UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
AIR AND RADIATION

September 2, 2020

Dear ENERGY STAR® Partners and Stakeholders:

The U.S. Environmental Protection Agency (EPA) is pleased to announce final recognition criteria for ENERGY STAR Most Efficient 2021. This letter outlines the final criteria.

These criteria will recognize the most efficient ENERGY STAR products in 2021 across 12 product categories: Air Source Heat Pumps and Central Air Conditioners, Ceiling Fans, Clothes Washers, Dryers, Computer Monitors, Freezers, Furnaces, Geothermal Heat Pumps, Refrigerator-Freezers, Room Air Conditioners, Ventilation Fans, and Residential Windows and Sliding Glass Doors. The proposed criteria for Dishwashers and Televisions are expected to be shared with stakeholders once the associated ENERGY STAR specification revisions are nearing completion bringing the Most Efficient category count to 14. Products that meet the 2021 criteria will deliver significant savings over a conventional product as noted below:

Ceiling Fans: 83 kWh/yr in annual energy savings, 66% over the Federal Minimum	**Central AC and Air Source Heat Pumps**: 266-694 kW/yr in annual energy savings, 20-30% over the Federal Minimum	**Non-Ducted Split Air Conditioners and Heat Pumps**: 799-1012 kWh/yr in annual energy savings, 25%-35% over the Federal Minimum
Clothes Washers: ≤ 2.5 cu-ft: 107 kWh/yr in annual energy savings, 24% over the Federal Minimum and 1,534 gal/year in annual water savings, 37% over the Federal Minimum > 2.5 cu-ft: 466 kWh/yr in annual energy savings, 43% over the Federal Minimum and 3,509 gal/yr in annual water savings, 46% over the Federal Minimum	**Dehumidifiers: Portable Dehumidifiers:** 100 kWh/yr in annual energy savings, 19% above the Federal Minimum. **Whole-home Dehumidifiers**: 177 kWh/yr in annual energy savings, 23% above the Federal Minimum.	**Dryers:** 170-213 kWh/yr in annual energy savings, 28%-43% over the Federal Minimum
Furnaces: 114 kWh/yr in annual energy savings, 18% over Federal Minimum	**Geothermal Heat Pumps**: 1027-1614 kWh/yr in annual energy savings, 28-44% over the Federal Minimum	**Monitors**: 15.0 kWh/yr in annual energy savings, 27% over a standard model

Standard Refrigerators: 40-134 kWh/yr in annual energy savings, 10-20% over the Federal Minimum **Standard Freezers:** 36-73 kWh/yr in annual energy savings, 10-20% over the Federal Minimum **Compact Refrigerators and Freezers:** 34-80 kWh/yr in annual energy savings, 20-25% over the Federal Minimum	**Room Air Conditioners**: 138-496 kWh/yr in annual energy savings, 20-26% over the Federal Minimum (25-35% over DOE CEER Standard)	**Ventilating Fans**: Bathroom/utility: 17 kWh/yr in annual energy savings, 85% over the Federal Minimum In-line: 7 kWh/yr in annual energy savings, 44% over the Federal Minimum
	Windows and Sliding Glass Doors: Savings vary by climate, house construction, and number and type of windows replaced.	

**Note: In the case of appliances and HVAC equipment, energy use of a product that meets ENERGY STAR Most Efficient 2021 criteria is compared to the federal standard.*

Overview of Comments on the ENERGY STAR Most Efficient 2021 Proposals

EPA hosted a webinar on July 15th to present the 2021 proposed recognition criteria. Stakeholders shared feedback with EPA during the webinar and through a limited set of written comments. Commenters offered broad support for the proposed recognition criteria as well as for pausing recognition of boilers. EPA responds to key comments below. Additional comments are addressed in the comment response document.

Clothes Washers:
One commenter asked EPA to begin documenting which ENERGY STAR Most Efficient Clothes Washer models incorporate microfiber plastic filters or filter technology. EPA understands the importance of helping consumers identify product features that are important to them. EPA will encourage partners to identify products with microfiber plastic filters at the time of certification so consumers can identify products with this feature using the ENERGY STAR certified product list. If partners are interested, EPA will consider ways to raise the profile of products with this feature using ENERGY STAR outreach tools like ENERGY STAR Ask the Experts.

