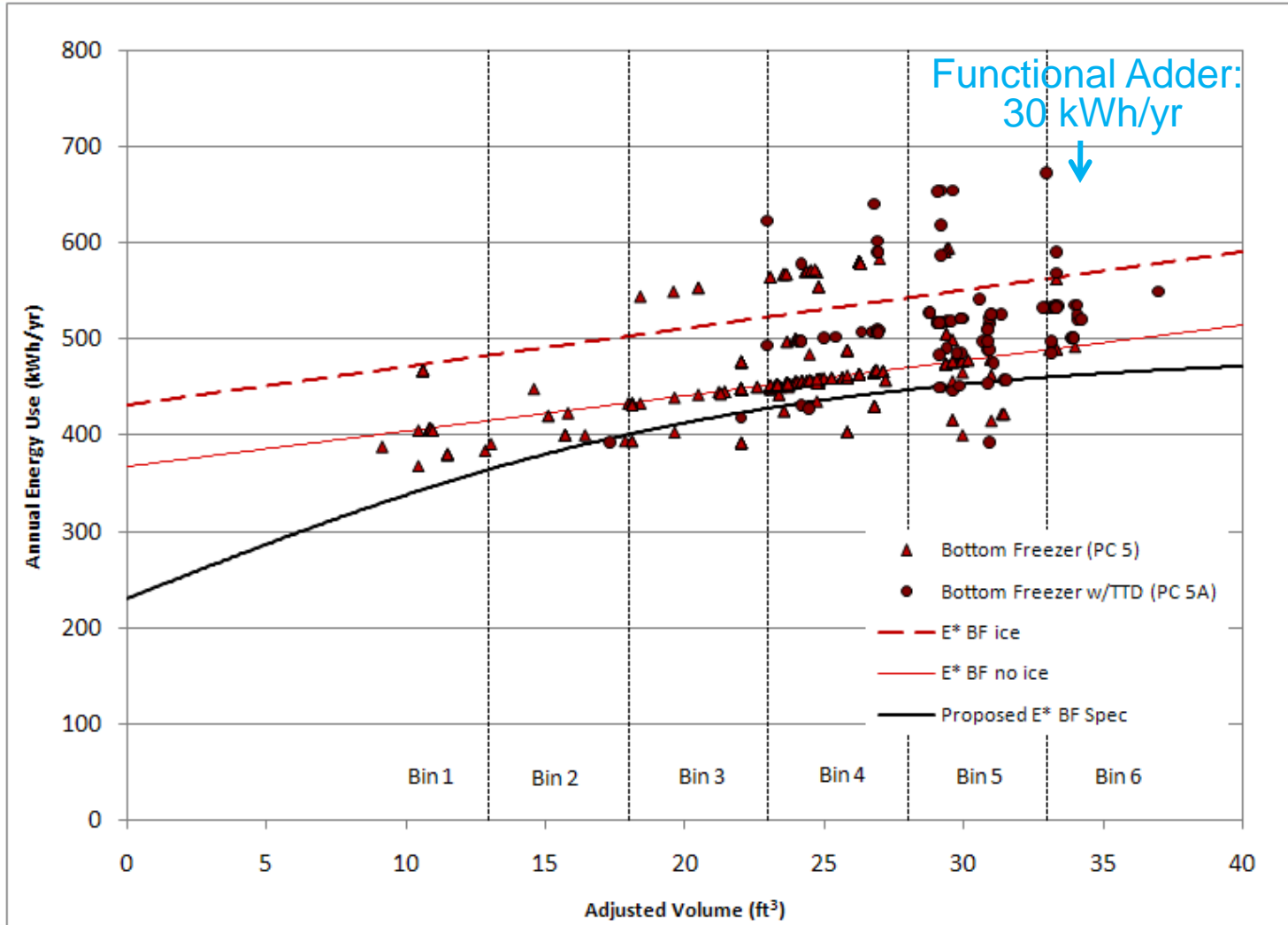
Example: Bottom Freezers



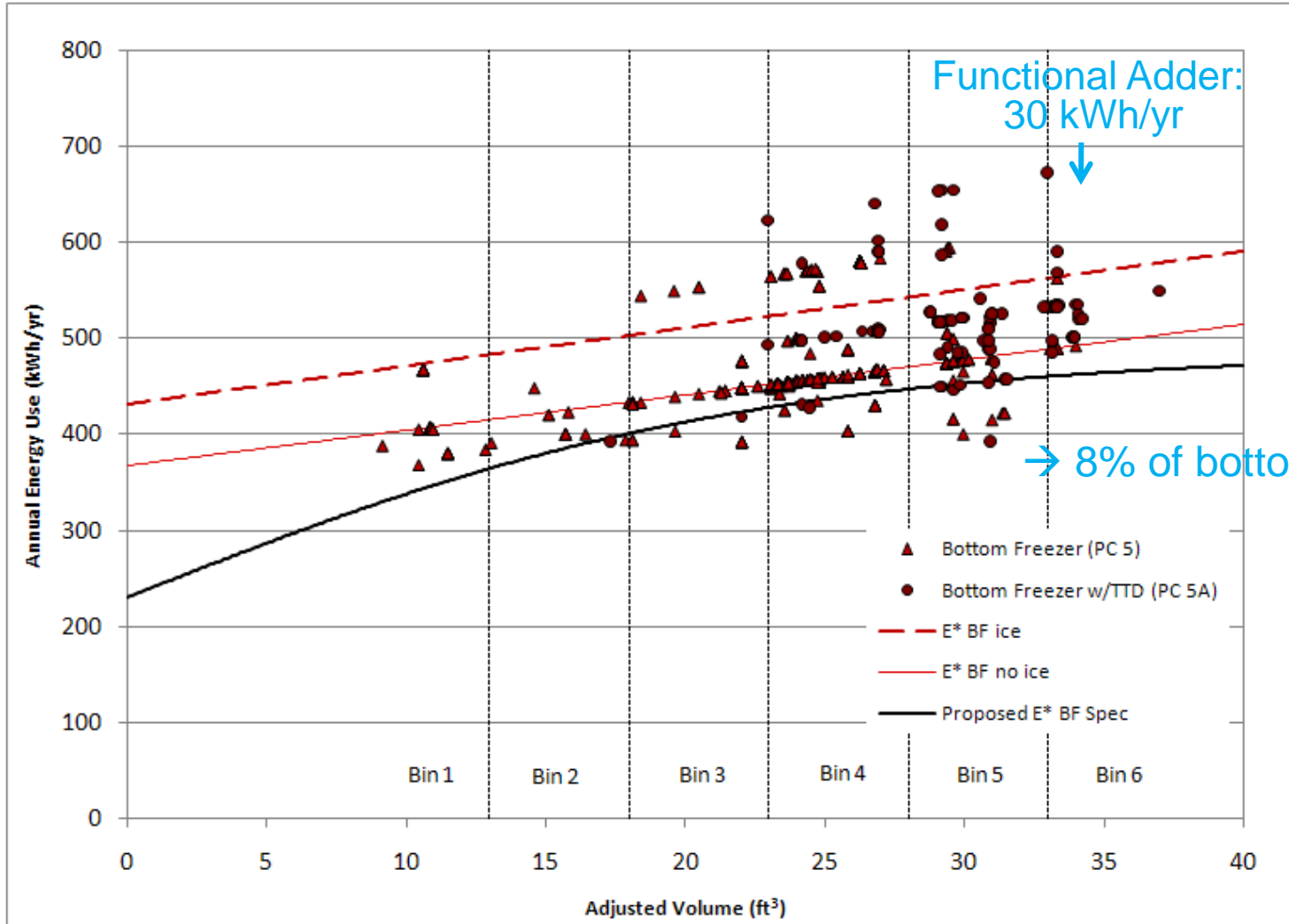
Example: Bottom Freezers



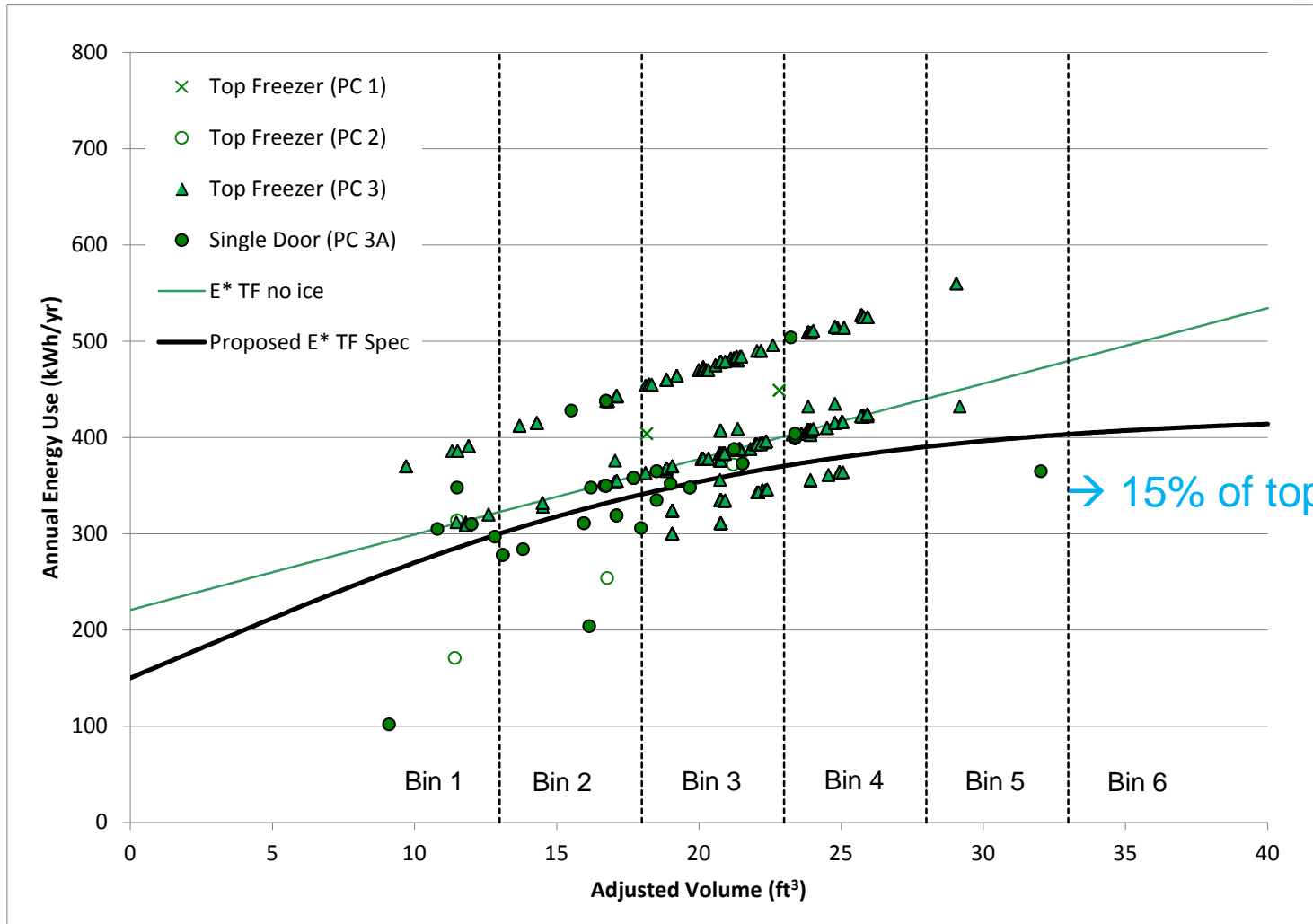
Example: Bottom Freezers



