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Mr. Christopher Kent
ENERGY STAR® Program Manager
Environmental Protection Agency
Ariel Rios Building, SW, MS 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Mr. Kent:

The Consortium for Energy Efficiency (CEE) respectfully submits the following comments in response to the ENERGY STAR Commercial Ice Machines Version 2 Draft 1 Specification, released by the Environmental Protection Agency (EPA) on May 19, 2011.

CEE is the binational organization of energy efficiency program administrators and a staunch supporter of the ENERGY STAR Program. CEE members are responsible for ratepayer-funded efficiency programs in 45 US states and 8 Canadian provinces. In 2010, CEE members directed over $7.5 billion of energy efficiency program budgets in the two countries. In short, CEE represents the groups that are actively working to make ENERGY STAR the relevant platform for energy efficiency across North America.

CEE highly values the role ENERGY STAR plays in differentiating energy efficient products and services that the CEE membership supports locally throughout the US and Canada. We appreciate the opportunity to provide these comments.

CEE maintains a high efficiency ice machine specification for use in voluntary energy efficiency programs. From 2009 through 2011, CEE conducted its own analysis and sought industry input on revisions to the CEE ice machines specification, which went into effect July 1, 2011. During this process, CEE engaged with its members and the ice machine manufacturing industry on questions that EPA now faces in revising the ENERGY STAR specification for ice machines, including: What is the technical potential for additional energy savings beyond the Version 1 ENERGY STAR levels? What assumptions are inherent in the current specification structure, and do they remain relevant?

What are the technical and market based considerations related to the treatment of continuous type ice machines in a high efficiency specification?

Based on our analysis during the CEE specification development and vetting process, we offer insights and several recommendations to support EPA in the ENERGY STAR revision process. CEE recommends that EPA:

- Within the bounds of the ENERGY STAR brand tenets consider setting energy performance levels that administrators of voluntary energy efficiency programs can promote with incentives
- Consider product availability by size category when analyzing for and making performance level determinations (machine size is a key purchasing characteristic in this market)
- Support a technology neutral specification (consistent bar for self-contained, ice making heads, and remote condensing units)
- Organize the specification by typical ice applications found in the market with cube and nugget ice machines in one category (aimed at machines most typically used for beverage applications) and flake ice machines in a second category (aimed at machines most typically used for non-beverage applications).

Each of these recommendations is discussed further in this letter and we have included associated analysis. The comments are organized according to the following topics: 1) the proposed performance levels; 2) the proposed power curve approach; 3) technology platforms (ice making head (IMH); remote condensing units (RCU); and self-contained (SC)) and technology platform neutrality; and 4) the addition of continuous type machines.

CEE notes that the data sets used in the CEE specification process may be somewhat different than those used by EPA in the development of the Draft 1 proposal. CEE analyzed data sets based on data available from the Air-Conditioning, Heating, and Refrigeration Institute, Natural Resources Canada, and manufacturers over the last two years. CEE only recently received a copy of the EPA data set and has not compared the data sets side by side to determine if and how they may differ. The approach CEE used to analyze the data is somewhat different than that used by EPA in the development of the Draft 1 proposal. The CEE approach used aims to account for assumptions from research conducted by the CEE Commercial Kitchens Committee over the last several years and typical methodologies used by CEE members to calculate energy savings and product model availability. Significant assumptions and differences in methodology are highlighted in the subsequent sections.

Proposed Performance Levels

CEE analysis of the proposed performance levels indicates that while the energy savings resulting from the Version 2 Draft 1 proposal (versus the ENERGY STAR Version 1 levels) can reach over 25%, for some equipment categories and sizes the energy savings are negative or very small (we have highlighted these categories and sizes in Tables 1, 2, and 3 which is appended to this letter). Given the high level of market penetration of machines that are currently ENERGY STAR labeled, energy efficiency program administrators seek performance levels and associated savings that will continue to justify program investments (meet cost effectiveness and program savings attribution considerations). Negative (reduced savings) or very small incremental energy savings compared to the current ENERGY STAR levels makes the pursuit of offerings and incentives at the Draft 1 ENERGY STAR levels a challenge for program administrators for future program cycles.

CEE requests that EPA, within the bounds of the ENERGY STAR brand tenets, consider setting energy performance levels that justify energy efficiency program investment including incentives. CEE acknowledges that there may be trade offs between energy savings and product model availability and is glad to work with EPA going forward to balance these considerations.

Power Curve Approach

EPA has eliminated the existing size categories based on ice harvest rate in the Version 2 Draft 1 proposal and instead proposes a series of power curves that span all machine sizes. **CEE supports EPA's consideration of the use of power curves and recommends EPA consider this approach in conjunction with the following: 1) technology platform neutrality, which is discussed in detail in the next section; and 2) consideration of qualifying product availability by specific size categories.**

EPA analysis demonstrates that qualifying product availability is around 25% of models for the machine categories defined in the Draft 1 proposal; however, this analysis includes and spans all eligible machine sizes and does not consider product availability for specific size categories of machines. Based on member program experience and industry input during the CEE specification revision process, it is our understanding that size is a key purchasing characteristic for ice machines. According to input CEE received, it is unlikely for an end user to purchase a machine

significantly smaller or larger than the size needed for his or her application.[1] Therefore, it is important to consider product availability at a more granular level to ensure end users have access to qualifying machines that meet their size needs.

