

Summary of Stakeholder Comments in Response to Draft 1 Version 6.0 ENERGY STAR Displays Specification (Distributed June 3, 2011)

Topic No.	Document	Topic	Comment	ENERGY STAR Response
1	Specification - Draft 1	Definitions	<p>One stakeholder suggested providing examples of Display Type definitions instead of giving a complete list to avoid unintentionally implying what types of displays are not within scope. Another stakeholder mentioned that the definition of input signals in sleep mode is not clear.</p> <p>Several stakeholders noted that the maximum luminance varies from unit to unit depending on many factors such as "white point" and "color temperature". Another stakeholder commented that the definition for "as-shipped luminance" should correspond to factory default settings and not to what is recommended by the manufacturer.</p> <p>One stakeholder suggested making the product family definition more flexible by listing more possible differences between models within a family. Another stakeholder asked to preclude models with customized special configurations as being Representative Models within a family.</p>	<p>EPA has clarified the definition of as-shipped luminance, to indicate factory default preset settings, and the definition of maximum luminance, to indicate the luminance level specified by the manufacturer. EPA has also further clarified the definition for input signals in sleep mode.</p> <p>Due to partner inquiries, EPA proposes to list examples of specific display types, such as digital picture frames, to identify covered products under the specification. To increase flexibility with the product family definition, EPA has adopted the definition of 'Representative Model' to clarify the definition of family and to avoid additional testing burden and its associated cost. EPA has not precluded customized displays from being placed within the same family.</p>
2	Specification - Draft 1	Scope	<p>One stakeholder suggested listing touch screen displays among the Included Products to prevent confusion. Another stakeholder requested that EPA consider whether wallmounted displays capable of touch input (marketed as replacements for whiteboards), or interactive kiosks should be in scope.</p> <p>For the list of Excluded Products, one stakeholder recommended combining the "products with VGA sold as TVs" with "dual-function TVs" in the list since they are the same products. Another stakeholder suggested removing component TVs from Excluded Products because such a provision relies on how the product is marketed. One stakeholder suggested including medical displays except when regulations prevent compliance. Another stakeholder suggested including all-in-one computers in the Included Products.</p> <p>Several stakeholders noted that they would agree with the inclusion of displays over 60" if there is data supporting this change and if these displays meet the 1W sleep limit. One stakeholder disagreed with the inclusion of displays over 60" because the specification covers a wide range of sizes from digital picture frames to signage, and therefore cannot accommodate for extremely large displays.</p>	<p>Although displays with touch screen technology are included under the scope of products and would be eligible for qualification if they meet the program requirements, EPA has not explicitly named them in the Included Products as many would automatically be included based on features that would qualify them as displays other than touch screen technology. EPA is interested in feedback on whether further clarification would be helpful.</p> <p>Through market research, EPA found that products with a VGA interface marketed as TVs do not necessarily serve as dual-function TVs. Also based on this research, displays used in medical applications were found to carry a range of different features, and some could potentially qualify for ENERGY STAR. To promote efficiency without harming performance, only products used in diagnostic medical applications that have power management capabilities and a power state meeting the definition of Sleep Mode are included in the scope of this specification. More specifically, only products that do not need to meet FDA's specifications for medical devices (i.e., requiring lifetime luminance maintenance and prohibiting power management) are eligible for qualification under this specification.</p> <p>EPA has limited data on the power consumption for displays greater than 60" and is therefore unable to include them in the scope of this specification. EPA welcomes additional data that would enable EPA to consider expanding the scope of this specification to displays greater than 60".</p>
3	Specification - Draft 1	Power Management	<p>One stakeholder suggested giving an allowance for screen dimming features, in the range of 10-20% of the product On Mode power. They also recommended setting a default time to sleep for all display products since many are not turned off by the user for days. Another stakeholder suggested changing "DPMS" to "DMS" in power management section since the VESA standard was renamed the DMS standard.</p>	<p>EPA understands that manufacturers continue to develop and implement innovative power management functions involving new technologies such as occupancy sensors, proximity sensors, timer functions, and display dimming capabilities. EPA would like to understand these technologies better, their prevalence in the market, energy savings they offer consumers and, as appropriate, encourage their broader application.</p> <p>EPA is considering implementing a default delay time to sleep requirement and welcomes stakeholder feedback on the impact of the requirement and typical delay times currently employed in existing products. To this end, EPA is also interested in learning more about energy saving opportunities with screen dimming features.</p>

