December 9, 2011

Ms. Amanda Stevens
U.S. Environmental Protection Agency
ENERGY STAR Appliance Program
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: ENERGY STAR Program Requirements Product Specification for Residential Refrigerators and Freezers – Eligibility Criteria Draft 1 Version 5.0 (the "Framework")

Dear Ms. Stevens:

BSH Home Appliances Corporation (BSH) appreciates the opportunity to submit to EPA additional comments regarding EPA's proposal for a 5% ENERGY STAR qualification credit for refrigerators and freezers with Smart Grid functionality or Demand Response technology.

As the winner of the 2011 ENERGY STAR Partner of the Year Sustained Excellence Award, BSH strongly supports the ENERGY STAR program. We also support Smart Grid Technologies (SGT) including Demand Response in home appliances, however, BSH does not believe that such efforts should come about by issuing an allowance for such functionality that will weaken the ENERGY STAR program.

ENERGY STAR ratings are based on the efficiency of a product or appliance, not the behavior of the consumer or end user. Although SGT have significant benefits for the power grid, the functionality does not significantly improve an appliance's efficiency. In fact, in some cases SGT can result in an increase of total energy consumed by the appliance for the same job. In addition, developments will need to evolve further before wide scale Smart Grid or Demand Response functionality can become a reality.

Summary of BSH August 2011 Comments: As stated in previous comments filed this August, BSH opposes EPA's Framework proposal and believes that the proposed 5% Credit will:

- Permit less-efficient products, which do not currently qualify for ENERGY STAR under present standards, to qualify going forward;
- Undermine the integrity and principles of ENERGY STAR by reducing the efficiency requirements for refrigerators and freezers; and
- Mislead consumers into believing they are purchasing the most efficient appliances available.

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Furthermore, BSH strongly disputes EPA's premise that the efficiencies gained by adding SGT will offset the lower efficiency threshold offered by the 5% Credit.

BSH has come to the following conclusions regarding the 5% Credit for connected appliances:

- Appliances do not necessarily consume less energy for the same function just by being Smart Grid or Demand Response capable (*See, Appendix 1)*;
- In some circumstances, the actual energy consumption of an appliance with Smart Grid technologies can be greater due to interruption and restart of cycles, or additional energy storage at the appliance (*See, BSH comments to EPA Response #3, pages 7 & 8 of this document)*;
- The proposed allowance penalizes energy efficient products without Smart Grid functionality, e.g., a non-connected refrigerator just below the ENERGY STAR threshold will not be eligible for ENERGY STAR even though it is more efficient, than some newly qualified ENERGY STAR connected refrigerators earning the ENERGY STAR mark via the proposed 5% credit;
- Granting a 5% energy credit will send an unclear message to the consumer regarding the energy efficiency of the product. With the 5% credit, ENERGY STAR marks will no longer represent the top 25% of energy efficient products;
- The Credit will enable products with a higher carbon footprint to be eligible for tax credits and government rebates; and
- The Credit will decrease a manufacturer's incentive for future energy efficient innovation.

The Purpose of the Allowance as stated in the Framework:

> *"Products that meet the "Connected" criteria (proposed and discussed further, in Section 4 of this document) and qualified using the final and validated DOE test method (currently under development), could also utilize an allowance that is 5 percent of the product's base annual energy consumption. EPA intends this allowance to serve as an incentive to help jump start the market for connected appliances, provide immediate convenience and energy-savings opportunities as well as future-oriented DR [Demand Response] capabilities." See, the Framework at lines 167-172.*

The market for connected appliances does not need "jump-starting."

In March 2010, Zpryme Research & Consulting, LLC conducted a study that investigated the penetration of Smart Grid functional appliances by 2015. For the report, Zpryme adopted the smart appliance definition referenced by the Association of Home Appliance Manufactures' (AHAM) *Smart Grid White Paper* released in December of 2009. According to the report:

- "From 2011 to 2015, the US household smart appliance market is projected to grow from $1.42 billion to $5.46 billion, respectively. The US compound annual growth rate (CAGR) from 2011 to 2015 is projected to be 40.0 percent.

- In 2015, sales of smart **refrigerators** are projected to reach $0.95 billion and account for **17.4 percent** of the US household smart appliance market.
- In 2015, sales of **smart freezers** are projected to reach $0.33 billion and account for **6.0 percent** of the US household smart appliance market."

See, Smart Grid Insights Smart Appliances, March 2010, Zpryme Research & Consulting, LLC smart Grid Report at page 11.