To gain an understanding of product availability for different size machines, CEE calculated the percentage of product models that would meet the proposed Draft 1 performance levels in the size categories outlined in the revised CEE specification.

Our analysis identified two size categories for two different technology platforms in which product model availability is significantly below 25%, which may hinder the ability of customers to purchase efficient machines and programs to support them. In addition, energy efficiency program administrators may struggle to justify support for machines in one size category for one technology platform in which product model availability is 100%. The details and results of the product availability analysis are outlined at the end of this letter. **CEE recommends that in subsequent drafts, EPA consider qualifying product availability by size category.**

Technology Platforms and Technology Platform Neutrality

In the Version 2 Draft 1 proposal, EPA has maintained different performance levels for machines built on different technology platforms (SC, IMH, and RCU). During its recent specification revision, CEE analyzed the advantages and disadvantages of this approach. Our analysis found that: 1) there is no clear technical basis for maintaining technology platform based categories; 2) there is an advantage for efficiency programs and their customers in applying a technology platform neutral approach; and 3) there are disadvantages for efficiency programs and their customers in maintaining a technology platform based approach. **CEE recommends that EPA consider a technology platform neutral approach for the ENERGY STAR specification** and offers the following technical analysis and market research to support this recommendation:

1. Technical Basis: CEE plotted the energy consumption of all ice machines available for sale in the US and Canada by technology platform to determine if there are inherent energy performance advantages between technology platforms. The data analyzed by CEE demonstrate no inherent performance advantage in energy efficiency of machines of the same size across technology platforms.) CEE offers part of its analysis (see Chart 1 at the

[1] This assumption is based on informal conversations and anecdotal information from industry partners and CEE members. Given that the price of machines increases as machine size increases, this appears to be a reasonable assumption.

end of this letter), which demonstrates no discernable or consistent efficiency advantage or disadvantage when comparing one technology platform to another.

2. Advantage of a Technology Platform Neutral Approach: By removing technology platforms, energy efficiency programs can help to motivate customers to choose the most efficient machine for their need. Using this approach, many customers (in particular those purchasing smaller machine sizes) have the ability to choose the most efficient option to meet their needs. According to manufacturer input, in larger size machines customers may not choose to (or may find it economically infeasible) to switch from an ice making head to a remote machine due to the increased installation costs of remote machines. This circumstance presents an opportunity for the ENERGY STAR label and energy efficiency program incentives to help raise awareness of lifecycle cost considerations and, in the case of energy efficiency program design and incentives, to help the customer mitigate the potentially higher incremental costs of the most efficient equipment choice.

3. Disadvantage of a Technology Platform Specific Approach: A technology platform specific approach has the potential to influence a customer to choose a less efficient machine than he or she otherwise may have purchased absent the ENERGY STAR label or energy efficiency program incentives. Without the ability to compare across technology platforms, the ENERGY STAR label and energy efficiency program incentives may influence a customer to switch from a more efficient but non-qualifying machine based on one technology platform to a less efficient qualifying machine based on another technology platform. The risk of this occurring is the highest for smaller ice machines, those making up to 450 lbs. of ice per day, because technology platforms are easily interchanged for these sizes.

CEE recommends that EPA consider a technology platform neutral approach to developing ENERGY STAR performance levels.

Continuous Type Machines

In the Version 2 Draft 1 specification, EPA proposed creation of separate categories for cube, nugget, and flake type ice. While EPA did not propose normalization of energy and water consumption rates in the Version 2 Draft 1 specification, several manufacturers suggested EPA consider this approach at a recent stakeholder meeting. Based on the information and analysis below, **CEE recommends EPA consider organizing the specification by typical ice application, with cube and nugget ice machines in one category (aimed at machines most typically used for beverage applications) and flake ice machines in a second category (aimed at machines**

most typically used for non-beverage applications). CEE offers the following technical and market information to inform decisions related to both approaches.

1. Technical Analysis: Cube type machines typically make ice that is 95% to 99% hard. Nugget type machines typically make ice that is 80% to 95% hard. Flake type machines typically make ice that is 60% to 80% hard. CEE analysis supports the conclusion that, without normalizing for ice hardness, machines that make softer ice tend to appear more efficient and would have a relative advantage over machines making harder ice. One approach to addressing this relative efficiency advantage is to normalize by ice hardness. From a technical perspective, there are two main reasons that CEE recommends EPA not pursue this approach:

    a. Manufacturers and AHRI informed CEE that ice hardness tests were showing variability in excess of the variability limits set by the AHRI certification program. Such variability would impact the reliability of a normalized energy efficiency rating. It is our understanding that this situation has yet to be resolved at this time.

    b. Manufacturers informed CEE that while cube ice is assumed to be 100% hard, this is not in fact the case. Cube ice may range from 95% to 99% hard; however, ice hardness is not tested for cube type machines. If ice hardness were to be normalized for nugget and flake type machines but not cube type machines, cube type machines could have a relative advantage.

