



October 14, 2011

Ms. Verena Radulovic  
United States Environmental Protection Agency  
Office of Air and Radiation  
1200 Pennsylvania Ave NW  
Washington, DC 20460

**Subject: Comments regarding Draft 2 Version 6 Displays Specification**

Dear Verena Radulovic,

On behalf of the Natural Resources Defense Council (NRDC) and Northwest Energy Efficiency Alliance (NEEA), we respectfully submit the following comments in regards to the ENERGY STAR Draft 2 Version 6.0 Displays specification issued September 20<sup>th</sup>, 2011.

On behalf of its more than 1.2 million members and online activists, the NRDC is working to help the world achieve decisive reductions in electricity and natural gas needs from buildings and appliances, in order to safeguard the Earth, its people, its plants, its animals and the natural systems on which all life depends.

The Northwest Energy Efficiency Alliance (NEEA) is a non-profit organization working to maximize energy efficiency to meet our future energy needs. NEEA is supported by, and works in collaboration with, the Bonneville Power Administration, Energy Trust of Oregon and more than 100 Northwest utilities on behalf of more than 12 million energy consumers.

Electronic displays, including computer monitors, professional displays and digital picture frames constitute a substantial portion of electricity end use in U.S. homes and businesses: computer monitors, which represent 90 percent of current ENERGY STAR qualified displays products, are increasingly used not just with desktop computers but also with commercial notebooks in docking stations and as second screens. The majority

of common size computer displays' power consumption (18-24 inch diagonal) ranges from 15 W to 35 W in On Mode. This corresponds to roughly 40-100 kWh electricity per year, or up to two thirds of an ENERGY STAR Category A desktop computer.

Modern displays use similar technology as large screen TVs. Developments in TV technology, such as the recent announcement by LG Electronics of a 47-inch TV that claims to use only 28 W in Active mode vs. over 90 W for current best-in-class models<sup>1</sup>, suggest that there remains a large opportunity for energy efficiency improvements in electronic displays.

ENERGY STAR has a critical role to play to ensure rapid market adoption of these super-efficient technologies which will save US consumers and businesses substantial sums of money from reduced electricity bills. We have seen rapid market adoption of efficient display technology in part due to the decreasing costs of LED technology. We believe this will likely lead to dramatic improvements in monitor efficiency in the next few years. A 2011 McKinsey report estimates that market penetration of LED backlighting in monitors will increase from 50% in 2011 to 85% in 2013<sup>2</sup>. To ensure that the ENERGY STAR brand continues to maximize its value to consumers by identifying only the most efficient models on the market, we strongly recommend that EPA set **more stringent** Version 6 On Mode criteria for displays 12 to 30 inches and professional displays 30 to 60 inches.

**1) We recommend that EPA make public the dataset used in their analysis for Version 6. If EPA has not already done so, we recommend they filter their dataset to only include models that were introduced into the US market within the past year.**

In recent years, ENERGY STAR has seen rapid uptake of models that meet ENERGY STAR requirements for some of its consumer electronic product categories. In some cases, significantly more than 25% of models available on the market (EPA's stated goal) can meet a specification by the time it becomes effective. In order to ensure the ENERGY STAR label continues to represent the top performing display models, it is critical that EPA set requirements to ensure that only the most efficient models, using technologies that are available to many manufacturers, meet the requirements when the specification becomes effective.

Based on past efficiency improvement trends and currently available technology options, we strongly suggest that EPA attempt to capture these recent efficiency

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<sup>1</sup> "LG Display Develops World's Most Energy Efficiency LCD TV Panel"  
[http://www.engadget.com/2011/10/10/lg-panel-puts-leds-along-a-single-edge-achieves-more-nits-with/#disqus\\_thread](http://www.engadget.com/2011/10/10/lg-panel-puts-leds-along-a-single-edge-achieves-more-nits-with/#disqus_thread)

<sup>2</sup> McKinsey & Company. 2011. "Lighting the way: Perspectives on the global lighting market".  
<http://img.ledsmagazine.com/pdf/LightingtheWay.pdf>

improvements in the monitor market as part of developing its On Mode Power requirements. If EPA has not already done so, we recommend the following strategies:

- a) **Only include models that were manufactured or added to the ENERGY STAR list in the past year.** It is important to ensure that the models used in setting On Mode power requirements accurately reflect ongoing trends in screen size, resolution, and energy efficiency. For example, models placed on the Version 5 Qualified Products List before November 2010 were 24% better than ENERGY STAR, on average. Models added to the list between November 2010 and September 2011 were roughly 30% better than ENERGY STAR, on average. As Table 1 indicates, the models added to the list in the past year have larger screen sizes and higher resolution, yet require less power.