According to the report, 40% of all new appliances sold in the U.S. will have Smart Grid functionality within 36 months. This is hardly a market that needs jump starting with incentives.

Consumers are unlikely to gain any significant energy-savings opportunities to offset the 5% allowance.

The Framework fails to reference data or demonstrate that the 5% allowance for a connected refrigerator will be offset with significant energy savings from non-connected refrigerators. The data cited by EPA is in essence, based on assumed behavioral patterns and purchasing preferences by consumers and not increased efficiency gains.

The Framework attempts to outline EPA's rationale for "proposing a number of consumer-oriented features a 'connected' refrigerator must have to be eligible for the incentive." *See, EPA's Framework at pages 8 and 9.*

The Framework references three reports to conclude that homeowners armed with energy information will reduce their energy consumption enough to justify a 5% Credit. *See, Framework line 294-296.*

One report, the Cape Light Compact Pilot Project, monitored 100 homes on Cape Cod and Martha's Vineyard. The conclusion from that project was that consumers reduced their energy consumption by an average of 9.3%. This project focused on a monitoring system for a consumer's entire house, NOT refrigerators and freezers. The project at NO time details specific energy savings from SGT connected to a refrigerator or freezer. Instead, the project identified "Attitudinal" responses from participants with regard to information regarding whether the refrigerator was left open, the condensing coils needed cleaning and temperature control. The report did not measure specific energy savings or efficiency gains from having these functions available. *See, Cape Light Compact Residential Smart Energy Monitoring Pilot Final Report, March 31, 2010.*

The two other reports referenced are consumer surveys and do not present actual data that justifies the 5% credit. *See, Framework at page 9.* Both the ACEEE 2010 report Advanced Metering Initiatives and Residential Feedback Programs and the Parks Associates 2010 Residential Energy Management Survey do not set forth justifications for reducing refrigerator efficiency levels in order to incentivize manufacturers to incorporate connected functionality. The reports do, however,

acknowledge that consumers would like to have certain connected functionality. *See, Framework at page 9.*

Although the three reports cited in Section 4 of the Framework provide useful information with regard to consumer energy consumption habits and adaptation of energy management systems, the reports provide no basis for claiming that consumers will gain significant energy savings to offset the efficiency reduction provided by the Framework's Allowance.

For refrigeration, ENERGY STAR is a performance based standard, not one determined by technological innovations.

The Department of Energy (DOE) specifically noted in September of 2010 that the information it received from manufacturers on the benefits of Smart Grid controls "did not clearly indicate that smart grid controls could provide significant benefits when used in refrigeration products comparable to the benefits associated with proposed" energy reductions. *See, 75 FR No. 186, September 27, 2010 at 59530.*

A year later, in response to objections raised by AHAM, DOE repeated its conclusion that "demand response would not contribute significantly to energy use." *See, 76 FR No. 179 (September 15, 2011) at 57561*. DOE further stated that:

> *"AHAM's comments did not provide any information quantifying the potential energy savings associated with implementation of demand response in refrigeration products. The highlighted conclusions of the Electric Power Research Institute study cited by AHAM do not even explicitly indicate that refrigeration product demand response contributed to energy savings. (Id.)" See, 76 FR No. 179 at 57562.*

In September 2010, DOE found the requirement to include a demand response capability in a product constitutes a design requirement. As such, it appears the Framework's proposal specifically undermines the Congressional intent of the Energy Policy and Conservation Act (EPCA) which set out standards for DOE to offer credits. EPCA:

> *"…allows establishment of design requirements, but only for certain products. EPCA defines ''energy conservation standard'' as: (A) a performance standard which prescribes a minimum level of energy efficiency or a maximum quantity of energy use, or, in the case of showerheads, faucets, water closets, and urinals, water use, for a covered product, determined in accordance with test procedures prescribed under section 6293 of this title; or (B) a design requirement for the products specified in paragraphs (6), (7), (8), (10), (15), (16), (17), and (19) of section 6292(a) of this title * * * 42 U.S.C. 6291(6)*
>
> *<u>Refrigeration products do not belong to the group of products for which DOE can set design requirements</u> (such as demand response capability) under 6291(6)(B). Based on this limitation and the available facts, it is DOE's tentative view that a demand response requirement cannot be included as part of today's NOPR.*

