

Appliance Standards Awareness Project  
American Council for an Energy-Efficient Economy  
Alliance to Save Energy  
Natural Resources Defense Council  
Northwest Power and Conservation Council

May 16, 2014

Ms. Brenda Edwards  
U.S. Department of Energy  
Building Technologies Program  
1000 Independence Avenue, SW  
Mailstop EE-2J  
Washington, DC 20585

**RE: Docket Number EERE-2010-BT-STD-0037/ RIN 1904-AC39: Notice of Proposed Rulemaking for Automatic Commercial Ice Makers**

Dear Ms. Edwards:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Alliance to Save Energy (ASE), Natural Resources Defense Council (NRDC), and Northwest Power and Conservation Council (NPCC) on the notice of proposed rulemaking (NOPR) for automatic commercial ice makers. 79 Fed. Reg. 14846 (March 17, 2014). We appreciate the opportunity to provide input to the Department. Below we provide our comments on specific issues related to the NOPR.

**Efficiency Levels**

We urge DOE to strongly consider adopting the maximum cost-effective efficiency levels for automatic commercial ice makers. In the NOPR, DOE proposed to adopt TSL 3. However, DOE's analysis showed that higher levels would be cost-effective for customers. For batch-type equipment, DOE found that TSL 5 would yield positive LCC savings across all the representative equipment classes, and for continuous-type equipment, DOE found that TSL 4 would yield positive LCC savings for the three representative equipment classes.<sup>1</sup> Adopting the maximum cost-effective levels (TSL 5 for batch-type equipment and TSL 4 for continuous-type equipment) would increase national energy savings by 37%, from 0.286 quads to 0.393 quads.<sup>2</sup>

**Concentration of Current Production of Batch Ice Makers**

In the NOPR, DOE stated that only two manufacturers (Hoshizaki and a "small business manufacturer") currently produce batch commercial ice makers that would meet TSLs 4 and 5, and cited this as a rationale for rejecting these higher TSLs.<sup>3</sup> Based on a review of DOE's

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<sup>1</sup> 79 Fed. Reg. 14937. Table V.52.

<sup>2</sup> *Ibid.* 14928. Table V.37.

<sup>3</sup> *Ibid.* 14940-41.

Certification Compliance Database, it appears that the “small business manufacturer” is ITV (see Appendix A). As shown in the graphs in Appendix A, while it appears as though Hoshizaki and ITV are the only manufacturers with current models that meet TSLs 4 and 5 for ice-making head (IMH) air- and water-cooled batch equipment and self-contained (SCU) water-cooled batch equipment, the other two major manufacturers, Manitowoc and Scotsman/Ice-O-Matic, have models that meet TSLs 4 and 5 for other equipment classes. Specifically, Manitowoc has equipment that meets TSLs 4 and 5 for remote-condensing (RCU) air-cooled batch equipment (both remote-compressor and non-remote-compressor types) and SCU air-cooled batch equipment, and Scotsman/Ice-O-Matic has equipment that meets TSLs 4 and 5 for RCU (non-remote-compressor) air-cooled batch equipment. In sum, the data show that all three major manufacturers (Hoshizaki, Manitowoc, and Scotsman/Ice-O-Matic) in addition to one small manufacturer (ITV) have models available today in one or more batch-type equipment classes that already meet TSLs 4 and 5.

DOE also raised a concern in the NOPR regarding Hoshizaki’s proprietary low-thermal-mass evaporator design used in their batch-type equipment. Specifically, DOE stated that Hoshizaki’s proprietary evaporator design limits the range of possible alternative paths to achieving TSL 4 and 5 levels for batch-type equipment, and reported that manufacturers expressed doubts regarding their ability to achieve TSL 4 and 5 levels.<sup>4</sup> We do not believe that Hoshizaki’s proprietary evaporator design raises any concerns about the technological feasibility of TSLs 4 and 5. First, because Hoshizaki’s evaporator design is proprietary, DOE appropriately screened out this technology option in the analysis for the NOPR,<sup>5</sup> meaning that TSLs 4 and 5 are not based on the use of low-thermal-mass evaporators but rather on the suite of non-proprietary technologies that were screened in. Second, as shown in the graphs in Appendix A, for the four equipment classes where Hoshizaki has current products available that meet TSLs 4 and 5 (IMH water-cooled, IMH air-cooled, RCU non-remote-compressor, and SCU water-cooled), Hoshizaki is not the only manufacturer with products at those efficiency levels. Finally, the NOPR notes that manufacturers are not employing permanent magnet motors or drain water heat exchangers in current products.<sup>6</sup> These two technology options would provide additional efficiency gains beyond the performance of the most-efficient products available today.