4	Specification - Draft 1	Automatic Brightness Control (ABC)	<p>While several stakeholders suggested maintaining the formula from the current specification, other stakeholders voiced concern about the effectiveness of the proposed ABC formula. One stakeholder suggested adjusting the formula to have at least 75% weighting at 150 and 300 lux since that reflects typical office lighting in which these products would spend the majority of their use. Another stakeholder suggested to place more weighting on 300 lux since most displays won't see much variability in ambient light. One stakeholder commented that the proposed ABC testing requirements are too burdensome to manufacturers and fail to capture true representation of ABC by placing only 25% of the weighting at the level where there will be a drop in power consumption (10 lux).</p> <p>One stakeholder provided a different approach to ABC by testing at the maximum luminance necessary to achieve a product's maximum ABC luminance. Another stakeholder commented that outdoor displays usually require higher luminance. One stakeholder suggested excluding signage products from the "as-shipped settings" requirement for ABC enabled displays.</p>	<p>EPA and the U.S. Department of Energy (DOE) believe that the test conditions for room illuminance should be representative of consumer use. EPA intends to align with DOE's forthcoming proposed Televisions testing conditions for ABC enabled by default where certain display products are covered under the scope once the test procedure is finalized.</p> <p>EPA is interested in any additional feedback from stakeholders on which room illumination levels and percentage weighting are appropriate to account for how ABC is featured in displays, especially in computer monitors. EPA anticipates including a revised proposal for addressing ABC in a subsequent draft of this Displays specification.</p>
5	Specification - Draft 1	Resolution	<p>Several stakeholders suggested keeping resolution in the On Mode equation because:</p> <ul style="list-style-type: none"> - displays, unlike TVs, have varying resolutions (for closer, detailed viewing), and higher image quality displays should not be penalized. - it affects light transmittance, and doing so would allow EPA to still keep the specification technology-neutral while not favoring low-resolution displays. - transistors increase wiring density, thereby reducing transmittance. - there is a trend toward the use of large sized display boards. - the Computer specification is planning to use the Display specification for tablets, notebooks, and all-in-one computers which are typically high-resolution. <p>One stakeholder commented that there does not seem to be a significant relationship between resolution and power consumption, or rather it is masked by the fact that bigger screens have higher resolution. Another stakeholder commented that VA and IPS technologies also require more backlighting similarly to higher resolution displays with denser pixels. They also noted that the effect of resolution on power consumption is much less than the effect of backlight technology and the required backlight brightness.</p>	<p>Based on data analysis and information received from stakeholders, EPA agrees that resolution appears to have a direct impact on the power consumption of a display, increasing On Mode power consumption independently from the viewable screen area. EPA therefore proposes to retain resolution in the On Mode power equation.</p> <p>EPA has proposed an allowance of 6 watts per megapixel (W/MP) for screen resolution but some stakeholders suggested that a lower W/MP value would be more appropriate. Therefore, EPA continues to seek information regarding its proposal to account for resolution in the On Mode power equation.</p>

6	Specification - Draft 1	On Mode	<p>One stakeholder suggested maintaining the the On Mode equation from Version 5.1 for the current specification. Another stakeholder proposed to have an allowance in On Mode for networking capabilities and peripheral connections.</p> <p>One stakeholder requested that EPA share any quantitative (e.g., market penetration and reference data set) or qualitative data and reasoning that it has used as a basis for the On Mode criteria proposal in Draft 2.</p>	<p>From its dataset, EPA observed that displays less than 30" mainly encompass two types of products: digital picture frames, which are typically less than 12" in diagonal screen size, and computer monitors, which typically range in screen size between 12" and under 30". Displays greater than 30" are typically marketed as professional signage.