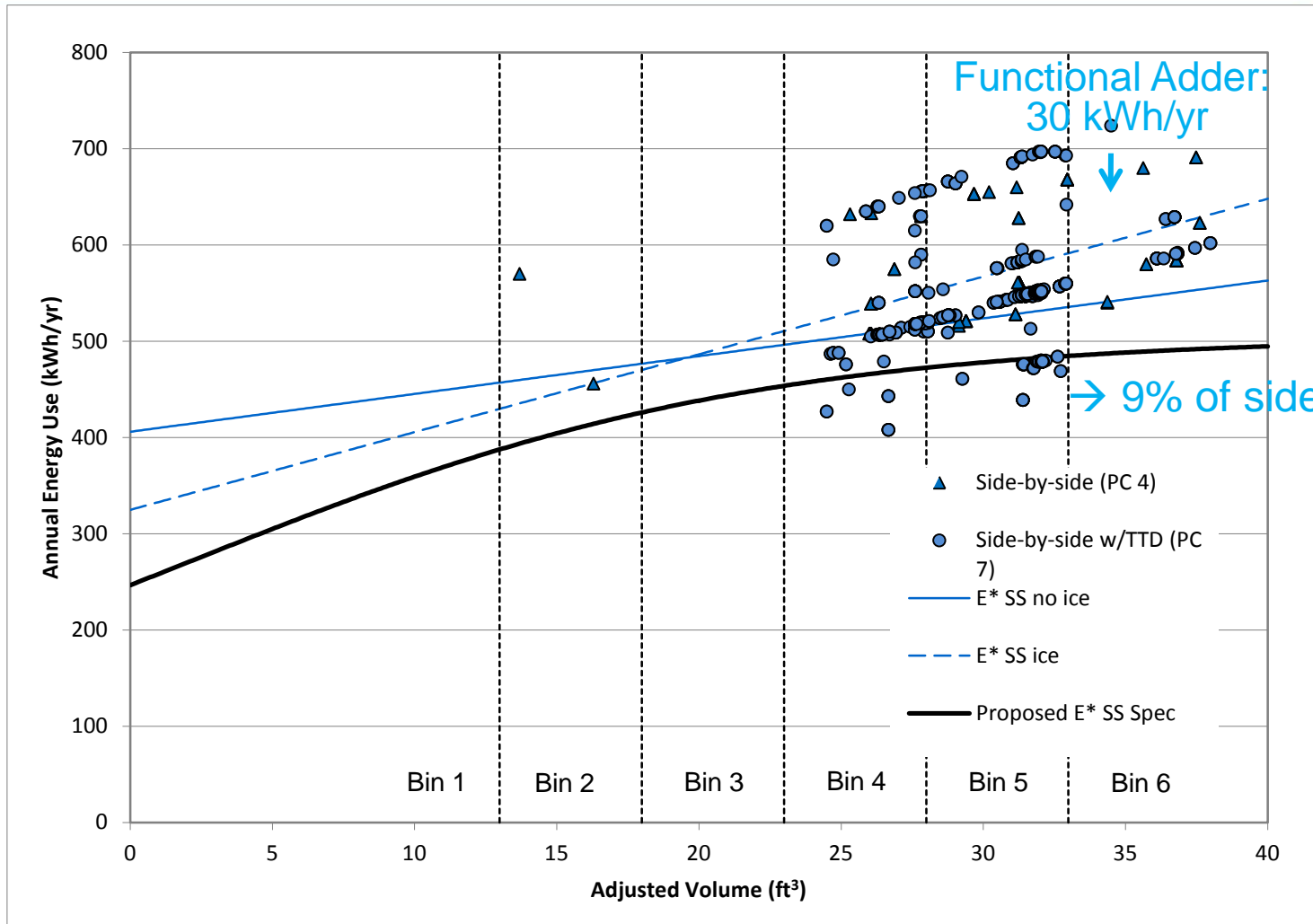
Example: Bottom Freezers



Top Freezers



Side by Sides



Relative to 2001 Federal Standards



Proposed Criteria: Approximate Percent Less Energy Consumption Relative to Current Federal Standard