### **Permanent Magnet Motors**

In the NOPR, DOE cited a concern regarding the availability of permanent magnet motors as a rationale for rejecting TSLs 4 and 5. Specifically, DOE stated that “motor suppliers would be required to develop and initiate production for a broad range of new motor designs suitable for automatic commercial ice makers.”<sup>7</sup> In the analysis for the NOPR, DOE evaluated permanent magnet motors for three separate ice maker components: condenser fans, pumps, and augers.<sup>8</sup> We understand that ice maker condenser fan motors are likely “off-the-shelf” motors that are not specifically designed for ice makers, and that pump motors may also be “off-the-shelf” motors. On the other hand, we understand that auger motors may be specifically designed for the

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<sup>4</sup> *Ibid.* 14940-41.

<sup>5</sup> *Ibid.* 14870.

<sup>6</sup> *Ibid.* 14889.

<sup>7</sup> *Ibid.* 14940-41.

<sup>8</sup> *Ibid.* 14911.

application. We urge DOE to determine whether each of these three motor applications (condenser fan, pump, and auger) uses “off-the-shelf” motors or motors specifically designed for the application. If DOE confirms that condenser fan motors and pump motors use “off-the-shelf” designs, this would suggest that the availability of permanent magnet motors for batch-type ice makers should not be a concern since batch-type machines do not use augers.

### **Drain Water Heat Exchangers**

In the NOPR, DOE cited a concern regarding the availability of drain water heat exchangers as another rationale for rejecting TSLs 4 and 5. Specifically, the NOPR states that DOE was only able to identify one supplier of drain water heat exchangers, whose design is patented.<sup>9</sup> While the NOPR does not identify the supplier, DOE stated in the preliminary technical support document that they were able to identify one drain water heat exchanger called Chill ICE.<sup>10</sup> The Chill ICE drain water heat exchanger does appear to use patented technology.<sup>11</sup> However, there is at least one other manufacturer of drain water heat exchangers that can be used with commercial ice makers whose design is not patented. WaterFilm Energy’s GFX drain water heat exchangers can be used for a variety of applications, and their G2-30 model is specifically advertised as being able to be used with ice machines.<sup>12</sup> We urge DOE to investigate WaterFilm Energy’s GFX technology.

### **Package Size Increases**

At the DOE public meeting on April 14, manufacturers raised concerns regarding DOE’s assumptions about package size increases. We believe that DOE has appropriately considered size increases in the analysis for the NOPR. DOE only incorporated design options that increase package size in cases where there are available units on the market larger than the baseline unit, and DOE did not consider design options that would increase package size for self-contained units, where space constraints are more critical. In total, DOE only analyzed design options that would increase package size for three out of the fourteen representative equipment classes. Further, for those three equipment classes, DOE did not assume any increase in ice maker footprint, but rather an increase in height.<sup>13</sup> In addition, customers who have smaller units today would have at least three options when purchasing a new ice maker: (1) purchasing a taller unit with the same capacity; (2) purchasing a smaller-capacity unit, which may be feasible for many customers since DOE assumed that on average, ice makers are used to produce only one-half of the ice the machines could produce;<sup>14</sup> and (3) purchasing two smaller-capacity units instead of one larger-capacity unit.

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<sup>9</sup> *Ibid.* 14940-41.

<sup>10</sup> Preliminary Technical Support Document. p. 4-5.

<sup>11</sup> <http://www.webstaurantstore.com/documents/specsheets/137ice1000.pdf>.

<sup>12</sup> <http://www.gfxtechnology.com/>.

<sup>13</sup> Technical Support Document. pp. 5-29, 5-30.

<sup>14</sup> 79 Fed. Reg. 14891.