</p> <p>Digital picture frames were added to the scope of products during the previous Version 5.1 specification. In 2010, ENERGY STAR qualified digital picture frames represented approximately 10% of the market. Given this low market share, EPA is not inclined to increase the stringency of the performance requirements for these products at this time. That said, a review of the current ENERGY STAR qualified product list shows a broad selection of competitively priced products from a variety of manufacturers. EPA is therefore proposing to retain the existing On Mode power requirements for these products. EPA welcomes feedback on this approach as well as any additional data that stakeholders would like to share. The market share of ENERGY STAR qualified computer monitors under Version 5.1 grew significantly in 2010, suggesting that a change in the On Mode power requirements may be warranted. A review of the qualifying and non-qualifying offerings of ENERGY STAR Displays Partners indicates that EPA's dataset is representative of models currently on the market. New, separate On Mode power equations are proposed, reflecting the performance of roughly the top quartile of models. For monitors with resolution of 2.074 MP, one of the most common resolutions, 21% of models in the popular 18"-24" size range would qualify. EPA's current data set supports a good selection of products from a range of manufacturers that would be available and cost effective at the proposed levels. EPA welcomes feedback on these proposed On Mode power requirements as well as any additional data that stakeholders would like to share. Displays larger than 30", namely professional signage products, were added to the scope of products during the previous Version 5.1 specification, effective January 30, 2010. In 2010, ENERGY STAR professional signage products represented less than 10% of the market. Given this low market share, EPA is not inclined to increase the stringency of the performance requirements for these products at this time. That said, a review of ENERGY STAR's currently qualified product listing shows a broad selection of competitively priced products from a variety of manufacturers. EPA is therefore proposing to retain the existing On Mode power requirements for these products. EPA welcomes feedback on this approach as well as <u>any additional data that stakeholders would like to share.</u></p>
7	Specification - Draft 1	Sleep Mode	<p>Several stakeholders suggested reconsidering the 0.5W limit since there is a practical difference between sleep and off modes and such a requirement would not promote the use of these lower power modes. In addition, network communication will consume more power in sleep, such as a USB Hub which can consume an additional 0.6W for some products. Furthermore, displays equipped with digital terminals would not meet the proposed 0.5W requirement.</p>	<p>Although stakeholders expressed concern that a 0.5 W limit would not allow displays with data/networking capabilities to qualify, EPA has not received sufficient test data to reconsider the requirement. Many ENERGY STAR qualified displays that do not have networking capability can already meet the 0.5 W limit. EPA welcomes feedback and data on any additional features, such as peripherals or data/network capabilities, to understand to what extent they may increase power consumption in Sleep Mode.</p>
8	Specification - Draft 1	Off Mode	<p>One stakeholder requested exceptions to the 0.5W limit in off mode for some products such as touch-panel type displays. Another stakeholder suggested testing with only signal interfaces and without any network connections if EPA will go forward with 0.5W limit.</p>	<p>Based on analysis of currently qualified products and data submitted by stakeholders, the majority of ENERGY STAR qualified displays that have an Off Mode already meet the 0.5 W limit. EPA therefore proposes to retain the proposal of the 0.5 W limit in Off Mode, harmonizing with the Off Mode requirement in the European Commission (EC) Ecodesign Regulation No 1275/2008.</p>
9	Specification - Draft 1	Networking	<p>One stakeholder commented that it is difficult to provide a specific power consumption value for displays with network connections. Another stakeholder suggested that EPA perform an independent study to quantify the incremental power associated with network connections rather than setting a limit for this functionality now or rather than asking manufacturers to gather this data, especially since this increment should not be significant compared to the On Mode power.</p> <p>One stakeholder suggested adopting adders for networking features since they are a growing trend and pose as an opportunity for energy savings.</p> <p>One stakeholder proposed to modify the networking language in the specification to cover functionalities provided by specific displays such as Ethernet network interface, audio interfaces, some USB interfaces (mainly for HID) and HW to transform network data to video, audio and USB streams and vice versa.</p>	<p>Given the relatively large power consumption of the principal features compared to the relatively small power consumption of data/networking capabilities in On Mode for products with such capabilities, EPA proposes not to include any adders to compensate for the additional power consumption in On Mode.</p> <p>EPA still welcomes stakeholder feedback on the additional power consumption in Sleep Mode due to these capabilities, including Ethernet, USB, and other connections.</p>