	<i>Adjusted Volume (AV)</i>				
<i>Configuration</i>	15	20	25	30	35
Top Freezer	25%	25%	25%		
Bottom Freezer	28%	25%	24%	24%	
Bottom Freezer w/TTD		31%	30%	30%	31%
Side by Side w/ TTD			25%	28%	32%

Full-Size Refrigerators and Refrigerator-Freezers AEC_{BASE}



Product Type	Annual Energy Consumption Base Allowance, AEC_{BASE} (kWh/year)
<i>Full-Size Refrigerators and Refrigerator-freezers</i>	
<ul style="list-style-type: none"> • Refrigerators and Refrigerator-freezers with manual defrost • Refrigerator-freezers with partial automatic defrost • Refrigerator-freezers with automatic defrost and top-mounted freezer • All Refrigerators with automatic defrost 	$250 \times \tanh(0.050 \times AV - 0.1) + 175$
<ul style="list-style-type: none"> • Refrigerator-freezers with side-mounted freezer 	$235 \times \tanh(0.050 \times AV - 0.1) + 270$
<ul style="list-style-type: none"> • Refrigerator-freezers with bottom-mounted freezer 	$255 \times \tanh(0.045 \times AV) + 230$

Functional Adders (AEC_{ADD_i})



Product Type	Description	Annual Energy Consumption Allowance, AEC_{ADD_i} (kWh/year)
<ul style="list-style-type: none"> Refrigerator-freezers with top-mounted freezer Refrigerator-freezers with bottom-mounted freezer Refrigerator-freezers with side-mounted freezer 	Through-the-Door Ice Service	30

- Proposed functional adder for through the door ice accommodates the best performing TTD models
 - Models in all three configurations with through the door ice could qualify

Functional Adders (AEC_{ADD_i})



Product Type	Description	Annual Energy Consumption Allowance, AEC_{ADD_i} (kWh/year)
• All product types in Table 1	Connected	$0.05 \times AEC_{BASE}$

- EPA is proposing an allowance for products meeting the “Connected” criteria.
 - Intended to serve as an incentive to jump start the market for connected appliances.
 - Recognizes new, immediate convenience and energy savings opportunities and longer-term demand response capabilities.
 - To utilized this allowance, products must be qualified using final and validated DOE test procedure.

Example of Functional Adders



- A bottom-mount refrigerator-freezer (21 cu-ft) with through the door ice:
 - Would need to consume 462 kWh per year (432 kWh + 30 kWh allowance for TTD) or less to qualify. It would use about 30% less energy than a model that just meets the Federal standard (approx. 659 kWh).
 - If it also has “connected” functionality, it could also use up to an additional 22 kWh per year (0.05×432). If the model utilizes the full allowance, its consumption (484 kWh) would be about 27% less than a model that just meets the Federal standard.

Additional Examples of Functional Adders



Product Class	Size (Cu-ft.)	Baseline Energy Consumption (kWh/year)	Energy Consumption with 30 kWh TTD ice Adder (kWh/year)	Energy Consumption with 5% Connected Adder (kWh/year)	Percent Better than Federal Std. after Adders
Top Freezer	16.5	348	--	365	21%
Side by Side (w/ TTD)	26	482	512	538	26%
Bottom Freezer	18.5	423	--	444	21%
Bottom Freezer (w/ TTD)	24.7	450	480	504	26%

Product Availability: Full-Size Refrigerators



- Pass rate is the percentage of models that could qualify relative to the entire market or some sub-class of the market.
- Overall, 11% of full-size refrigerators and refrigerator freezers meets proposed criteria.
 - 10% for all products with through the door ice.
 - Top Freezers – 15%
 - Bottom Freezers – 8%
 - Side-by Sides – 9%
- Includes 24 brands from 11 manufacturers.
- EPA anticipates these will be higher by time V5.0 becomes effective, providing consumers with even more choice.

Price Differential: Full-Size Refrigerators



- EPA develops “like-to-like” comparisons in order to determine the incremental cost of ENERGY STAR.
- To determine the price differential, EPA consulted a variety of sources including the DOE TSD and retail websites.
- DOE TSD estimated the baseline costs for the major refrigerator classes:
 - TF – \$492
 - SS – \$1,044
 - BF – \$861
- Major Takeaways:
 - There are very few bottom freezers and side by sides that only meet the federal standard.
 - Retail data indicates that there would be cost-effective models that meet the V5.0 criteria.

Savings Estimates: Full Size Refrigerators



Configuration	Annual Energy Savings (kWh/year)	Annual Savings (\$)	Lifetime Savings (\$)
Top Freezer (16.5 cu-ft)	114	12	211
Bottom Freezer (18.5 cu-ft)	137	15	254
Bottom Freezer (w/ TTD) (24.7 cu-ft)	204	22	378
Side By Side (w/ TTD) (26 cu-ft)	247	27	457

Note: Annual energy savings calculated using the difference between the federal standard and proposed criteria at the appropriate AV for the total volume chosen. Total volume chosen is mode total volume using the ENERGY STAR qualified product list. Electric price used is 10.89 cents per kWh. Lifetime of 17 years assumed.