> *DOE next considered whether a credit may be allowed for demand response features. DOE understands that such features, when applied to refrigeration products, could be used to reduce energy costs by shifting portions of the energy use associated with defrost or icemaking to times when the electricity cost is lower,* ***but that they would not contribute significantly to reduction of energy use.*** (Emphasis added.) *EPCA does not allow establishment of energy conservation standards if, ''the establishment of such standard will not result in significant conservation of energy'' (42 U.S.C. 6295(o)(3)(B)).” See, 75 FR No. 186 at 59530 (September 27, 2010).*

The conclusions reached above were reiterated in DOE's Final Rule one year later. *See, 76 F.R. No. 179 at 57561-2.*

The Framework's 5% credit proposal attempts to accomplish a credit system that DOE has already rejected and opens a slippery slope for ENERGY STAR standards. Simply put, the proposal makes an exception for a specific technology that EPA wishes to see widely incorporated into appliances without providing data to support claims of similar efficiency.

By reducing the thresholds for ENERGY STAR, the Allowance will undermine a successful program based on a new functionality that may or may not lead to additional energy savings. Conclusions in the Framework are not only unsupported by specific scientific data but are clearly undermined by the DOE's conclusions.

DOE's conclusions prove that the proposed 5% credit will accomplish the opposite of what ENERGY STAR was intended to do. Historically, ENERGY STAR administrators would INCREASE the compliance standards to persuade manufacturers to incorporate newer efficiency innovations. In contrast, EPA now seeks to DECREASE thresholds to encourage manufacturers to innovate with a technology that has not yet proven any improvement to efficiency levels.

What EPA's proposal does not assume is that a manufacturer, attempting to take advantage of producing an appliance with Smart Grid functionality, may very well decide to remove certain energy efficiency components (that would be unnecessary due to the 5% credit) as a way to keep the appliance's overall cost down. EPA has not provided any analysis for this very strong likelihood.

EPA's 5% allowance will result in higher energy consumption and less efficient refrigerators.

The Framework's Allowance has the potential to introduce approximately 1,532 additional less efficient refrigerator and freezer models (42.5%) into the ENERGY STAR program with the thresholds in place today. This will result in consumers purchasing refrigerators that consume more energy. *See, Slide 1 below.*

Historically, EPA has increased the minimum efficiency levels by 5% approximately every three years. With Scenario 1 below (which depicts an ENERGY STAR threshold that is 5% more

stringent) – with the Smart Grid functionality – has the potential to qualify approximately 1,750 additional less efficient refrigerator and freezer models (84.5%) for the ENERGY STAR program.

Only 15% of the products would be actually qualified purely on the basis of energy efficiency.

Both scenarios below will be misleading to energy conscious consumers.

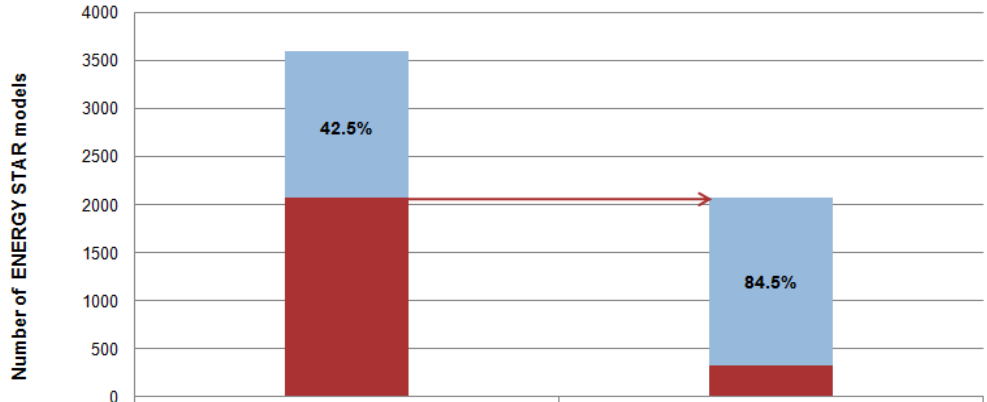
SLIDE 1

ENERGY STAR: 5% allowance for refrigerators and freezer with smart grid functionality

Remark:

Shipping data for ENERGY STAR models is not publicly available.

