



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

OFFICE OF
 AIR AND RADIATION

October 3, 2016

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 2017. This letter outlines the final criteria as well as a refined proposal on dryers.

These criteria will recognize the most efficient ENERGY STAR products in 2017 across 12 product categories: Air Source Heat Pumps and Central Air Conditioners, Boilers, Ceiling Fans, Clothes Washers, Clothes Dryers, Dishwashers, Computer Monitors, Furnaces, Geothermal Heat Pumps, Refrigerator-Freezers, Ventilation Fans, and Residential Windows. Products that meet the 2017 criteria will deliver significant savings over a conventional product as noted below:

Boilers: 14% energy savings	Furnaces: 18% energy savings	Clothes Dryers: savings will be provided with final recognition criteria
Central AC and Air Source Heat Pumps: 20-30% energy savings	Geothermal Heat Pumps: 20-40% energy savings	Ventilating Fans: bathroom/utility: 85% in-line: 44% energy savings
Clothes Washers: 33% energy savings and 32% water savings (for front load models)	Monitors: 35% energy savings	Windows: Savings vary by climate, house construction, and number and type of windows replaced.
Ceiling Fans: 66% energy savings	Refrigerators: 15% energy savings	Dishwashers: 22% energy savings and 36% water savings
Ductless AC and Heat Pumps: 25%-35%		

**Note: In the case of appliances and HVAC equipment, energy use of a product that meets ENERGY STAR Most Efficient 2017 criteria is compared to the federal standard.*

For refrigerators/freezers, EPA is pleased to continue to offer the opportunity for dual recognition as both ENERGY STAR Most Efficient and a recipient of the ENERGY STAR Emerging Technology Award. Brand owners making use of innovative, climate friendly refrigerants are encouraged to apply for added recognition through the [Emerging Technology Award](#).

Overview of Comments on the ENERGY STAR Most Efficient 2017 Proposals

EPA received a modest number of comments on the proposed criteria distributed on August 5, 2016. Commenters voiced overall support for the program as a tool for moving the market for efficient products forward. One commenter raised ongoing concern that the approach used to recognize efficiency for ENERGY STAR Most Efficient program does not always mirror that used in the ENERGY STAR program, citing the clothes dryers proposal in this instance. ENERGY STAR Most Efficient is designed to identify and advance highly efficient products in the marketplace. ENERGY STAR Most Efficient complements the base ENERGY STAR program, identifying for early adopter and environmentally conscious consumers, the most energy efficient of the ENERGY STAR certified products. Designed for this audience, EPA sets criteria with efficiency prioritized above all else and understands from a range of stakeholders that this objective is being met.

EPA has maintained the August 5th proposals in all cases but two. Numerous comments and suggestions were received for the clothes dryer recognition criteria. EPA has considered these carefully and is issuing a refined proposal. This proposal aims to ensure consumers are realizing the promised savings while being mindful of testing burden. EPA has adjusted the “most energy consuming” criterion to instead focus on capturing the highest dryness setting within the normal cycle, based on findings that the consumer uses higher dryness settings relatively often. According to our analysis of the 2012 NEEA Laundry Study, consumers select more dry/very dry at least 31% of the time, and specifically select more dry/very dry within the normal cycle at least 32% of the time. Consistent with protecting the consumer experience, as a floor, products must meet the applicable ENERGY STAR CEF when tested at the maximum dryness setting. To allow for additional feedback, finalization of the dryer criteria will be deferred until October 21, 2016. EPA also received a comment that the gas levels were too stringent. While no gas dryers currently meet the proposed level, based on stakeholder input, EPA is aware that multiple feasible technology options are currently available, such as modulating valves. EPA sees the ENERGY STAR Most Efficient gas dryer criteria as an opportunity to advance efficiency in the gas dryer market. As such, EPA has not adjusted the gas level.

EPA is also excluding open and closed loop water to water geothermal heat pumps (GHP) systems from the variable capacity requirements applied to most other HVAC categories. Commenters noted that this subcategory is installed with a buffer tank, offering the same benefit of steady even heat that variable capacity does for other HVAC products. EPA agrees with this commenter and has adjusted the requirements for water to water GHP products.

Responses to the full range of comments can be found in the attached ENERGY STAR Most Efficient 2017 Comment Response document. You may view this and comments received on the [ENERGY STAR Most Efficient 2017 Criteria Development web page](#).