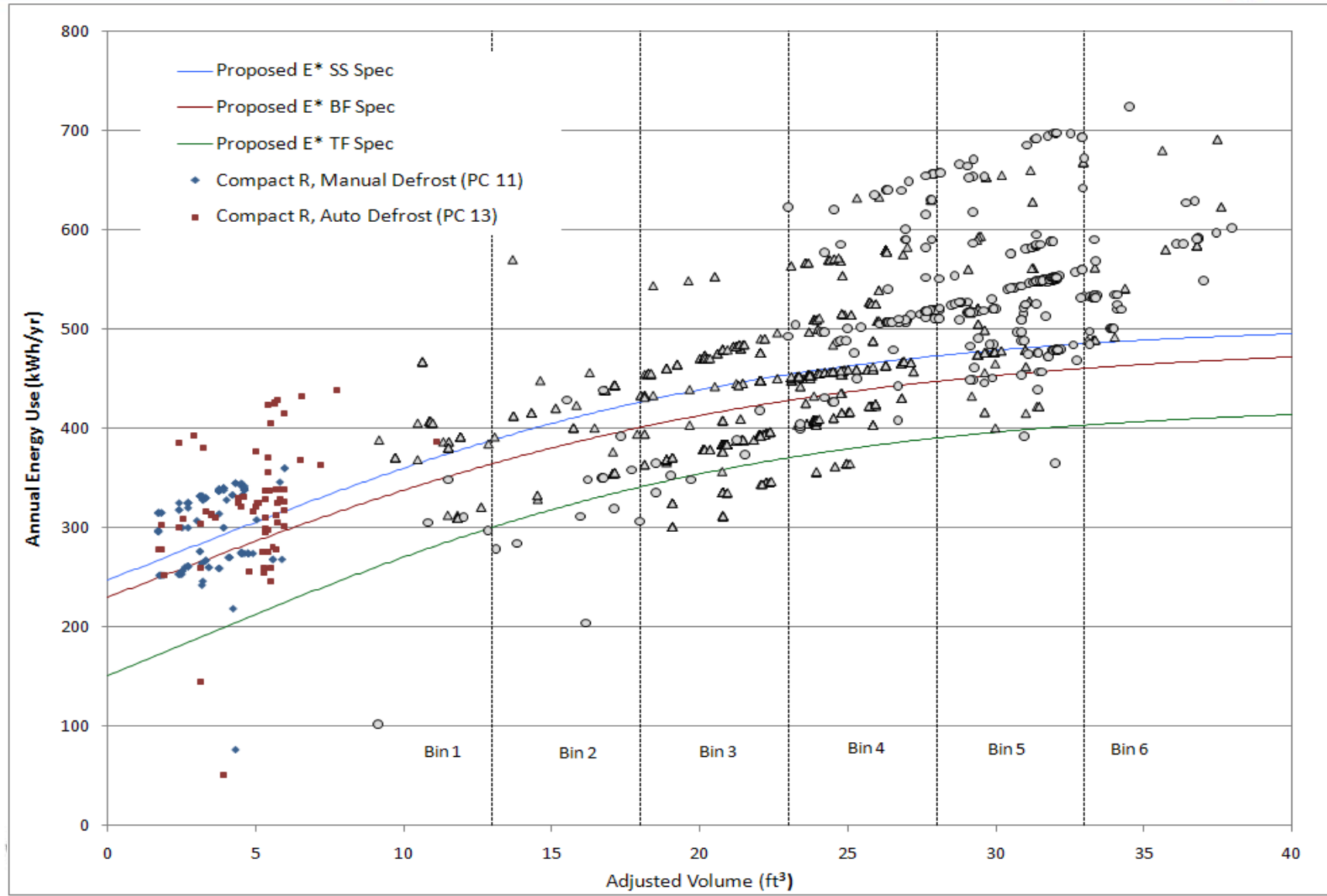
Compact Refrigerators AEC_{BASE}



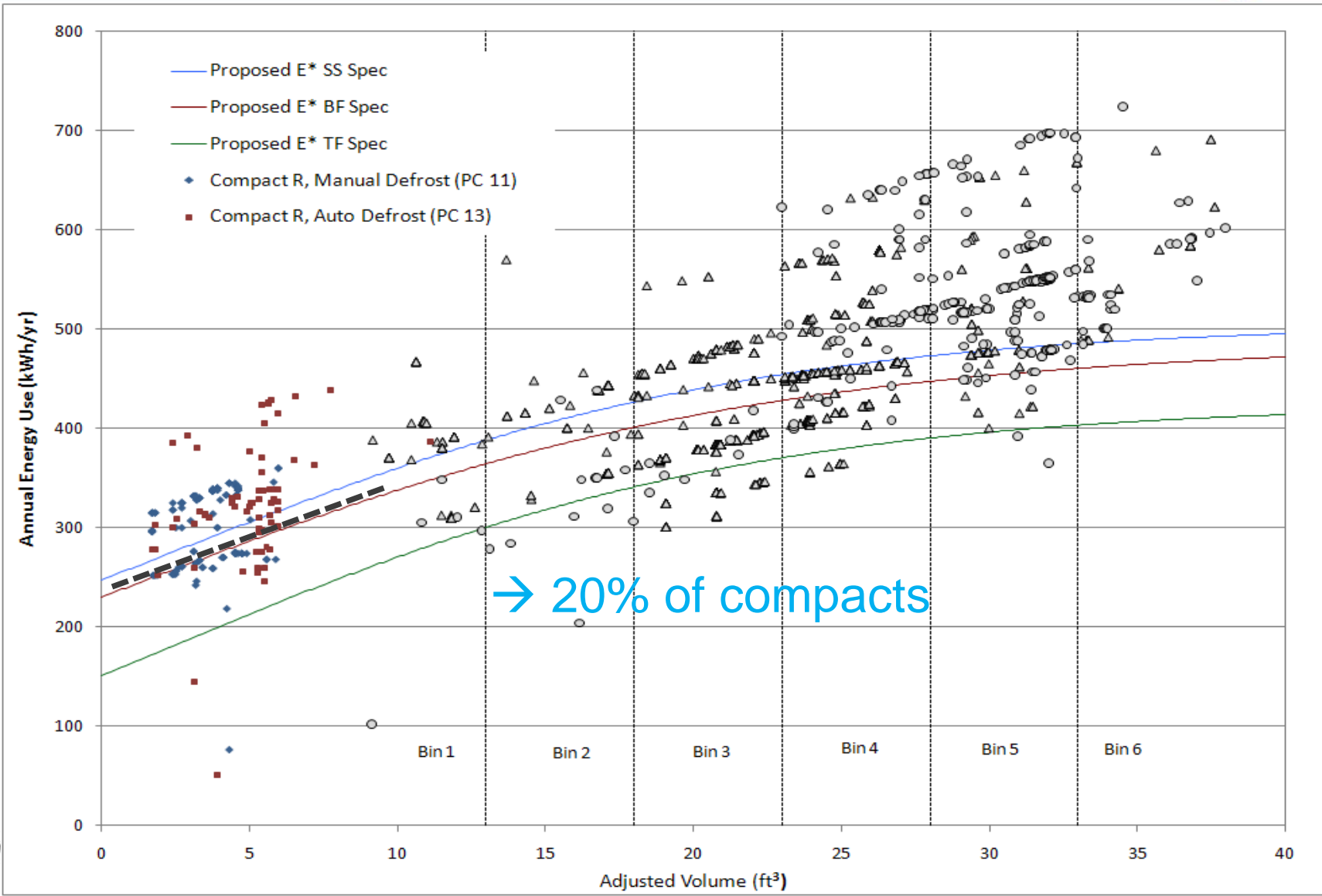
Product Type	Annual Energy Consumption Base Allowance, AEC_{BASE} (kWh/year)
<i>Compact Refrigerators and Refrigerator-Freezers</i>	
<ul style="list-style-type: none"> Compact refrigerators and refrigerator-freezers 	$255 \times \tanh(0.045 \times AV) + 230$

- Many high-efficient compact refrigerators with manual defrost and compact refrigerators with automatic defrost use similar amounts of energy.
- Proposed compact criteria utilizes the same equation as bottom freezers.
 - Virtually no change from V4.1 for compact manual defrost products.
 - For automatic defrost (5 cu-ft unit):
 - 15% reduction in energy use from the current V4.1 requirements
 - About a 31% reduction in energy use from the federal standard

Proposed V5.0 Level for Compact Refrigerators and Refrigerator-Freezers



Proposed V5.0 Level for Compact Refrigerators and Refrigerator-Freezers



Product Availability: Compact Refrigerators



- Overall, an estimated 20% of compact refrigerators and refrigerator-freezers meet proposed criteria.
- This includes 16 brands from 12 manufacturers.
- Based on EPA's data set, there are no products with partial automatic defrost that meet the proposed requirements.
 - EPA found that these products V4.1 requirements allowed them to use significantly more energy than many other similar-sized products, including those models with automatic defrost.
 - EPA is seeking further information on this product class including information on the energy use of this defrost type and feedback on the consumer value associated with partial defrost.