**Table 1:** Comparison of average values for models added to the ENERGY STAR list between October 2009 and September 2011

Date Model was added to ENERGY STAR list	Diagonal Screen Size (in)	Resolution (Megapixels)	% better than Version 5	On Mode Power (W)
October 2009 - October 2010	20.7	1.65	24%	20.5
November 2010 - September 2011	21.1	1.69	30%	19.4

- b) **Exclude models that DO NOT meet ENERGY STAR Version 5 requirements from the Version 6 dataset.** Given the high market penetration of Version 5 in the current market and the rapidly decreasing costs of LED backlighting, we assume that market penetration of ENERGY STAR Version 5 will be much higher when Version 6 takes effect in September 2012. To account for these expected changes, we recommend that EPA exclude models that do not meet Version 5 from its analysis when establishing Version 6 power requirements.

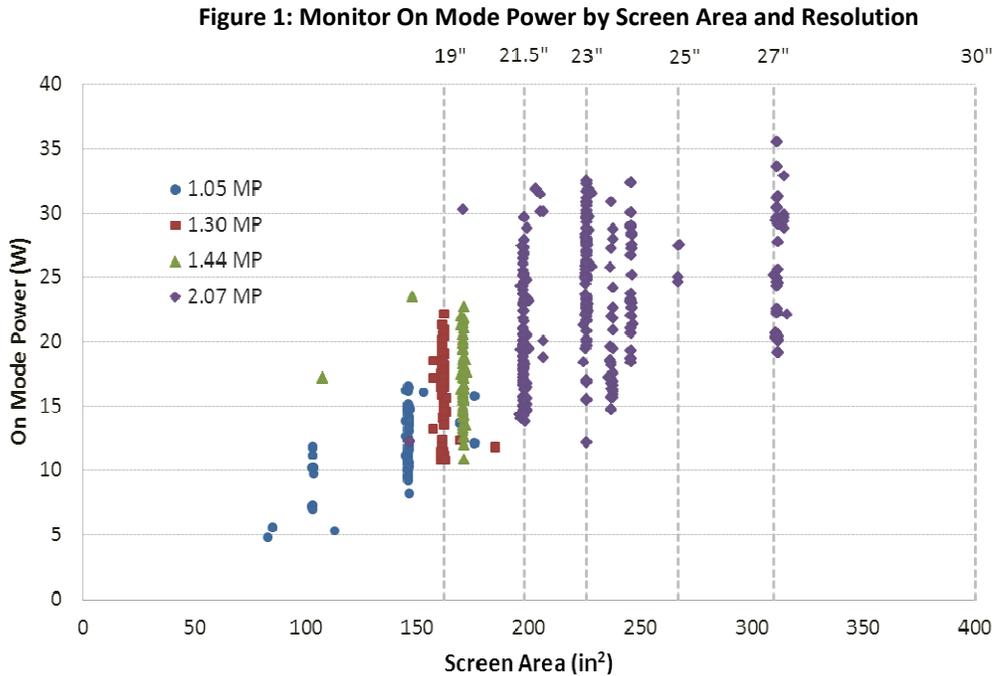
In order to ensure the transparency of this specification revision process, we respectfully request EPA to make the dataset used to derive the Draft 2 On Mode power requirements publically available. We understand that there may be some sensitivity with manufacturer-submitted data; however, as it has done in the past, EPA can mask manufacturer and model information from the dataset before making it public. To help stakeholders achieve a better understanding of the current monitors market, we recommend that EPA publish the 'date first available on market' for all models in their dataset.

**2) EPA should remove resolution from the On Mode power requirements for displays of all sizes.**

While screen resolution may be an important secondary factor, our analysis below shows that for the vast majority of models, screen area *alone* can be used to accurately predict On Mode power. We developed a dataset based on a modified version of the September 15, 2011 ENERGY STAR QPL, incorporating the changes described above in Comment 1. For our analysis, we used the Qualified Product List dated September 15,

2011 and only included monitor models that had been added to the list after October 15, 2010.<sup>3</sup>

As depicted in Figure 1 below, for the four most common resolution values (i.e., 1.05, 1.30, 1.44, 2.07 MP) which represent 86% of all monitors in the dataset, On Mode power increases as a linear function of screen area from 12-25". After 25", it continues to increase as a function of screen area, albeit with a smaller slope.