10	Specification - Draft 1	Toxicity and Recyclability Requirements	<p>Stakeholders voiced disagreement with non-energy-use requirements in the specification, asking EPA to:</p> <ul style="list-style-type: none"> - Avoid toxicity requirements in this specification since EPEAT and other labels already cover such areas - Avoid toxicity and packaging recyclability requirements in this specification since it is intended to promote product energy efficiency - Avoid non-energy-use requirements in this specification since they are not directly related to the benefits consumers have come to expect from energy efficient products <p>Another stakeholder commented that in the context of EU ENERGY STAR, preparatory work should remain focused on energy consumption in the use phase.</p> <p>One stakeholder requested to review any information EPA possesses or acquires through this stakeholder process regarding how any proposed restrictions on greenhouse gas emissions, recyclability, or toxicity are to be defined and how many products, if any, would cease to qualify due to any proposed restrictions.</p>	<p>Energy efficiency remains the environmental benefit that forms the basis for determining the select group of products that earn the ENERGY STAR. The program has a long history of including other, non-energy requirements in ENERGY STAR specifications to ensure that overall product performance and value is maintained. To the extent that other requirements are included, EPA leverages existing standards and looks to achieve a minimally acceptable level of performance, as EPA does not aim to create product differentiation around these requirements. The proposed toxicity requirement and compliance approach is consistent with the European Union RoHS Directive, which also applies to displays. The proposed design for ease of disassembly and recyclability requirement is harmonized with the existing IEEE 1680.1 standard. Through research, EPA has found that the majority of display manufacturers in the marketplace already meet these requirements.</p>
11	Specification - Draft 1	Luminance	<p>Several stakeholders suggested to keep the luminance requirement of testing at a fixed level because:</p> <ul style="list-style-type: none"> - it represents real-world use conditions - it is an efficiency-based standard which provides the most meaningful and relevant standard for the benefit of everyone - a product with higher luminance specifications becomes more disadvantageous <p>One stakeholder recommended using a fixed value of 180 nits because it's the most common default luminance for displays below 30" and because it encourages improved energy efficiency independent of the performance level. Another stakeholder suggested keeping the displays specification as an efficiency-based standard by performing testing at a fixed luminance and change the Televisions spec to one that is also based on efficiency and fixed luminance testing.</p> <p>One stakeholder suggested basing the calculation for as-tested luminance on an absolute figure instead of as a percentage of maximum luminance, which can vary. Another stakeholder noted that maximum luminance varies from supplier to supplier with the default luminance setting at around 80% of maximum luminance.</p> <p>Another stakeholder suggested testing/shipping at 65% of maximum luminance instead of making it mandatory since it might render screens too dark or too light. One stakeholder agreed with the proposal to test at as-shipped luminance value with the precondition that it is greater than or equal to 65 % of maximum luminance.</p>	<p>Following analysis of currently qualified products, EPA has determined the average as-shipped luminance to be 235 cd/m2 for displays under 30". Furthermore, most of these displays have a resolution of more than 1.1 MP and were therefore tested for qualification at 200 cd/m2 using the VESA test standard under the previous ENERGY STAR Version 5.1 Displays specification. To ensure that testing for ENERGY STAR qualification resembles intended product usage, EPA proposes to test displays with a viewable screen size less than 30 inches at 200 cd/m2.</p> <p>For displays with a viewable screen size of 30 inches or more, the as-shipped luminance of currently qualified displays was found to vary significantly from product to product across the entire range of sizes, thus making it difficult to set a fixed luminance for all sizes. EPA proposes to test displays with a viewable screen size of 30 inches or more at a luminance that is greater than or equal to 65% of the reported maximum luminance. Since many of the displays already ship at a luminance that is greater than or equal to 65% of the reported maximum luminance, EPA expects that requiring products to be tested at greater than or equal to 65% of the maximum luminance also accurately reflects, at minimum, how most products are shipped or installed.</p>
12	Specification - Draft 1	Effective Date	<p>One stakeholder asked to keep Version 5.1 in effect after Version 6.0 becomes effective. Another stakeholder suggested providing manufacturers of business-use displays such as signage products with a one-year window after the spec becomes effective.</p>	<p>EPA allows products qualified under an existing specification that cannot meet a forthcoming specification a 9-month period during which to transition collateral material. EPA will maintain this approach for this product category.</p>
13	Specification - Draft 1	Harmonization with Televisions	<p>One stakeholder requested that EPA share any information and reasoning that is related to similarities and differences between televisions and displays and that has served as a basis for EPA's proposal.</p>	<p>Along with other regulatory organizations, EPA would like to pursue harmonization of specifications for displays and televisions due to their similar, converging technical characteristics and continued market movement in this direction. EPA recognized, however, the usage differences between the products, which led EPA to reconsider some of its original proposals.</p>