2. Market Research: To inform alternative approaches to normalization by ice hardness, CEE investigated the role of ice hardness and different ice types in the market. Several manufacturers informed CEE that harder ice does not necessarily equate to "better" or "higher performing" ice, but instead is largely a matter of end use application and user preference. For example, in hospital applications softer, more chewable ice may be preferred. CEE also found that while no ice type is used exclusively for any one application, cube and nugget ice is most typically used in beverage applications and flake type ice is most typically used in non-beverage applications. CEE concluded, given the difference in typical application for flake type ice and technical efficiency advantages associated with making softer ice, that a separate category for flake type machines is merited. Cube and nugget machines, on the other hand, are typically used for the same application (beverages). CEE recommends EPA consider the potential role of the ENERGY STAR label in providing end users that can use either cube or nugget ice with clear comparisons across ice types. The advantages of such an approach are analogous to the advantages of a technology platform neutral approach discussed in the previous section.

CEE recognizes that a small number of end users (e.g., bars) will likely not choose nugget ice due to its cloudiness. CEE considered the implications but concluded that: 1) the recommended approach does not have a significant adverse impact on cube machine performance levels or qualifying model availability; and 2) the potential benefits to customers and energy efficiency program administrators of the recommended approach are greater in magnitude than the potential drawbacks. CEE offers the following supporting information that informed our conclusion:

- Magnitude of impact of combining ice types by application. Cube type models in the CEE data set outnumber nugget type machines 36:1. This indicates that combining cube and nugget ice types into a single, application based category will likely not significantly impact performance levels for cube type machines.
- Size of bar market share. CEE does not have data demonstrating ice machine sales by market segment; however, according to the *2002 U.S. Food Marketing System Publication AER-811,* revenues from bars make up about only 1% of foodservice revenues. These data indicates and CEE concluded that the potential efficiency upside for enabling all of the non-bar market segments to choose the most efficient options across all machines outweighs the relatively minor effect of including nugget and cube machines in the same category.

In sum, CEE recommends EPA consider organizing the specification by typical ice application with cube and nugget ice machines in one category (aimed at machines most typically used for beverage applications) and flake ice machines in a second category (aimed at machines most typically used for non-beverage applications).

CEE would like to thank the EPA for the opportunity to comment on the ENERGY STAR specification for Commercial Ice Machines, Version 2, Draft 1. Please contact CEE Program Manager Kim Erickson at 617-532-0026 with any questions about these comments.

Sincerely,

Marc Hoffman
Executive Director

Energy Savings Comparison Between Current ENERGY STAR Specification and Proposed Version 2 Performance Levels

Table 1. Estimated Annual Energy Consumption of Self-Contained Machines

Technology Platform	**SC**		
Harvest Rate (lbs/day)	**Estimated Annual Energy Consumption (kWh)**		
	Current ENERGY STAR	**Proposed V2 ENERGY STAR**	**% Savings Proposed V2 ES vs. Current ES**
50	1,060	929	12%
175	2,328	2,289	2%
449	5,972	4,536	24%

Table 2. Estimated Annual Energy Consumption of Ice Making Heads

Technology Platform	**IMH**		
Harvest Rate (lbs/day)	**Estimated Annual Energy Consumption (kWh)**		
	Current ENERGY STAR	**Proposed V2 ENERGY STAR**	**% Savings Proposed V2 ES vs. Current ES**
175	2,014	2,075	-3%
450	3,778	3,991	-6%
580	4,759	4,756	0%
1000	7,592	6,923	9%
1775	11,467	10,265	10%

Table 3. Estimated Annual Energy Consumption of Remote Condensing Machines

Technology Platform	**RCU**
Harvest Rate (lbs/day)	**Estimated Annual Energy Consumption (kWh)**

	Current ENERGY STAR	Proposed V2 ENERGY STAR	% Savings Proposed V2 ES vs. Current ES
175	1,900	2,133	-12%
450	4,254	4,142	3%
770	6,020	6,041	0%
1000	6,774	7,259	-7%
1250	8,468	8,490	0%
4000	27,098	19,216	29%

Product Availability Under Draft 2 Proposal

Following are the ice machine categories and sizes in which CEE analysis indicates that either end users may have difficulty accessing qualifying models or energy efficiency program administrators may have difficulty justifying the performance levels.

Self-contained machines (SC)

- For harvest rates from 50 to 174 pounds per day, only 4 of 27 products (15%) would qualify
- For harvest rates from 175 to 449 pounds per day, only 2 of 17 products (12%) would qualify

Ice making heads (IMH)

- For harvest rates from 450 to 999 pounds per day, only 2 of 71 products (3%) qualify
- For harvest rates from 1000 to 4000 pounds per day, only 3 of 43 products (7%) qualify

Remote condensing units (RCU)

- For harvest rates from 175 to 449 pounds per day, 4 of 4 products (100%) qualify

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Chart 1

This chart is part of the CEE analysis conducted in May 2011 and intended for use by EPA in consideration of proposed revisions to the ENERGY STAR specification for ice machines.