Estimated Energy Savings



Configuration	Annual Energy Savings (kWh/year)	Annual Savings (\$)	Lifetime Savings (\$)
Manual Defrost	66	7	50
Automatic Defrost	132	14	101

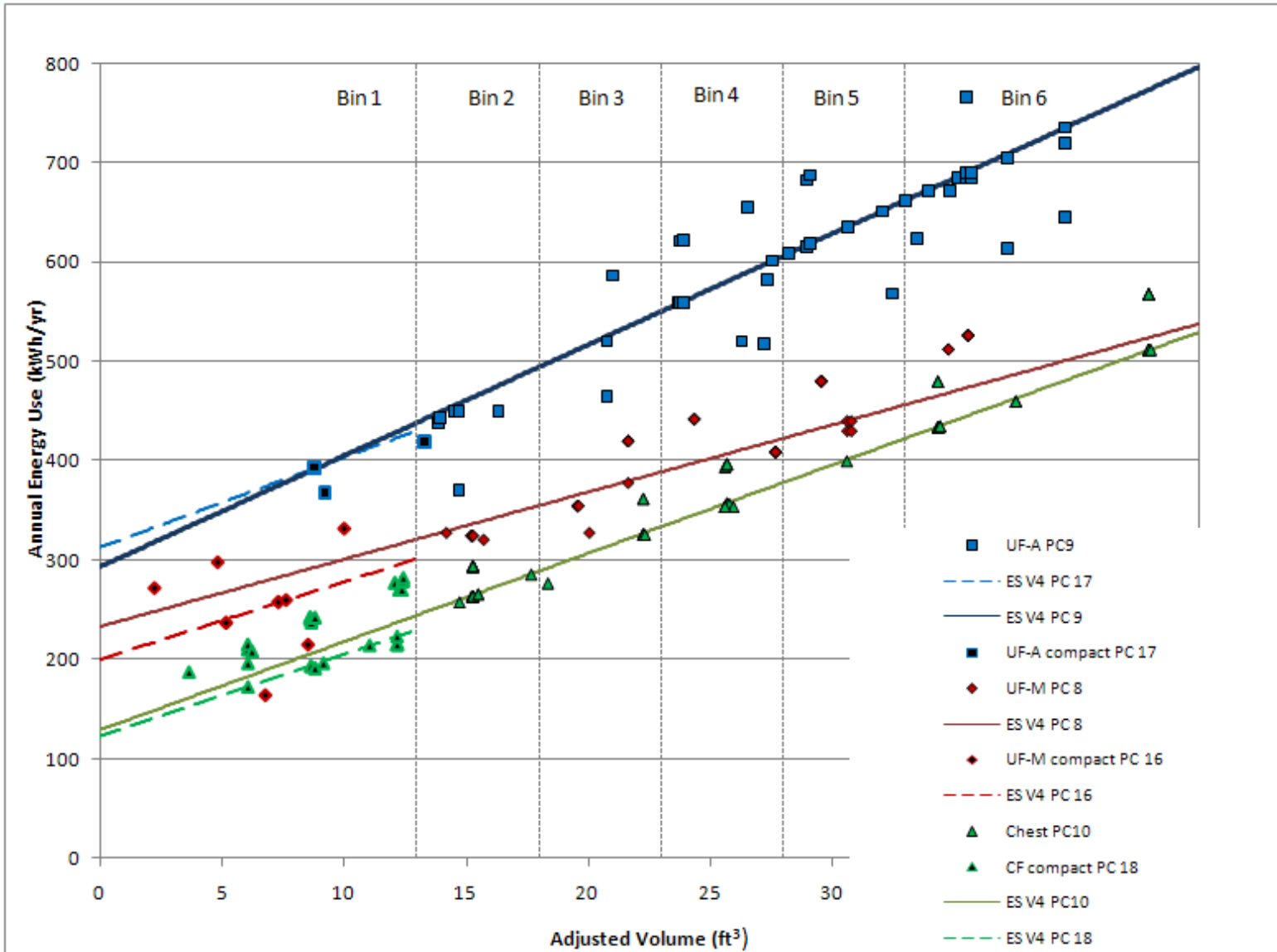
Note: Changes have been proposed for manual defrost refrigerator; savings shown above are consistent with savings from current ENERGY STAR V4.1 requirements. Annual energy savings calculated using the difference between the federal standard and proposed criteria at the appropriate AV for the total volume chosen. Total volume is 5.0 cu-ft. Electric price used is 10.89 cents per kWh. Lifetime of 7 years assumed.

Proposed V5.0 for Freezers (Full-Size & Compact)

