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

OFFICE OF
AIR AND RADIATION

September 28, 2021

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 2022. This letter outlines the final criteria.

These criteria will recognize the most efficient ENERGY STAR products in 2022 across 11 product categories: Air Source Heat Pumps and Central Air Conditioners, Ceiling Fans, Clothes Washers, Clothes Dryers, Computer Monitors, Consumer Refrigeration Products, Dehumidifiers, Geothermal Heat Pumps, Residential Windows and Sliding Glass Doors, Room Air Conditioners, and Ventilation Fans. The proposed criteria for Dishwashers are expected to be shared with stakeholders once the associated ENERGY STAR specification revision nears completion, bringing the Most Efficient category count to 12. EPA will not be recognizing ENERGY STAR Most Efficient Furnaces, Boilers, or gas Dryers in 2022. Products that meet the 2022 criteria will deliver significant savings over a conventional product as noted below:

Air Source Heat Pumps and Central AC: 266-694 kW/yr in annual energy savings, 20-30% over the Federal Minimum	**Computer Monitors**: 15.0 kWh/yr in annual energy savings, 27% over a standard model	**Residential Windows and Sliding Glass Doors**: Savings vary by climate, house construction, and number and type of windows replaced.
Ceiling Fans: 84 kWh/yr in annual energy savings, 67% over the Federal Minimum	**Consumer Refrigeration Products:** **Standard Refrigerators:** 40-181 kWh/yr in annual energy savings, 10-27% over the Federal Minimum **Standard Freezers:** 36-73 kWh/yr in annual energy savings, 10-20% over the Federal Minimum **Compact Refrigerators and Freezers:** 34-109 kWh/yr in annual energy savings, 20-30% over the Federal Minimum	**Room Air Conditioners**: 178-496 kWh/yr in annual energy savings, 35% over the Federal Minimum (25-35% over DOE CEER Standard)
Clothes Dryers: 170-213 kWh/yr in annual energy savings, 28%-43% over the Federal Minimum	**Dehumidifiers:** **Portable Dehumidifiers:** 100 kWh/yr in annual energy savings, 19% above the Federal Minimum.	**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

	Whole-home Dehumidifiers: 177 kWh/yr in annual energy savings, 23% above the Federal Minimum	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	**Geothermal Heat Pumps**: 1027-1614 kWh/yr in annual energy savings, 28-44% over the Federal Minimum	

**Note: In the case of appliances and HVAC equipment, energy use of a product that meets ENERGY STAR Most Efficient 2022 criteria is compared to the federal standard.*

Overview of Comments on the ENERGY STAR Most Efficient 2022 Proposals

EPA hosted a webinar on July 29th to present the 2022 proposed recognition criteria. Stakeholders shared feedback with EPA during the webinar and through 10 sets of written comments from 15 commenters. Commenters offered broad support for many of the proposed recognition criteria, as well as specific requests for changes that EPA addresses below. All other comments are addressed in the comment response document.

Consumer Refrigeration Products: EPA changed the category name from Refrigerator-Freezers and Freezers to Consumer Refrigeration Products to align with the ENERGY STAR specification. EPA proposed to revise the criteria for side-by-side, bottom freezer, and compact refrigerator product types in 2022 to greater than or equal to 30% above the Federal Minimum. One stakeholder requested the criteria be set to 25% more efficient than the federal standard. Upon review of calculated data, EPA is easing the criteria slightly to 27% better than the federal standard. Using calculated data with a 5% cushion, 18 models (~3% of models) from 15 brands can meet this level. EPA will return to proposing a recognition level of at least 30% for standard models in 2023.

A second stakeholder requested mandatory reporting of low-GWP refrigerant and insulation in refrigeration products. EPA will propose mandatory refrigerant reporting and consider insulation reporting in conjunction with the next revision of the ENERGY STAR specification, where doing so will reach more consumers with this information. Reporting of this information will remain encouraged but not mandatory for Most Efficient in 2022.

Clothes Washers: EPA's proposed criteria for clothes washers and clothes dryers excluded combination all-in-one washers and dryers from Most Efficient recognition. One stakeholder requested that the criteria be updated to be inclusive of combination all-in-one washers and dryer air-cooled only models that are certified through the ENERGY STAR Clothes Washer specification. Recognizing the savings for a specific audience, EPA has updated the Most Efficient Clothes Washer criteria to allow all-in-one washer and dryer air-cooled only models to

be recognized, with the requirement that the product also must meet the Most Efficient Clothes Dryer criteria, with the exception of the time requirement.

Gas Dryers, Furnaces and Boilers: EPA received comments from nine commenters recommending that the Agency discontinue ENERGY STAR Most Efficient recognition of products that use gas to: help achieve President Biden's 2050 net-zero economy goal, to protect consumer health, and better appeal to the Most Efficient target audience - environmentally-conscious consumers. At the same time, commenters pointed out several technical challenges associated with continuing to recognize the most efficient in these categories. For example, for multiple years now, gas dryers have failed to earn Most Efficient recognition even at the current level which is less rigorous than that applied to electric models. For gas furnaces, further differentiation is not meaningful, absent the feasibility of furnaces with greater than 100% efficiency. Lastly, while EPA proposed a gas heat pump level for boilers, comments made clear that the proposed test method does not cover the common application of space heat plus water heating, and that the proposal presented a disincentive for other attractive technologies with >100% efficiency. Given the stakeholder feedback and these challenges, EPA has decided to suspend ENERGY STAR Most Efficient recognition of these products in 2022 and will continue to monitor relevant market developments.