14	Draft Test Method	IEC 62087	<p>Several stakeholders supported the use of IEC 62087 but noted to use the latest edition 3.0 and indicate specific sections since much of the standard does not relate. One stakeholder commented that the IEC 62087 is not an adequate reproducible method for power consumption measurement and that the current VESA standard should be kept. Another stakeholder commented that harmonization efforts should not be forced where settings or usage models are not consistent.</p> <p>One stakeholder voiced concern that the internet content measurement makes testing burdensome and, although it may apply to monitors under 30", it would not apply to displays over 30". Another stakeholder recommended that the Dynamic Broadcast Content Video Signal Test in section 11.6 of IEC 62087 should be used in both On Mode testing sections 8.2.B and 8.3.A of the Displays Test Method.</p>	<p>EPA intends for displays of all sizes to be tested using the IEC 62087 Dynamic Broadcast Content video signal. For displays that are not able to play the Dynamic Broadcast Content, EPA proposes testing them with the IEC 62087 three-bar static signal. EPA welcomes stakeholder feedback on any displays, such as digital picture frames, which may not be tested using either the IEC 62087 Dynamic Broadcast Content video signal or the IEC 62087 three-bar static signal.</p>
15	Draft Test Method	Test Setup	<p>One stakeholder commented to allow an LMD tolerance of +15/- 0 lux instead of a 10% tolerance because it is too wide and encourages gaming of the test method.</p>	<p>EPA is currently investigating the approach to ABC and will include guidance in the subsequent version of the draft test method.</p> <p>EPA is interested in any additional feedback from stakeholders on accurate measurements for ABC.</p>
16	Draft Test Method	Test Conduct	<p>One stakeholder proposed using measuring power in watts to the nearest hundredth of a watt instead of to the nearest tenth.</p> <p>Another stakeholder proposed additional clarification language for "Testing at Factory Default Settings" by specifying that for displays with different picture modes, the settings should be the same as the host computer settings.</p> <p>One stakeholder suggested specifying that for power measurements that are inherently unstable due to pulse mode power management features, a 5 minute integration should be used to determine average power.</p> <p>Another stakeholder commented that testing displays with speakers in their as-shipped configuration will cause power consumption higher.</p>	<p>To ensure accurate power measurements and consistency with the eligibility criteria, EPA proposes unrounded power measurements be recorded.</p> <p>EPA also proposes requiring power measurements to be recorded after instrument readings are stable to within 1% over a five minute period.</p> <p>EPA has modified the language for factory default settings and intends to test displays in their as-shipped configuration to provide consumers with the most accurate intended usage information.</p>
17	Draft Test Method	Luminance Testing	<p>One stakeholder commented that the 500 mm requirement for measuring luminance is not enough and should be coupled with requiring a measured area of 200 or 500 pixels. Another stakeholder suggested mentioning only pixels and avoiding distance requirements.</p> <p>One stakeholder recommended using picture mode settings for measuring maximum luminance, like in the Televisions method, and require manual adjustment only for displays with no set picture modes. One stakeholder commented that there are other user control settings which affect luminance such as the color temperature setting or the enabling/disabling of certain features such as a "dynamic contrast ratio" function.</p> <p>One stakeholder suggested first measuring the as-shipped luminance of the display and, after maximizing user controls, measure the maximum luminance, without regard to whether or not the as-shipped is 65% of the maximum luminance.</p>	<p>Due to the redundancy and inconsistency in recommending the LMD to be placed at a certain distance from the screen or covering a set pixel area, EPA has clarified the recommendation to measure an area of at least 500 pixels.</p> <p>Based on stakeholder feedback regarding difficulties with measuring the maximum luminance of a display, EPA proposes the maximum luminance to be claimed by the manufacturer, instead of being measured as part of the test method.</p>

18	Draft Test Method	Automatic Brightness Control (ABC) Testing	<p>Several stakeholders commented that consistent ABC testing is difficult because:</p> <ul style="list-style-type: none"> - ambient light measurements vary and thus need to be specified in detail - type of testing equipment used affects results - 300 lux may be suitable for monitors but does not apply to signage which may operate at as much as 2000 lux - different third party laboratories must be able to supply the identical ambient illumination to the ABC sensor such that the power is reproducible - the display's bezel design such as transparency, curvature, etc. will also affect the light that reaches the sensor, possibly providing inconsistent test results <p>One stakeholder commented that IEC 62087 suggested 1 of 2 measurements at 300 lux (or greater) to be so high that all ABC sensors would be saturated and thus provide the maximum display brightness, even though 300 lux was considered to be an extremely bright illuminance level that would not be encountered during normal viewing in a typical environment. Another stakeholder suggested to wait for results from the CEA ABC study and keep the current ABC equation meanwhile.</p> <p>One stakeholder commented that due to the complexity, time required, and associated accumulative error of making measurements at multiple absolute illumination values, it is recommended that the number of measurements be limited to no more than two or three.</p>	<p>EPA thanks stakeholders for their feedback on ABC.</p> <p>EPA is currently investigating the approach to ABC and will include guidance in the subsequent version of the draft test method. EPA is interested in any additional feedback from stakeholders on accurate measurements for ABC.</p>