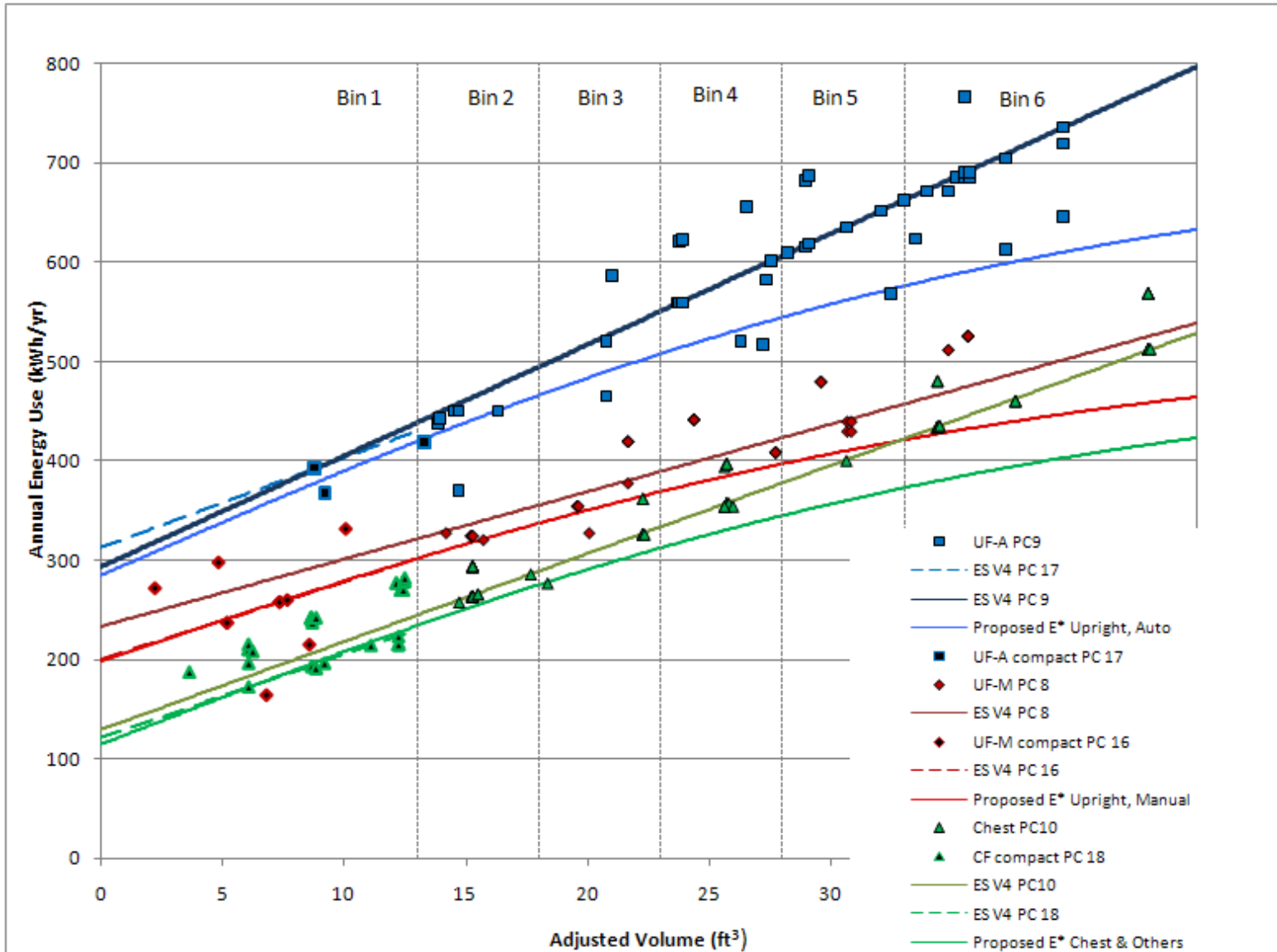


- EPA is proposing strengthened levels for freezers, in anticipation that more efficient products will be introduced as manufacturers transition product lines to meet Federal standards.
 - Given different applicability, three product classes have been retained.
 - Proposed levels are inclusive of both full-size and compact.
- EPA is proposing strengthened levels for three types of freezers.
 - Upright, Automatic Defrost
 - Upright, Manual Defrost
 - Chest Freezer

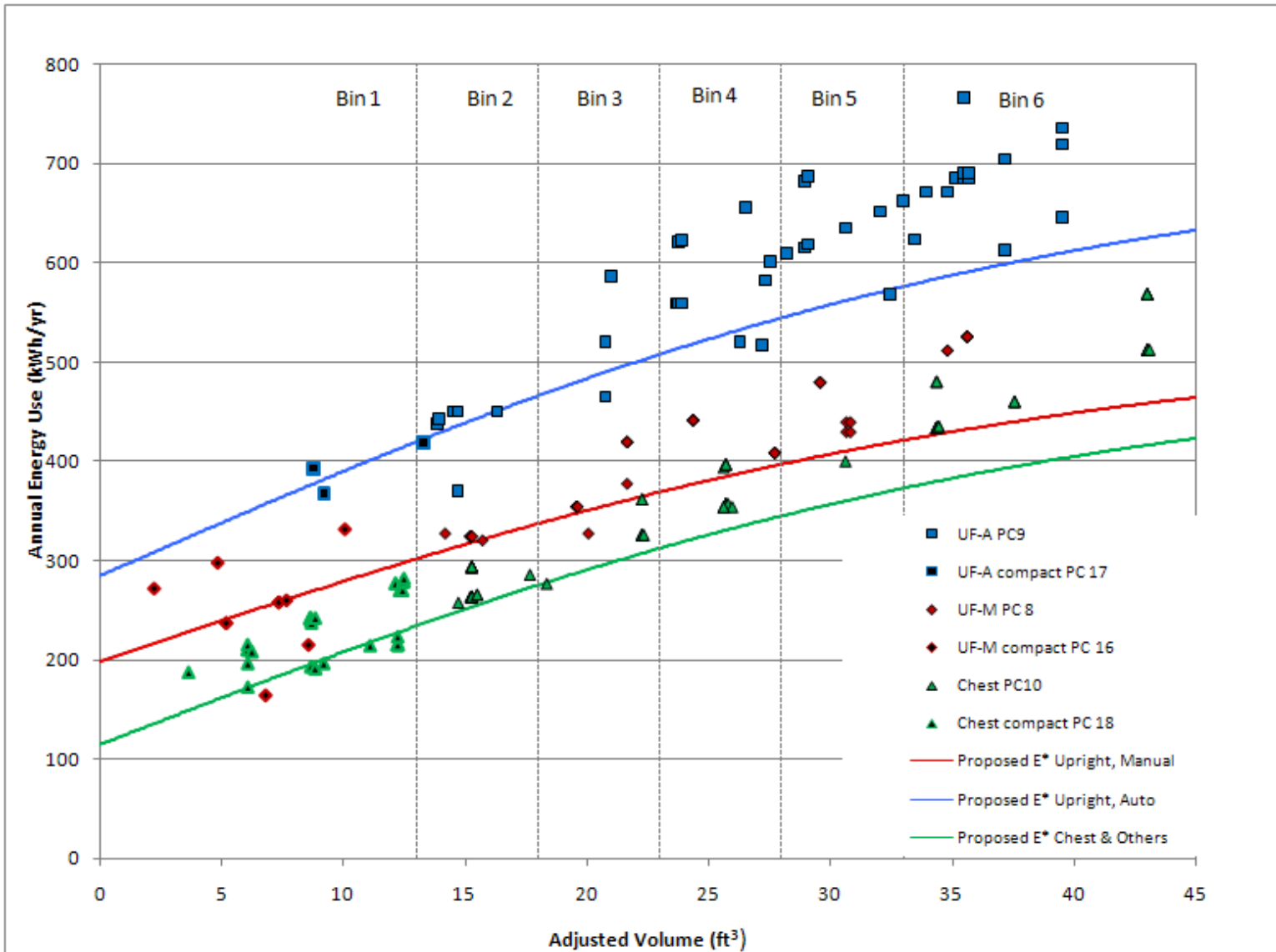
Current V4.1 for Freezers



V4.1 & Proposed V5.0 Levels



Proposed V5.0 Level for Freezers



Freezers AEC_{BASE}



Product Type	Annual Energy Consumption Base Allowance, AEC_{BASE} (kWh/year)
<i>Full-Size and Compact Freezers</i>	
• Compact and Full-Size Upright freezers with manual defrost	$330 \times \tanh(0.025 \times AV) + 198$
• Compact and Full-Size Upright freezers with automatic defrost	$430 \times \tanh(0.025 \times AV) + 284$
• Compact and Full-Size Chest freezers	$380 \times \tanh(0.025 \times AV) + 115$

- Reduction in energy consumption (examples):
 - 18.5 cu-ft upright freezer (automatic defrost)
 - From current V4.1: 13%
 - From federal standard: 21%
 - 15 cu-ft chest freezer:
 - From current V4.1: 8%
 - From federal standard: 17%

Product Availability: Freezers



- About 11% of freezers (full-size and compact) meet proposed requirements.
 - This includes 7 brands from 4 manufacturers.
 - About 8% of upright freezers
 - Very low number of full-size chest freezers; there are very few models at levels that exceed current V4.1.
 - DOE TSD analysis indicates that higher efficiency levels are feasible and cost effective.
 - EPA believes its reasonable that manufacturers could incorporate modest efficiency improvements by 2013 to meet proposed levels.

Estimated Energy Savings



Configuration	Annual Energy Savings (kWh/year)	Annual Savings (\$)	Lifetime Savings (\$)
Upright Freezer – Automatic Defrost (18.5 cu-ft.)	126	14	308
Chest Freezer – Manual Defrost (15 cu-ft.)	70	8	176

Note: Annual energy savings calculated using the difference between the federal standard and proposed criteria at the appropriate AV for the total volume chosen. Total volume chosen is mode total volume using the ENERGY STAR qualified product list. Electric price used is 10.89 cents per kWh. Lifetime of 22 years assumed.

- DOE TSD estimated baseline costs of \$505 for upright freezers and \$367 for chest units.
 - Price estimates from the TSD indicate that the payback would be acceptable for the V5.0 efficiency levels.