ENERGY STAR Most Efficient 2022 Categories and Recognition Criteria

Final criteria for ENERGY STAR Most Efficient 2022 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 2022 Recognition Criteria</th></tr>
<tr><td>(Ducted) Air Source Heat Pumps and Central Air Conditioners</td><td>System status and messaging capabilities, installation criteria, variable capacity
<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>8.5</td></tr>
<tr><td>Cold Climate HP</td><td>16</td><td>11.5</td><td>10.0</td></tr>
</table>
ENERGY STAR Most Efficient Cold Climate heat pumps must be certified as cold climate heat pumps under Version 6.0 of the Central Air Conditioners and Heat pumps specification.</td></tr>
<tr><td>(Ductless) Air Source Heat Pumps and Central Air Conditioners</td><td>System status and messaging capabilities, installation criteria, variable capacity.
<table>
<tr><th>Product type</th><th>SEER</th><th>EER</th><th>HSPF</th></tr>
<tr><td>Ductless CAC</td><td>20</td><td>12.5</td><td></td></tr>
<tr><td>Ductless HP</td><td>20</td><td>12.5</td><td>10.0</td></tr>
<tr><td>Ductless Cold Climate HP</td><td>18</td><td>11.5</td><td>10.0</td></tr>
</table>
ENERGY STAR Most Efficient Cold Climate heat pumps must be certified as cold climate heat pumps under Version 6.0 of the Central Air Conditioners and Heat pumps specification</td></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>
</table></td></tr>
</table>

	Standard, Hugger, and Low-Mount HSSD Ceiling Fans	D ≤ 36”	≥ 1.44D + 83.86
		D > 36”	≥ 5.26D - 53.66

**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*

Clothes Dryers*

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.

Cycle Setting	Product Type	CEF_{Base} (lbs/kWh)
Normal	Compact Ventless Electric (240V)	≥ 3.70
	Electric (All Other)	≥ 4.30
Normal, Maximum Dryness[1]	Compact Ventless Electric (240V)	≥ 2.68
	Electric (All Other)	≥ 3.93

Clothes Washers*

Clothes Washer Capacity	Integrated Modified Energy Factor (IMEF)	Integrated Water Factor (IWF)
≤ 2.5 cu-ft	≥ 2.2	≤ 3.7
> 2.5 cu-ft	≥ 2.92	≤ 3.2

Total Cleaning Score (CS_t)	≥ 85.0

To be recognized, laundry centers and combination all-in-one washer-dryers with air-only drying must meet both Most Efficient washer and dryer criteria. Combination all-in-one washer-dryers with air-only drying do not need to meet the time requirement for ENERGY STAR clothes dryers.

Computer Monitors

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;

$$E_{TEC_{MAX}}=(1.9+(0.12\times A)+[3.1\times(r+C)])\times eff_{AC\_DC}$$

Where:

eff_{AC_DC} = 1.00 for AC-powered monitors
0.85 for DC-powered monitors

[1] 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).

<table>
<tr><td></td><td>A= viewable screen area in square inches;
r = Total Native Resolution in megapixels; and

$C = \begin{cases} 0 & \text{if } A < 180 \text{ in}^2 \\ -0.2 & \text{if } 180 \text{ in}^2 \le A < 220 \text{ in}^2 \\ -1.0 & \text{if } A \ge 220 \text{ in}^2 \end{cases}$</td></tr>
<tr><td>Consumer Refrigeration Products</td><td>Product must have an Annual Energy Consumption (AEC) of less than or equal to 637 kWh per year.

Side-by-side and bottom freezer product types must be at least 27% more efficient than federal requirements. Top freezers must be at least 10% more efficient than federal requirements. 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. Compact refrigerator or refrigerator-freezer product types must be at least 30% more efficient than federal requirements.</td></tr>
<tr><td>Dehumidifiers*</td><td>
<table>
<tr><th>Type, Size</th><th>Integrated Energy Factor (IEF)[2]</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 ft3</td><td>≥ 2.22</td></tr>
<tr><td>Whole Home, case volume > 8.0 ft3</td><td>≥ 3.40</td></tr>
</table>
Product must meet the following applicable minimum Integrated Energy Factor (IEF)[2]:</td></tr>
<tr><td>Geothermal Heat Pumps*</td><td>System status and messaging capabilities; variable capacity except water-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</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>Residential Windows and Sliding Glass Doors*</td><td>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</td></tr>
<tr><td>Room Air Conditioners</td><td>Product must have a Combined Energy Efficiency Ratio (CEER) that is greater than or equal to 35% better than the DOE Federal Minimum Standard.

Products must also be at or below a maximum sound level of 45 dB(A) for the lowest operational setting.</td></tr>
<tr><td>Ventilating Fans*</td><td>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.</td></tr>
</table>

**Proposed criteria carried over from 2021 for these categories with no changes.*

ENERGY STAR Most Efficient 2022 Recognition

ENERGY STAR certified products meeting these requirements will be highlighted as ENERGY STAR Most Efficient for 2022 at: www.energystar.gov/mostefficient beginning January 1, 2022. Shortly, EPA will begin distributing the 2022 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. This application will be updated in the coming weeks to mirror the changes in the 2022 recognition criteria. 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 2021 need not be resubmitted and EPA will distribute the ENERGY STAR Most Efficient 2022 graphic. Detailed instructions can be found on this website.

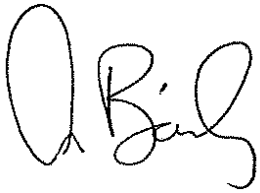
The ENERGY STAR Most Efficient 2022 designation is intended for use at point-of-sale on point-of-purchase materials, product literature, and websites. It may not be factory-applied to products or product packaging. Failure to abide by these guidelines may result in loss of recognition. EPA will highlight recognized products on the ENERGY STAR Most Efficient 2022 web page through December 31, 2022.

We look forward to working with you to market ENERGY STAR Most Efficient products in 2022.

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