Two stakeholders recommended that EPA separate its clothes washer efficiency criteria by product class, recommending more stringent criteria for 2020 for front load washers of ≥ 3.0 integrated modified energy factor (IMEF) and ≤ 3.2 integrated water factor (IWF). Recognizing the superior energy and water performance of the front load design and the intention of ENERGY STAR Most Efficient to recognize products that deliver top efficiency for customers who prioritize it, EPA has maintained one product bin for clothes washers. EPA continues, in close collaboration with partners, to educate consumers about the benefits of front load washers with the intention of increasing their prevalence in the US market.

Room Air Conditioners:
One stakeholder recommended that EPA require refrigerant reporting for ENERGY STAR Most Efficient Room Air Conditioners. EPA currently enables partners who wish to post this

information to voluntarily submit it through their certification body at the time of certification or have it added to currently certified products through their certification body. EPA will continue this approach in 2021. If partners are interested, EPA will consider ways to raise the profile of products with this feature using ENERGY STAR outreach tools such as ENERGY STAR Ask the Expert.

ENERGY STAR Most Efficient 2021 Categories and Recognition Criteria

Final criteria for ENERGY STAR Most Efficient 2021 are summarized below. In addition to meeting these performance requirements, products must be certified as ENERGY STAR by an EPA-recognized certification body. Additional detail for each product category is included in the recognition criteria documents available at www.energystar.gov/mostefficient.

<table>
<tr><th>Category</th><th>ENERGY STAR Most Efficient 2021 Recognition Criteria</th></tr>
<tr><td>Ceiling Fans</td><td>Efficiency as per 10 CFR 430 Subpart B, Appendix U (cfm/W)

<table>
<tr><th>Ceiling Fan Type</th><th>Blade span (D)* (inches)</th><th>Ceiling Fan Efficiency (CFM/W)**</th></tr>
<tr><td rowspan="2">Standard and Hugger Ceiling Fans</td><td>19” ≤ D ≤ 36”</td><td>≥ 1.03D + 60.43</td></tr>
<tr><td>> 36”</td><td>≥ 3.88D - 42.17</td></tr>
<tr><td>Low-Mount HSSD Ceiling Fans</td><td>All Blade Spans</td><td>≥ 4.16D + 0.02</td></tr>
</table>

*D is the ceiling fan blade span in inches
**This is a weighted average efficiency in different modes, according to 10 CFR 430 Subpart B, Appendix U</td></tr>
<tr><td>Clothes Washers</td><td>Top-loading and front-loading products must meet the energy and water performance requirements shown in the table below, as determined by the DOE test procedure in 10 CFR 430, Subpart B, Appendix J2.

<table>
<tr><th>Clothes Washer Capacity</th><th>Integrated Modified Energy Factor (IMEF)</th><th>Integrated Water Factor (IWF)</th></tr>
<tr><td>≤ 2.5 cu-ft</td><td>≥ 2.20</td><td>≤ 3.7</td></tr>
<tr><td>> 2.5 cu-ft</td><td>≥ 2.92</td><td>≤ 3.2</td></tr>
</table>

<table>
<tr><td>Total Cleaning Score (CS_t)</td><td>≥ 85.0</td></tr>
</table></td></tr>
<tr><td>Ducted Central Air Conditioners and Air Source Heat Pumps</td><td>System status and messaging capabilities, two or more capacity levels.

<table>
<tr><th>Product type</th><th>SEER</th><th>EER</th><th>HSPF</th></tr>
<tr><td>Split AC</td><td>18</td><td>13.0</td><td>-</td></tr>
<tr><td>Packaged AC</td><td>16</td><td>12.0</td><td>-</td></tr>
<tr><td>Split HP</td><td>18</td><td>12.5</td><td>9.6</td></tr>
<tr><td>Packaged HP</td><td>16</td><td>12.0</td><td>8.2</td></tr>
</table></td></tr>
<tr><td>Non-Ducted Split Air Conditioners</td><td>Products must meet the following cooling and heating performance levels: 20 SEER, 12.5 EER, 10 HSPF (Heat pumps only); system status and messaging</td></tr>
</table>