Future Revisions: Energy Criteria



- DOE published Final Rule finalizing new standards for all refrigerator and freezer product classes.
 - EPA believes that in light of these new standards, ENERGY STAR criteria will need to be strengthened in 2014.
- To be consistent with the regulatory schedule, EPA would plan to specify that starting in 2014 products would need to be tested and certified to ENERGY STAR using new DOE test procedure.

V6.0 Energy Criteria



- EPA believes that setting V6.0 levels now would provide manufacturers with more certainty during a time they are re-designing for 2014 standards.
 - To set V6.0 levels, EPA would need test data on refrigerator performance under new test procedure.
 - EPA is also discussing with DOE and whether the DOE cross walk calculation might be leveraged.
 - EPA is seeking feedback from stakeholders on the possibility of setting V6.0 requirements during this stakeholder process.

Low GWP Foam Blowing Agents



- EPA signaled in the Framework document that the Agency was considering a requirement that refrigerators be produced with a low GWP foam blowing agent.
 - A number of stakeholders supported this requirement.
 - Additional stakeholders indicated they would support this requirement if more time were given to comply.
 - ENERGY STAR also received information on new, low GWP fluorinated alternatives that are in development.
- EPA is deferring consideration on this issue at this time.

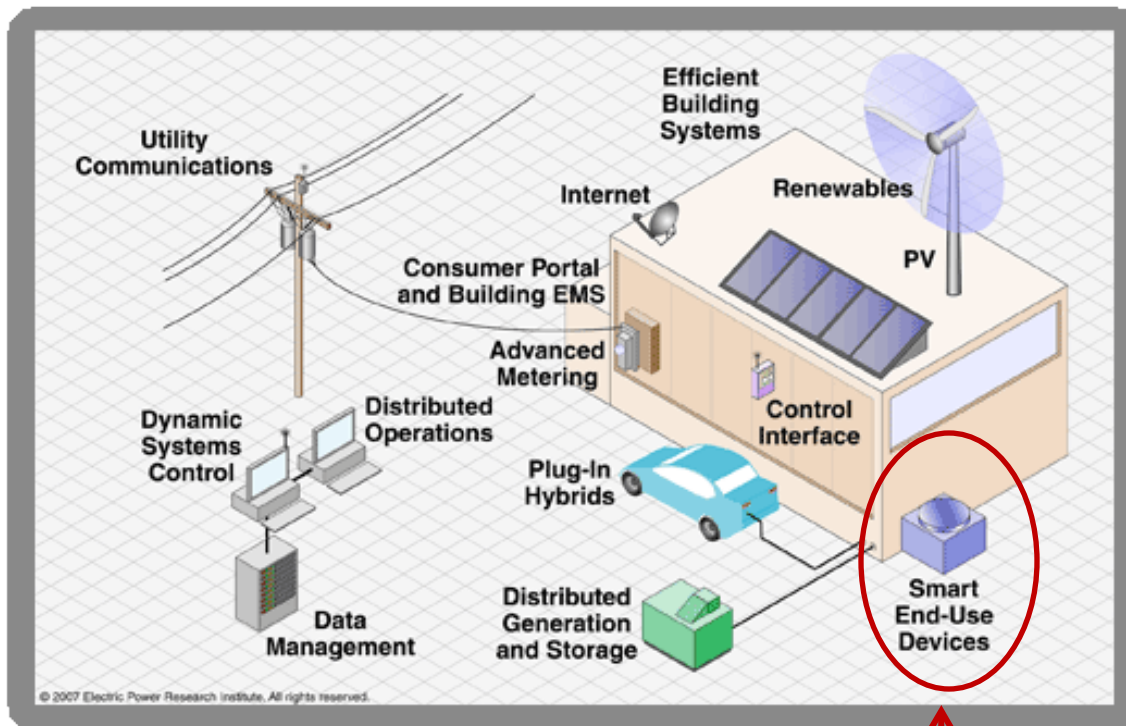
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What is the “Smart Grid”?

- Many definitions/meanings. Generally, it involves use of information and communications technology (ICT) in the electricity grid system.



Per 2007 EISA, a smart grid is characterized by:

- Increased use of digital information & controls to improve reliability, security, efficiency of the grid
- Increased use of distributed generation & renewable energy, demand response, energy efficiency
- Use of smart technologies & appliances (like meters, distribution automation), storage
- Information to consumers
- Development of interoperability standards for device to grid communication

Source: EPRI

ENERGY STAR's Role



- EPA, through the ENERGY STAR program, has long encouraged development of “intelligence” in products, while enabling emissions reductions that persist over the long-term.
 - Deep sleep in set-top boxes
 - Power management for monitors
- EPA sees opportunity to apply the ENERGY STAR program’s longstanding commitment to the consumer as various aspects of “smart grid” are extended to end-use products
 - Consumer value is longstanding brand promise
 - Complements more recent emphasis within smart grid community on *consumer-focused* smart grid

Promote “Connected” for Immediate & Long Term Value



- End-use products use bi-directional communications can interface with the Home Area Network (HAN), enabling new energy-saving opportunities, for example:
 - Enhanced energy awareness; disaggregate household energy use down to product level – personalized and actionable information!
 - Diagnostics and alerts to minimize periods of reduced efficiency (important convenience factor here too)
- Enable consumers to take advantage of future programs and rate designs that help them to tailor their energy use to when its cheaper or cleaner
- Consumers **must** retain ultimate control over product

Building upon Recommendations in “Smart Appliance” Petition



- Coalition of appliance manufacturers and efficiency advocates submitted “Smart Appliance” petition to ENERGY STAR in early 2011
- Requests EPA and DOE consider “smart” functionality for:
 - Refrigerators/Freezers
 - Clothes Washers
 - Clothes Dryers
 - Room Air Conditioners
 - Dishwashers
- Groups have requested “smart” appliances be eligible for an allowance against minimum performance levels

Proposed Approach



- For “connected” products that deliver both both consumer-oriented enhancements and demand response functionality, EPA is considering two complementary approach:
 - Highlighting functionality on the ENERGY STAR qualified product list
 - Allowance towards minimum energy requirement.
 - Products must be qualified using validated DOE test procedure to utilize allowance

Overview of “Connected” Criteria



- A. HEM Functionality – near term value for consumers, developed based on discussions with stakeholders:
 - i. Energy consumption reporting
 - ii. Remote management
 - iii. Operational status & alerts
- B. Embedded Delay Defrost – automatically shift defrost outside peak period
- C. Demand Response functionality – based on Smart Appliance petition language
- D. Communication Standards, Open Access & Info to Consumers

HEM Functionality



- Energy Consumption reporting
 - i. Must be capable of communicating self energy-consumption
 - ii. Reporting intervals of 15m or less
 - iii. No accuracy specified, but accuracy of reporting must be made available to interested parties
- Remote Management
 - i. Similar functionality to consumer controls on the product
 - ii. Product must not respond to requests that would compromise product performance or safety
- Status & Alerts – either on the product *or* transmitted
 - i. DR status (normal, delay load, etc)
 - ii. Energy Alerts – at least (2) types of alerts related to product energy consumption

HEM Functionality – Feedback?



EPA is interested in stakeholder feedback on:

- Energy Consumption reporting
 - i. reporting interval
 - ii. accuracy specified only to interested 3rd parties
- Remote Management
 - i. energy saving opportunities, vacation mode, others?
- DR Status & Energy Alerts
 - i. on product or over a communication link?
 - ii. energy alerts: door open, unusual consumption, others?