ENERGY STAR Most Efficient 2017 Categories and Recognition Criteria

Recognition criteria have been finalized as proposed for all categories except dryers.

Final criteria for ENERGY STAR Most Efficient 2017 are summarized below. In addition to meeting these performance requirements, products must be ENERGY STAR certified 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 by following the link to “ENERGY STAR Most Efficient 2017 criteria.”

Category	ENERGY STAR Most Efficient 2017 Recognition Criteria
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Boilers*	Gas Powered Boilers: 95% AFUE or higher. Oil Powered Boilers: 90% AFUE or higher																							
Ceiling Fans	<p>Standard ceiling fans must meet at least one of the following efficiency criteria:</p> <table border="1" data-bbox="527 210 1474 331"> <tr> <th data-bbox="527 210 911 300">Efficiency as per 10 CFR 430 Subpart B, Appendix U (cfm/W)</th> <th data-bbox="911 210 1474 300">High Speed Efficiency as per ENERGY STAR Specification for Residential Ceiling Fans, V3.0 (cfm/W)</th> </tr> <tr> <td data-bbox="527 300 911 331">≥ 3.88D - 42.17*</td> <td data-bbox="911 300 1474 331">300</td> </tr> </table> <p style="text-align: center;">*D is the ceiling fan diameter in inches</p> <p>Note: Should hugger fans become eligible for ENERGY STAR in 2017, they will also be eligible for ENERGY STAR Most Efficient recognition at the above levels.</p>	Efficiency as per 10 CFR 430 Subpart B, Appendix U (cfm/W)	High Speed Efficiency as per ENERGY STAR Specification for Residential Ceiling Fans, V3.0 (cfm/W)	≥ 3.88D - 42.17*	300																			
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Clothes Washers*	<table border="1" data-bbox="613 533 1485 659"> <tr> <th data-bbox="613 533 979 623">Clothes Washer Volume</th> <th data-bbox="979 533 1252 623">Integrated Modified Energy Factor (IMEF)</th> <th data-bbox="1252 533 1485 623">Integrated Water Factor (IWF)</th> </tr> <tr> <td data-bbox="613 623 979 659">>2.5 cubic feet</td> <td data-bbox="979 623 1252 659">≥2.76</td> <td data-bbox="1252 623 1485 659">≤3.2</td> </tr> </table>	Clothes Washer Volume	Integrated Modified Energy Factor (IMEF)	Integrated Water Factor (IWF)	>2.5 cubic feet	≥2.76	≤3.2																	
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Central Air Conditioners and Air Source Heat Pumps	<p>System status and messaging capabilities, variable capacity</p> <table border="1" data-bbox="618 688 1382 867"> <tr> <th data-bbox="618 688 1032 720">Product type</th> <th data-bbox="1032 688 1138 720">SEER</th> <th data-bbox="1138 688 1252 720">EER</th> <th data-bbox="1252 688 1382 720">HSPF</th> </tr> <tr> <td data-bbox="618 720 1032 762">Split AC</td> <td data-bbox="1032 720 1138 762">18</td> <td data-bbox="1138 720 1252 762">13</td> <td data-bbox="1252 720 1382 762"></td> </tr> <tr> <td data-bbox="618 762 1032 804">Packaged AC</td> <td data-bbox="1032 762 1138 804">16</td> <td data-bbox="1138 762 1252 804">12.0</td> <td data-bbox="1252 762 1382 804"></td> </tr> <tr> <td data-bbox="618 804 1032 846">Split HP</td> <td data-bbox="1032 804 1138 846">18</td> <td data-bbox="1138 804 1252 846">12.5</td> <td data-bbox="1252 804 1382 846">9.6</td> </tr> <tr> <td data-bbox="618 846 1032 867">Packaged HP</td> <td data-bbox="1032 846 1138 867">16</td> <td data-bbox="1138 846 1252 867">12.0</td> <td data-bbox="1252 846 1382 867">8.2</td> </tr> </table>	Product type	SEER	EER	HSPF	Split AC	18	13		Packaged AC	16	12.0		Split HP	18	12.5	9.6	Packaged HP	16	12.0	8.2			
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Ductless AC and Heat Pumps	<p>Products must meet the following cooling and heating performance levels: 20 SEER, 12.5 EER, 10 HSPF (Heat pumps only); system status and messaging capabilities, variable capacity.</p>																							
Geothermal Heat Pumps	<p>System status and messaging capabilities</p> <table border="1" data-bbox="610 989 1390 1272"> <tr> <th data-bbox="610 989 1024 1020">Product type</th> <th data-bbox="1024 989 1138 1020">EER</th> <th data-bbox="1138 989 1252 1020">COP</th> <th data-bbox="1252 989 1390 1020"></th> </tr> <tr> <td data-bbox="610 1020 1024 1052">Closed Loop Water-to-Air/GHP</td> <td data-bbox="1024 1020 1138 1052">17.1</td> <td data-bbox="1138 1020 1252 1052">3.6</td> <td data-bbox="1252 1020 1390 1083" rowspan="2">Variable capacity</td> </tr> <tr> <td data-bbox="610 1052 1024 1083">Open Loop Water-to-Air GHP</td> <td data-bbox="1024 1052 1138 1083">21.1</td> <td data-bbox="1138 1052 1252 1083">4.1</td> </tr> <tr> <td data-bbox="610 1083 1024 1146">Closed Loop Water-to-Water GHP</td> <td data-bbox="1024 1083 1138 1146">16.1</td> <td data-bbox="1138 1083 1252 1146">3.1</td> <td data-bbox="1252 1083 1390 1146"></td> </tr> <tr> <td data-bbox="610 1146 1024 1209">Open Loop Water-to-Water GHP</td> <td data-bbox="1024 1146 1138 1209">20.1</td> <td data-bbox="1138 1146 1252 1209">3.5</td> <td data-bbox="1252 1146 1390 1209"></td> </tr> <tr> <td data-bbox="610 1209 1024 1272">DGX</td> <td data-bbox="1024 1209 1138 1272">16.0</td> <td data-bbox="1138 1209 1252 1272">3.6</td> <td data-bbox="1252 1209 1390 1272">Variable capacity</td> </tr> </table>	Product type	EER	COP		Closed Loop Water-to-Air/GHP	17.1	3.6	Variable capacity	Open Loop Water-to-Air GHP	21.1	4.1	Closed Loop Water-to-Water GHP	16.1	3.1		Open Loop Water-to-Water GHP	20.1	3.5		DGX	16.0	3.6	Variable capacity
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Computer Monitors	<p>Total Energy Consumption (E_{TEC}) in kilowatt-hours per year shall be calculated as follows:</p> $E_{TEC} = 8.76 \times (0.35 \times P_{ON} + 0.65 \times P_{SLEEP})$ <p>Where: P_{ON} = measured On Mode power in watts; P_{SLEEP} = measured Sleep Mode power in watts;</p> <p>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:</p> $E_{TEC_MAX} = 6.13 \times r + 55 \times \tanh(0.003 \times [A - 59] + 0.01) + 5.0$ <p>Where: A = viewable screen area in square inches; \tanh = hyperbolic tangent function; and r = Total Native Resolution in megapixels up to 5.0 megapixels total Products with >5.0 megapixels Total Native Resolution can receive a maximum r of 5 megapixels, for a resolution allowance ($6.13 \times r$) of 30.65 kilowatt-hours</p>																							