<table>
<tr><td>and Heat Pumps</td><td>capabilities, two or more capacity levels.</td></tr>
<tr><td>Dehumidifiers</td><td>Product must meet the following applicable minimum Integrated Energy Factor (IEF)[1]
<table>
<tr><th>Product Type, size</th><th>Integrated Energy Factor</th></tr>
<tr><td>Portable, capacity ≤ 25.00 pints/day</td><td>≥ 1.70</td></tr>
<tr><td>Portable, capacity 25.01 to 50.00 pints/day</td><td>≥ 1.90</td></tr>
<tr><td>Portable, capacity > 50.00 pints/day</td><td>≥ 3.40</td></tr>
<tr><td>Whole Home, case volume ≤ 8.0 ft^3</td><td>≥ 2.22</td></tr>
<tr><td>Whole Home, case volume > 8.0 ft^3</td><td>≥ 3.40</td></tr>
</table></td></tr>
<tr><td>Geothermal Heat Pumps</td><td>System status and messaging capabilities; two or more capacity levels except water-to-water and DGX-to-water models.
<table>
<tr><th>Product type</th><th>EER</th><th>COP</th></tr>
<tr><td>Closed Loop Water-to-Air GHP</td><td>17.1</td><td>3.6</td></tr>
<tr><td>Open Loop Water-to-Air GHP</td><td>21.1</td><td>4.1</td></tr>
<tr><td>Closed Loop Water-to-Water GHP</td><td>16.1</td><td>3.1</td></tr>
<tr><td>Open Loop Water-to-Water GHP</td><td>20.1</td><td>3.5</td></tr>
<tr><td>DGX-to-air</td><td>16.0</td><td>3.6</td></tr>
<tr><td>DGX-to-water</td><td>15</td><td>3.1</td></tr>
</table></td></tr>
<tr><td>Computer Monitors</td><td>Total Energy Consumption (E_{TEC}) in kilowatt-hours per year shall be calculated as follows:
$$E_{TEC} = 8.76 \times (0.35 \times P_{ON} + 0.65 \times P_{SLEEP})$$
Where:
P_{ON} = measured On Mode power in watts;
P_{SLEEP} = measured Sleep Mode power in watts;

Total Energy Consumption (E_{TEC}) shall be less than or equal to Maximum allowable Total Energy Consumption in kilowatt-hours per year calculated as follows:
$$E_{TEC\_MAX} = (1.9 + (0.12 \times A) + [3.1 \times (r + C)]) \times eff_{AC\_DC}$$
Where:
eff_{AC_DC} = 1.00 for AC-powered monitors; 0.85 for DC-powered monitors
A = viewable screen area in square inches;
r = Total Native Resolution in megapixels; and
$C =$ 1.2 if $A < 180$ in^2; 2.0 if 180 in^2 ≤ $A < 220$ in^2; 1.2 if $A \geq 220$ in^2</td></tr>
</table>

[1] Capacity and Integrated Energy Factor determined per Appendix X1 to 10 CFR Part 430, Subpart B.

<table>
<tr><td>Dryers</td><td>Products must meet the applicable energy performance requirements shown in the table below, as determined by 10 CFR Part 430 Subpart B Appendix D2, unless noted otherwise.

<table>
<tr><th>Cycle Setting</th><th>Product Type</th><th>CEF_{BASE} (lbs/kWh)</th></tr>
<tr><td rowspan="3">Normal</td><td>Compact Ventless Electric (240 V)</td><td>≥ 3.70</td></tr>
<tr><td>Electric (All Other)</td><td>≥ 4.30</td></tr>
<tr><td>Gas</td><td>≥ 3.80</td></tr>
<tr><td rowspan="3">Normal, Maximum Dryness[2]</td><td>Compact Ventless Electric (240 V)</td><td>≥ 2.68</td></tr>
<tr><td>Electric (All Other)</td><td>≥ 3.93</td></tr>
<tr><td>Gas</td><td>≥ 3.48</td></tr>
</table></td></tr>
<tr><td>Furnaces</td><td>AFUE 97% or higher; system status and messaging capabilities.</td></tr>
<tr><td>Refrigerator-Freezers</td><td>Product must have an Annual Energy Consumption (AEC) of less than or equal to 637 kWh per year.

As determined by the DOE test procedure in 10 CFR 430 Subpart B, Appendix A, side-by-side and bottom freezer product types must be ENERGY STAR certified and at least 20% more efficient than federal requirements. Top freezers must be ENERGY STAR certified. Compact refrigerator or refrigerator-freezer product types must be at least 25% more efficient than federal requirements. As determined by the DOE test procedure in 10 CFR 430 Subpart B, Appendix B, standard-size freezer product types must be at least 15% more efficient than federal requirements. Compact freezer product types must be at least 20% more efficient than federal requirements.</td></tr>
<tr><td>Room Air Conditioners</td><td>Product must have a Combined Energy Efficiency Ratio (CEER) that outperforms the U.S. Department of Energy (DOE) Federal Minimum Standard by the percentages in the table below.