## Refrigerants

At the DOE public meeting on April 14, AHRI suggested that DOE should not finalize this rulemaking until it is clear which refrigerants manufacturers may be using in the future. We believe that DOE's approach of conducting the analysis for this rulemaking based on the most commonly-used refrigerants today is appropriate. We understand that R404a is widely used as a refrigerant in commercial ice makers, and that it is possible that R404a may be phased out due to its high global warming potential (GWP). However, DOE is required by statute to publish a final rule for commercial ice makers by January 1, 2015.<sup>15</sup> As DOE notes in the NOPR, the Department can only consider laws and regulations that have been enacted, and therefore cannot speculate on potential future legislation or regulations that may impact refrigerants.<sup>16</sup> Furthermore, available evidence suggests that there are both flammable and non-flammable alternative refrigerants with comparable or even improved efficiency performance relative to R404a. Propane has a GWP close to 1 and also provides better efficiency compared to R404a.<sup>17</sup> Dupont's DR-33 and Honeywell's N-40 refrigerants, which are non-flammable, have 65% lower GWP than R404a and provide similar or better system efficiency.<sup>18</sup> Therefore, it does not appear that a phase-out of R404a would negatively impact ice maker efficiency.

## Compliance Date

For the analysis for the NOPR, DOE assumed a compliance date of three years after publication of the final rule. DOE also noted in the NOPR that the Department may extend the compliance date by two years if it determines that three years is inadequate.<sup>19</sup> In balancing the stringency of the standards with the compliance date and manufacturer impacts, we believe that the stringency of the standards is more important for national energy savings than the compliance date.

Thank you for considering these comments.

Sincerely,



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Technical Advocacy Manager  
Appliance Standards Awareness Project



Harvey Sachs  
Senior Fellow  
American Council for an Energy-Efficient  
Economy

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<sup>15</sup> 42 U.S.C. 6313 (d)(3)(a).

<sup>16</sup> 79 Fed. Reg. 14868.

<sup>17</sup> <http://www.achrnews.com/articles/120384-refrigeration-trends-toward-natural-refrigerants>.

<sup>18</sup> See [http://www2.dupont.com/Refrigerants/en\\_US/assets/downloads/k26492\\_Opteon\\_refrigerants.pdf](http://www2.dupont.com/Refrigerants/en_US/assets/downloads/k26492_Opteon_refrigerants.pdf) and [http://www.ozonoprogram.ru/upload/files/h/honeywell\\_solstice\\_lgwp\\_for\\_high\\_ambient.pdf](http://www.ozonoprogram.ru/upload/files/h/honeywell_solstice_lgwp_for_high_ambient.pdf).

<sup>19</sup> 79 Fed. Reg. 14947.