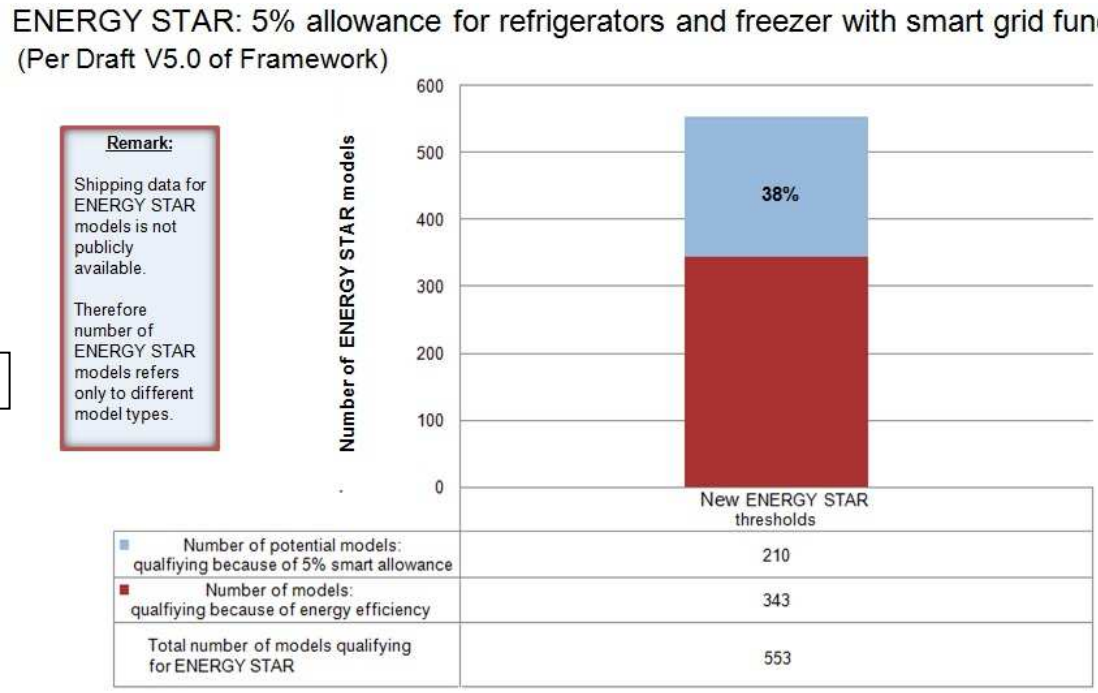
Therefore number of ENERGY STAR models refers only to different model types.



	Current ENERGY STAR thresholds	Scenario 1: ENERGY STAR 5% more stringent than current thresholds
Number of potential models: qualfiying because of 5% smart allowance	1532	1750
Number of models: qualfiying because of energy efficiency	2070	320
Total number of models qualifying for ENERGY STAR	3602	2070

With the new energy thresholds in EPA's Draft Framework V5.0 we see the following results in Slide 2.

SLIDE 2



EPA's responses to earlier public comments do not support weakening ENERGY STAR. (*See,* *V5.0 Refrigerators and Freezers Framework Comment Response Summary, http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/Ref_Freezer_V5.0_Framework_Doc_Comment_Response_Summary.pdf)*

EPA Response #3:
As outlined in the Framework, EPA is proposing an allowance for "connected" functionality as an incentive to help jump-start the market for refrigerators and freezers with functionality that delivers near-term consumer value while facilitating broader electric power system benefits. The approach bundles consumer-oriented enhancements, such as the ability to interface with an energy management system, with demand response functionality. Consumers could opt to leverage these functions in the future to save money on their energy bills once the supporting infrastructure is built. The proposed functionality can also provide near-term demand benefits to the grid through an embedded delay defrost capability that would automatically shift defrost from peak to non-peak periods of the day.

BSH comment to EPA Response #3:
Regarding "Consumer Value:" An average refrigerator in the ENERGY STAR program draws the equivalent of one 60W light bulb. Considering a typical electrical rate of $0.109 kWh (also the rate used in ENERGY STAR's Savings Calculator) we are talking about $57 a year of total consumer

cost. Assuming the consumer has the appliance connected to a utility offering Smart Grid rates, a 5% savings as proposed would result in $2.84 a year in net savings.

Regarding the "Embedded Delay Defrost Capability": This is not necessarily Smart Grid related. There are currently refrigerators on the market with this capability. It is a consumer programmable selection. This will never be automatic due to different peak times in different areas of the country. For example, manufacturers like BSH will not have different models for Texas, which typically has an earlier peak time than Ohio.
Note: By shifting the defrost cycle to a later time, the refrigerator

1) will not run as efficiently and
2) will utilize more energy to defrost due to a thicker layer of ice.

Both of the above factors will lead to the refrigerator using slightly more energy.