<table>
<tr><th>Cooling Capacity (BTU/hour)</th><th>Percent Better than the Federal Standard (%)</th></tr>
<tr><td>< 14,000</td><td>25%</td></tr>
<tr><td>≥ 14,000</td><td>35%</td></tr>
</table>
Products must also be at or below a maximum sound level of 45 dB(A) for the lowest operational setting.</td></tr>
</table>

[2] For purposes of this requirement, the manufacturer shall test the dryer according to the provisions in the DOE test procedure in 10 CFR 430, Subpart B, Appendix D2, but where the drying temperature setting can be chosen independently of the program, it shall be set to the maximum. At the time of certification, for each basic model the manufacturer shall report per this criteria section the energy performance (CEF), the cycle program name, the temperature setting, the dryness setting, as well as any settings enabled by default, and the time taken to complete the energy test cycle (as defined in the ENERGY STAR Version 1.1 specification, Section 5C).

Ventilating Fans	Bathroom/utility fans: Efficacy at high speed (cfm/W): ≥ 10 In line fans: Efficacy at high speed (cfm/W): ≥ 5 In-line Ventilating Fan tested with a filter in place (6 ≤ MERV < 13): ≥ 4.7 In-line Ventilating Fan tested with a filter in place (MERV ≥ 13): ≥ 3.8 Bathroom and Utility Room Fans must provide a sound level ≤ 4.0 sones at 0.25 inches of water gauge external static pressure at high speed.
Residential Windows and Sliding Glass Doors	U-factor ≤ 0.20 in all Zones SHGC in Northern Zone ≥ 0.20 SHGC in North-Central Zone ≤ 0.40 SHGC in South-Central and Southern Zones ≤ 0.25 North American Fenestration Standard/Specification (NAFS) Performance Grade ≥ 15

ENERGY STAR Most Efficient 2021 Recognition

ENERGY STAR certified products meeting these requirements will be highlighted as ENERGY STAR Most Efficient for 2021 at: www.energystar.gov/mostefficient beginning January 1, 2021. Shortly, EPA will begin distributing the 2021 ENERGY STAR Most Efficient designation to brand owners of eligible products. As a reminder, usage guidelines are available at http://www.energystar.gov/index.cfm?c=partners.most_efficient_criteria. As new products are certified that meet the criteria, EPA will contact partners and invite them to augment their product listing with the following:

- **A product image**. Product images can be in any common format (jpg, png, gif), should include only one product - do not include other people and objects - be a minimum of 250 pixels wide, and for best results, be on a single-color background, preferably white;
- **A product description** for use on the web page (i.e., key features and special functionalities). The first 50 words will be displayed beside the product photo on the web page; additional text will link to a separate web page; and
- **The name of retail stores or online distributors** where the product is available for consumer purchase. This information helps provide price and store location information to consumers on the web page.

To ensure the greatest utility of the ENERGY STAR Most Efficient webpage to consumers, EPA will only highlight products that are currently available for sale in the U.S. As such, EPA reminds partners that it is critical that they keep product availability information with their certification bodies current.

For all HVAC product categories, partners must apply for recognition for all products new to ENERGY STAR Most Efficient in order for the Agency to verify the system status and messaging and staged capacity requirements. To this end, partners must submit an application describing how their communications system and associated products and controllers meet the requirements. For window products, partners will need to apply for recognition for all products new to ENERGY STAR Most Efficient in order for the Agency to verify that a product meets the recognition criteria outlined above. Since the recognition criteria have not changed, window products recognized in 2020 need not be resubmitted and EPA will distribute the ENERGY STAR Most Efficient 2021 graphic. Detailed instructions can be found on this website.

The ENERGY STAR Most Efficient 2021 designation is intended for use at point-of-sale on point-of-purchase materials, product literature, and websites. It may not be factory-applied to products or product packaging. Failure to abide by these guidelines may result in loss of

recognition. EPA will highlight recognized products on the ENERGY STAR Most Efficient 2021 web page through December 31, 2021.

We look forward to working with you to market ENERGY STAR Most Efficient products in 2021. Please e-mail mostefficient@energystar.gov with any questions.

Thank you for your support of the ENERGY STAR program.

Sincerely,

Ann Bailey, Director
ENERGY STAR Product Labeling