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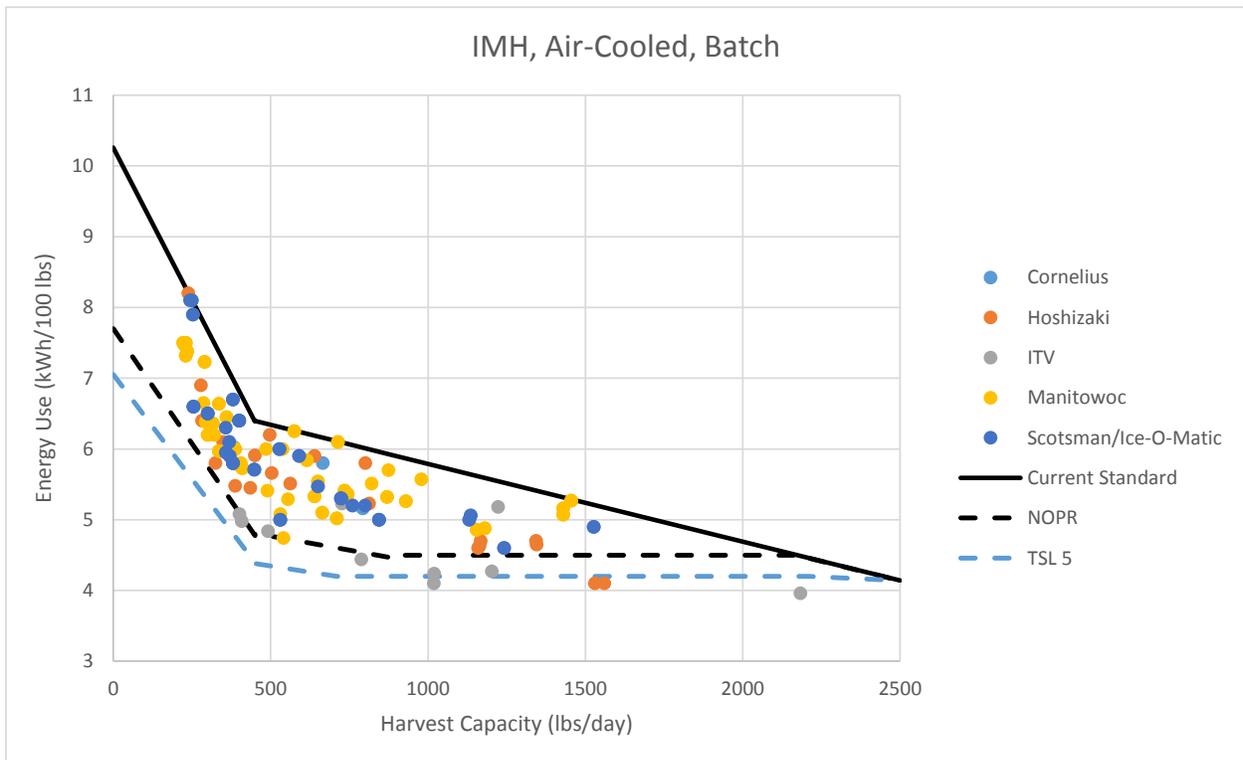
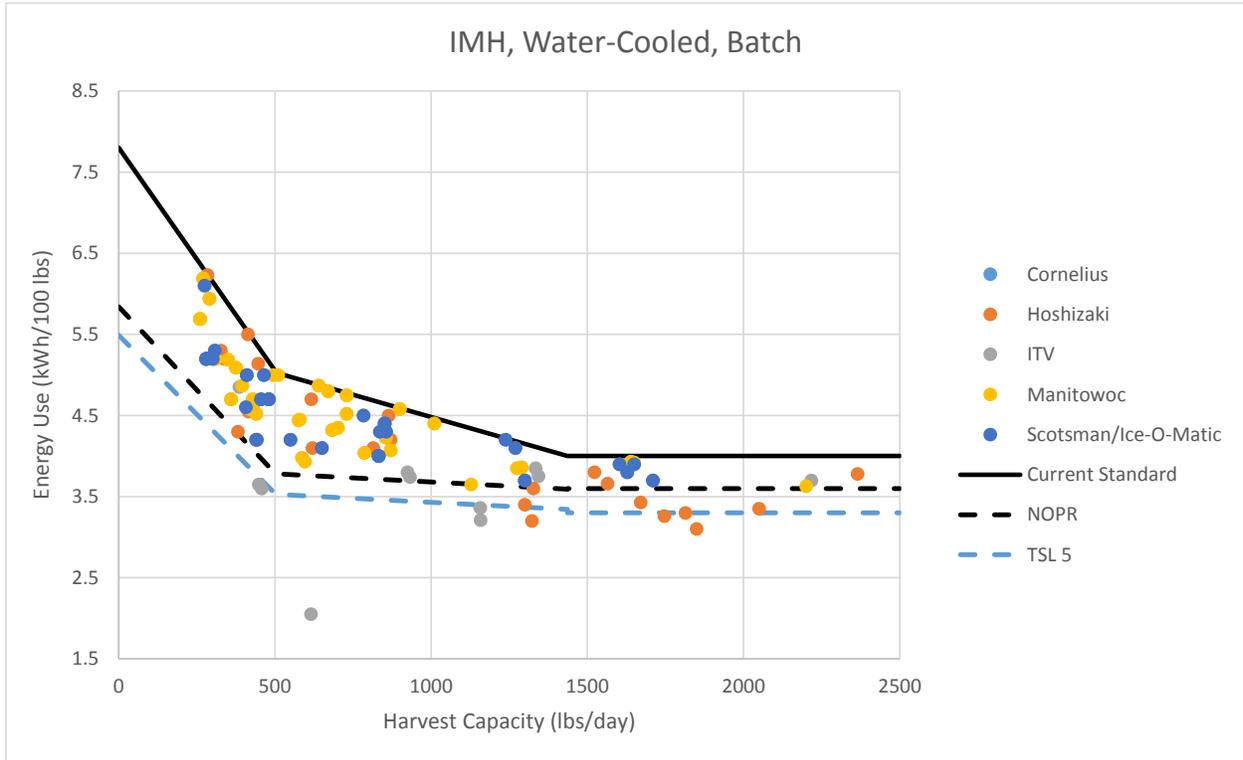


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## Appendix A<sup>20</sup>



<sup>20</sup> Models in DOE Certification Compliance Database accessed March 28, 2014.