19	Draft Test Method	Networking	<p>Many stakeholders confirmed the growing trend of networking features in displays and suggested providing an additional power allowance to accommodate qualification of these features. One stakeholder commented that USB hubs will still consume power in Sleep Mode, even if no ports are connected. Another stakeholder noted that network connectivity may be provided for a number of reasons, including basic centralized control of a number of display devices, the transmission of video (typically in compressed form) over the network, and permitting the monitor itself to act as a "smart" device (i.e., a "net monitor") with at least some capabilities such as web browsing, etc., which could be used even in the absence of a host PC system.</p> <p>One stakeholder commented that no power adder is needed for On Mode power and there should be no adder for multiple ports. Another stakeholder provided a specific comment about clarifying that usually a bridge connection is not made via WiFi so a WiFi access point should be specified in the description.</p>	<p>EPA proposes that manufacturers engage the USB/Firewire/Thunderbolt hub controller (or similar) in the display when testing for ENERGY STAR qualification to reflect a more accurate depiction of the state of hardware when operated by the end user. The requirements for data and network connections during testing have been revised to provide more guidance across various types of connections. EPA seeks additional data and feedback pertaining to the power consumption associated with peripherals' (e.g., data or network hubs, speakers, mice) connection to displays during Sleep Mode testing.</p>
20	Draft Test Method	Interface	<p>One stakeholder commented that "analog component" should take precedence over "analog composite" since most displays only have a VGA port.</p> <p>Another stakeholder commented that Section 5.2 (E) ("Accuracy of Signal Levels") should be explicitly stated as applicable only to analog interfaces since digital video inputs should be expected to maintain the precise white and black level codes as appropriate for the interface in question.</p> <p>One stakeholder commented that power factor decreases with a decreased load on the power supply and referred to the power factor requirement in the Computers specification as a good source for setting a minimum value.</p>	<p>EPA proposes the use of analog component over analog composite for products with only analog interfaces.</p> <p>Stakeholders did not express concern over measuring true power factor during On Mode testing. EPA therefore proposes to retain this measurement requirement to expand its understanding of this issue.</p>

21	Partner Commitments - Draft 1	F-GHG Requirements	<p>One stakeholder suggested removing F-gas requirements in this specification since it does not have a clear benefit to the program and would likely confuse consumers, diminishing the ENERGY STAR branding efforts</p> <p>Another stakeholder commented that in the context of EU ENERGY STAR, preparatory work should remain focused on energy consumption in the use phase.</p> <p>One stakeholder requested to review any information EPA possesses or acquires through this stakeholder process regarding how any proposed restrictions on greenhouse gas emissions, recyclability, or toxicity are to be defined and how many products, if any, would cease to qualify due to any proposed restrictions.</p>	<p>As ENERGY STAR requirements become increasingly stringent, EPA is sensitive to the need to guard against unintended increases in greenhouse gas (GHG) emissions associated with the manufacturing of more efficient technologies. While LCDs have proven an effective means to delivering high performance with less energy, producing LCDs requires using fluorinated gases (F-GHGs), which are among the greenhouse gases with the highest global warming potentials. In manufacturing LCDs, these gases are used as etching gases for dry patterning processes and as cleaning gases for chemical vapor deposition (CVD) chambers.</p> <p>EPA seeks to leverage the significant international work accomplished over the previous decade which has identified methods to destroy or remove F-GHGs in the manufacturing phase. Based on discussions with stakeholders, EPA has learned that LCD manufacturers are presently at various stages of installing and scaling up their F-GHG emissions controls, as well as measuring emissions annually across their facilities. EPA is currently exploring a viable timeframe for ensuring compliance with this requirement and welcomes stakeholder feedback. EPA is also interested in highlighting strides already made by manufacturers to reduce their F-GHG emissions and welcomes feedback on how to best do so.</p>
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