Dishwashers*	<table border="1" data-bbox="609 147 1390 273"> <thead> <tr> <th>Product Type</th> <th>Annual Energy Use (kWh/yr)</th> <th>Water Consumption (gallons/cycle)</th> </tr> </thead> <tbody> <tr> <td>Standard Dishwasher</td> <td>≤240</td> <td>≤3.2</td> </tr> </tbody> </table> <table border="1" data-bbox="756 304 1242 464"> <thead> <tr> <th>Test Cycle</th> <th>Cleaning Index</th> </tr> </thead> <tbody> <tr> <td>Heavy</td> <td>70</td> </tr> <tr> <td>Medium</td> <td>70</td> </tr> <tr> <td>Light</td> <td>70</td> </tr> </tbody> </table>	Product Type	Annual Energy Use (kWh/yr)	Water Consumption (gallons/cycle)	Standard Dishwasher	≤240	≤3.2	Test Cycle	Cleaning Index	Heavy	70	Medium	70	Light	70		
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Dryers	<p>Products must meet the applicable energy performance requirements shown in the table below, as determined by 10 CFR Part 430 Subpart B Appendix D2.</p> <table border="1" data-bbox="527 585 1472 682"> <thead> <tr> <th>Cycle Setting</th> <th>Product Type</th> <th>CEFBASE (lbs/kWh)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Normal</td> <td>Electric</td> <td>≥ 4.30</td> </tr> <tr> <td>Gas</td> <td>≥ 3.80</td> </tr> </tbody> </table> <p>Products must meet the applicable energy performance requirements shown in the table below in the normal program at the highest heat and dryness settings. For purposes of this requirement, the manufacturer shall test the dryer according to the provisions in the DOE test procedure in 10 CFR Part 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 1.0 specification, Section 5C).</p> <table border="1" data-bbox="527 1077 1472 1173"> <thead> <tr> <th>Cycle Setting</th> <th>Product Type</th> <th>CEFBASE (lbs/kWh)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Normal, Maximum Dryness</td> <td>Electric</td> <td>≥ 3.93</td> </tr> <tr> <td>Gas</td> <td>≥ 3.48</td> </tr> </tbody> </table>	Cycle Setting	Product Type	CEFBASE (lbs/kWh)	Normal	Electric	≥ 4.30	Gas	≥ 3.80	Cycle Setting	Product Type	CEFBASE (lbs/kWh)	Normal, Maximum Dryness	Electric	≥ 3.93	Gas	≥ 3.48
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Furnaces*	AFUE 97% or higher; system status and messaging capabilities.																
Refrigerator-Freezers*	<p>Product must be ENERGY STAR certified and have an Annual Energy Consumption (AEC) of less than or equal to 637 kWh/year.</p> <p>Side-by-side and bottom freezer products must be at least 15% more efficient than federal requirements.</p>																
Ventilating Fans	<p>Bathroom/utility fans: Efficacy at high speed (cfm/W): ≥10</p> <p>In line fans: Efficacy at high speed (cfm/W): ≥5</p>																
Residential Windows*	<p>U-factor ≤ 0.20 in all Zones</p> <p>SHGC in Northern Zone ≥ 0.20</p> <p>SHGC in North-Central Zone ≤ 0.40</p> <p>SHGC in South-Central and Southern Zones ≤ 0.25</p> <p>North American Fenestration Standard/Specification (NAFS) Performance Grade ≥15</p>																