Embedded Delay Defrost Capability (EDDC)



By default, a refrigerator or freezer with EDDC avoids defrosting during the traditional peak period of 3-7PM or as specified by the utility

- Connectivity not required
- Immediate grid benefits
- EDDC must operate as configured after power outages of 24 hours or less

EDDC Feedback?



EPA has proposed EDDC criterion intended to allow products to qualify without active communication links. However, more robust EDDC capability could be delivered with a connected product.

- Will proposed criterion deliver on these goals?
- Will the 24 hour outage criteria allow manufacturers to avoid use of batteries to back up time?

Demand Response (DR) Functionality



Connected refrigerators and freezers must be capable of responding to two types of DR signals:

- Delay Appliance Load Capability
 - up to 4-hours duration
 - expected to be typically scheduled in advance
- Temporary Appliance Load Reduction Capability
 - deeper load reduction for up to 10m
 - immediate or near-immediate response

Proposed Definition – System Operator



System Operator: The local distribution operator or other entity that is responsible for the issuance of signals that request immediate or scheduled reduction of residential load from connected appliances.

Delay Appliance Load (DAL) Criteria



- Product able to respond to at least 1 request per 24h period
- Upon receipt of DAL signal, product shall:
 - shift defrost cycles beyond the delay period, and
 - either:
 - shift ice maker cycles beyond the delay period, or
 - reduce average energy consumption during the delay period by at least 13%

Temporary Appliance Load Reduction (TALR) Criteria



- Product able to respond to at least 1 request per 24h period
- Upon receipt of TALR signal, product shall reduce average energy consumption during the delay period by at least 50%
- Two exceptions – the product is not required to respond to a TALR signal if:
 - it is received during a defrost cycle, or
 - there is a consumer initiated function such as a door opening or ice/water dispensing

Demand Response – Feedback?



EPA has worked with stakeholders to ensure that “Connected” refrigerators and freezers will be able to respond to DR requests and deliver grid benefits without impacting food preservation.

- Do the proposed DAL & TALR criterion deliver on this goal?
- Do the proposed criterion treat differing products equitably?
- Are proposed response exceptions sufficient?

Open Standards, 3rd Party Access & Interoperability



- DR communications must use HAN standards identified by the NIST SGIP
- HEM communications standards are not specified, but manufacturers are required to release the following information to 3rd parties:
 - accuracy of energy consumption reporting, and
 - documentation that enables transmission, reception and interpretation of:
 - Energy Consumption Reporting
 - Remote Management
 - Operational Status & Alerts (if transmitted)

Open Standards, 3rd Party Access & Interoperability Feedback?



- Will the HEM communication flexibility afforded by the proposed criteria negatively impact interoperability?
- What is the status of standardization activities for appliance remote management? Are common command sets coming?
- Are 3rd party information requirements sufficient to drive open access and interoperability?

Information to Consumers



- For “Connected” refrigerators and freezers that require modules or additional infrastructure:
 - prominent informational shall be displayed at the point of purchase and in the product literature
- “Connected” refrigerators and freezers that require installation of communication module(s):
 - modules must be easily user installable, and
 - must either ship with the product or be provided to consumers by the manufacturer in a reasonable amount of time

Information to Consumers Feedback?



- EPA recognizes that activation of networked products can be tricky
- Do proposed criteria do enough to ensure that consumers are suitably informed and instructed both before and after the sale?
- Are the communication module criterion likely to promote a simple upgrade path for DR interconnection?

Verification of “Connected” Criteria



- DR Criteria to be verified against an ENERGY STAR Test Method, currently being developed by the US Department of Energy (DOE)
- HEM functionality, Embedded Delay Defrost Capability, Communication Standards, Open Access & Information to Consumers to be verified through examination of the product or product documentation

Agenda



Introduction – Welcome/Goals	Amanda Stevens, U.S. EPA
Refrigerators & Freezers Draft 1, Version 5.0: Summary & Discussion	
<ul style="list-style-type: none">- Definitions- Scope- Clarifications on Test Requirements	Ryan Fogle, D&R Int'l
<ul style="list-style-type: none">- Revisions to the Maximum Annual Energy Use- Discussion on Possible V6.0 Levels	Amanda Stevens, U.S. EPA Ryan Fogle, D&R Int'l
<ul style="list-style-type: none">- Proposed “Connected” Functionality	Amanda Stevens, U.S. EPA Doug Frazee, ICF Int'l
<ul style="list-style-type: none">- “Connected” Test Procedure	Ashley Armstrong, U.S. DOE
Conclude & Next Steps	Amanda Stevens, U.S.EPA



“Connected” Refrigerators and Freezers

Update on DOE Test Method Development

Stakeholder Webinar
November 15, 2011

Introduction



- DOE responsible for validating and developing ENERGY STAR test methods
- Increased interest in smart appliances among manufacturers and other stakeholders
 - DOE initiated “Connected” Refrigerator test method development efforts in February 2011
 - ENERGY STAR Residential Refrigerators and Freezers Version 5.0 Specification Framework Document, published on July 11, 2011, included a “smart appliance” section
 - Draft 1 Version 5.0 contains proposed “Connected” criteria

Issues with Test Method Validation & Development



- Definition and Requirements
 - Federal standards and ENERGY STAR specifications should align, where possible, to utilize the same definition and approach for smart-grid capable appliances
 - Comments from Smart RFI under review
 - DOE and EPA continue to discuss definitions and criteria
- Product Procurement
 - Smart-grid capable products not yet available through retail
 - Manufacturers hesitant to make proprietary smart-grid capable appliances available for testing
 - Signal simulators necessary for testing - Difficult to obtain

Issues with Test Method Validation & Development



- Testing
 - Investigative testing requires additional time and resources
 - Learning curve associated with gaining experience in testing smart-grid capable appliances
- AHAM Test Procedure
 - Current test method based on AHAM Smart Refrigerator Test Procedure (AHAM SRF-0.5-2011)

Status



Issue	Current Status	Remaining Issues
Definitions and Requirements	In Progress	<ul style="list-style-type: none">• Preliminary criteria and definitions proposed through Draft 1 V5.0• Internal discussion and drafting efforts on definitions still underway
Product Procurement	In Progress	<ul style="list-style-type: none">• DOE currently has one sample.• Working with other manufacturers to obtain additional samples.
Testing	In Progress	<ul style="list-style-type: none">• DOE currently performing investigative testing
AHAM Test Procedure	In Review	<ul style="list-style-type: none">• DOE has some questions on the AHAM proposed approach

DOE TP Development Timeline



Milestone	Date
Stakeholder Meeting	November 2011
Publish Draft 1 Test Method	January 2012
Stakeholder Meeting	January 2012
Publish Draft 2 Test Method	March 2012

Agenda



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Anticipated Timeline for Version 5.0 Spec Revision



November 7, 2011	Draft 1, Version 5.0 Released
November 15, 2011	Draft 1, Version 5.0 Stakeholder Meeting
December 9, 2011	Comment Period Closes
January 2012	Draft 2 Version 5.0 Released , Stakeholder Meeting, Comment Period
February 2012	Final Draft Version 5.0 Released , Stakeholder Meeting, Comment Period
March/April 2012	Final Version 5.0 Published
January 2013	Proposed Effective Date

- EPA welcomes all partner and stakeholder comments by **December 9, 2011**.
- Comments should be submitted in writing to appliances@energystar.gov

Questions?

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