EPA Response #4:
EPA also notes that the energy efficiency of a model relative to a chosen baseline (such as the model's federal standard level), is based on the product's rated annual energy consumption and would not be affected by the proposed allowance. In this Version 5.0 revision, EPA is strengthening ENERGY STAR criteria so that qualified models continue to deliver superior energy efficiency. For example, a bottom-mount freezer with through the door ice that also utilizes the 5 percent allowance would still use about 27% less energy than the same model that just meets the federal standard.

BSH Comment to EPA Response #4
Based on the new method of calculation in the current draft V5.0, 343 models currently on the US market (per the CEC database) would qualify based on energy efficiency alone as shown in Slide 2. With the 5% credit, an additional 210 models would qualify if they met the conditions of the credit. This clearly shows that lower efficiency products will be able to gain ENERGY STAR eligibility based on the Smart Grid credit.

This potentially represents up to 38% of the currently available models on the U.S. market. BSH understands ENERGY STAR's data is based on models sold rather than available models and this information is not publicly available. We suspect that actual results would show a significantly greater percentage of total sales coming from models that would not have qualified for ENERGY STAR as more entry level (typically lower efficiency) products are sold per year.

A Better Alternative

The Framework fails to adequately set forth its reasoning for advancing the incorporation of Smart Grid functionality into the marketplace via the ENERGY STAR program. BSH supports efforts to increase customer awareness of energy consumption and the benefits of Smart Grid functionality. However, **BSH does believe that the EPA should consider recognizing the benefits to consumers that Smart Products can bring without combining the two programs**.

Proposals for integration and promotion of Smart Grid Technology and ENERGY STAR:

- No qualification credit for any technology. All products must meet minimum thresholds. Products with "Smart Technologies" as outlined in the ENERGY STAR refrigeration framework document are eligible for a new mark (perhaps ENERGY STAR with Smart type mark).

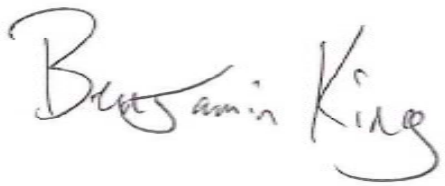
- No qualification credit for any technology. All products have to meet minimum thresholds. Make Smart Grid, as defined by AHAM, mandatory for the ENERGY STAR program.

If ENERGY STAR wants to point out additional environmental benefits besides energy efficiency, such as Smart appliances, this could be added as a sub-category to ENERGY STAR such as ENERGY STAR Smart or ENERGY STAR Green.

Conclusion

EPA can easily provide incentives to manufacturers to incorporate Smart Grid functionality into refrigerators and other appliances without sacrificing the many benefits of the ENERGY STAR program. We strongly encourage EPA to rework this proposal to reward an outcome based approach for energy efficiency and not reward specific technologies at the expense of other energy efficient innovations.

Respectfully submitted,



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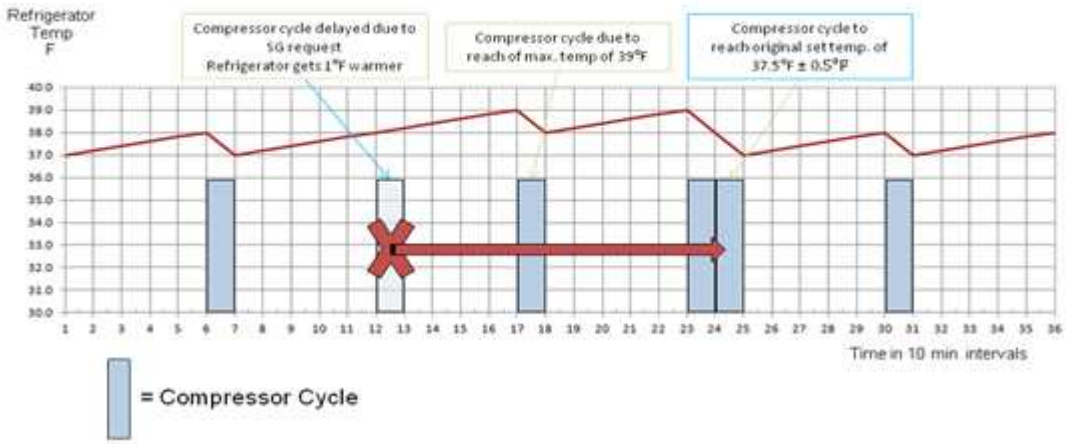
Appendix 1

Compressor and Refrigerator Temperature Cycle, Smart Grid delay 1 cycle



Compressor and Refrigerator Temperature Cycle, Stable Condition