*2017 criteria carried over from 2016 for these categories.

ENERGY STAR Most Efficient 2017 Recognition

ENERGY STAR certified products meeting these requirements will be highlighted as ENERGY STAR Most Efficient for 2017 at: www.energystar.gov/moste efficient beginning January 1, 2017. Shortly, EPA will begin distributing the 2017 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 an single color background, preferably white; and
- A product description for use on the web page (i.e., key features and functionalities, MSRP - for windows and HVAC only). The first 50 words will be displayed beside the product photo on the web page; additional text will link to a separate 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 **except boilers**, 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 variable capacity requirements. To this end, partners must submit a narrative description of how their communications system and associated products and controllers meet the requirements. EPA has provided a guide to speed the recognition process by ensuring that narratives address all the information EPA needs. EPA recognizes that these narratives apply to series of related products and only expects one submission for the entire series. For all partners with CAC, ASHP, Ductless AC or HP, or DGX and water to air heat pump products recognized in 2016, EPA will confirm the variable capacity capabilities of their products before distributing the ESME 2017 graphic. 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 2016 need not be resubmitted and EPA will distribute the ESME 2017 graphic. Detailed instructions can be found at http://www.energystar.gov/index.cfm?c=partners.most_efficient_instructions.

The ENERGY STAR Most Efficient 2017 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 2017 web page through December 31, 2017.



We look forward to working with you to market ENERGY STAR Most Efficient products in 2017. Please e-mail mostefficient@energystar.gov with any questions.

Thank you for your support of the ENERGY STAR program.

Sincerely,

A handwritten signature in black ink, appearing to read "Ann Bailey". The signature is fluid and cursive, with the first name "Ann" written in a large, open loop and the last name "Bailey" written in a more compact, cursive style.

Ann Bailey, Director
ENERGY STAR Product Labeling