Screen resolutions are generally correlated with specific screen sizes. Table 2 below shows that the most popular screen sizes have one principal resolution. Thus, for most of the monitor market, screen size and screen area can be used exclusively to develop On Mode power requirements for monitors.

**Table 2:** Common monitor screen sizes and the predominant resolution associated with that screen size

Diagonal Screen Size (in)	Predominant Resolution (MP)	% of models with predominant resolution
18.5	1.05	93%
19.0	1.30	62%
20.0	1.44	99%
21.5	2.07	100%
23.0	2.07	100%

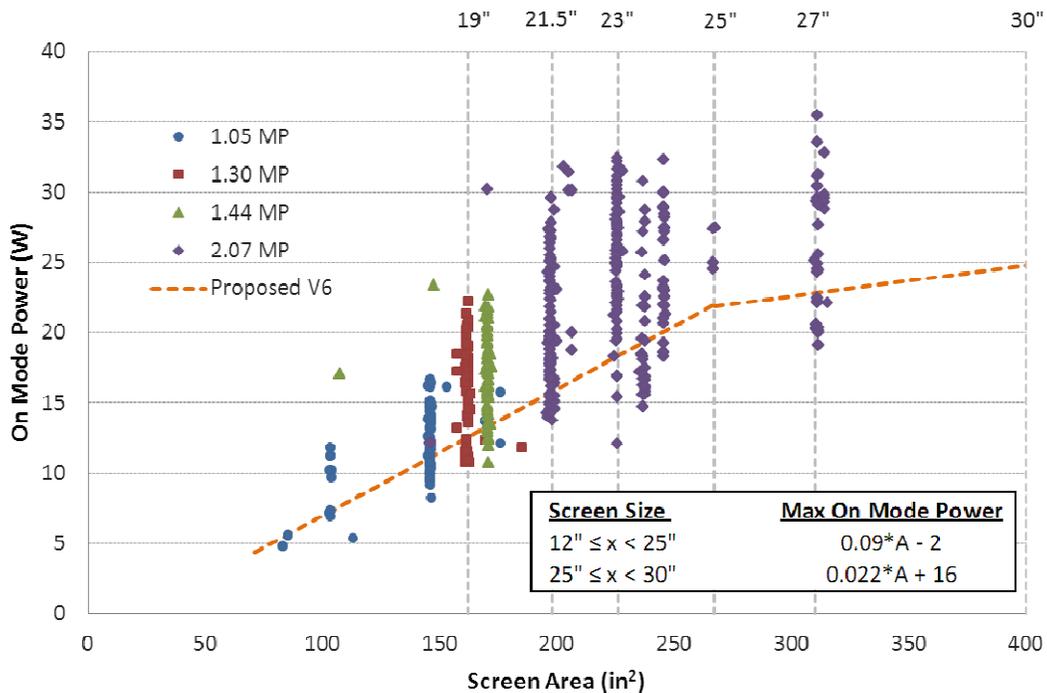
<sup>3</sup> In the absence of a date when models were first available on market, we proxied this value using the date added to the ENERGY STAR list. We encourage EPA to use the date when a product is first available on the market to develop a dataset that represents products introduced within the past year. For our analysis, we also removed all models which did not list values for On Mode Power.

By removing resolution as a variable in the On Mode requirements, the displays specification would be greatly simplified and better aligned with the On Mode requirements set in the Television specification. Given the increasing convergence between the displays and television markets, we encourage EPA to harmonize the Display specification requirements with the Television specification, where possible.

**3) Based on current efficiency trends and the rapid adoption of LED backlighting, we encourage EPA to set more stringent On Mode Power Requirements**

Based on our revised dataset, we recommend EPA set the following On Mode Power Requirements for displays between 12 and 30 inches, as stated below in Figure 2. On average, this is 43% better than current Version 5 levels, and is 11% more stringent than EPA’s proposed Version 6 specification.

**Figure 2:** Monitor On Mode Power by Screen Area, using the modified ENERGY STAR dataset.



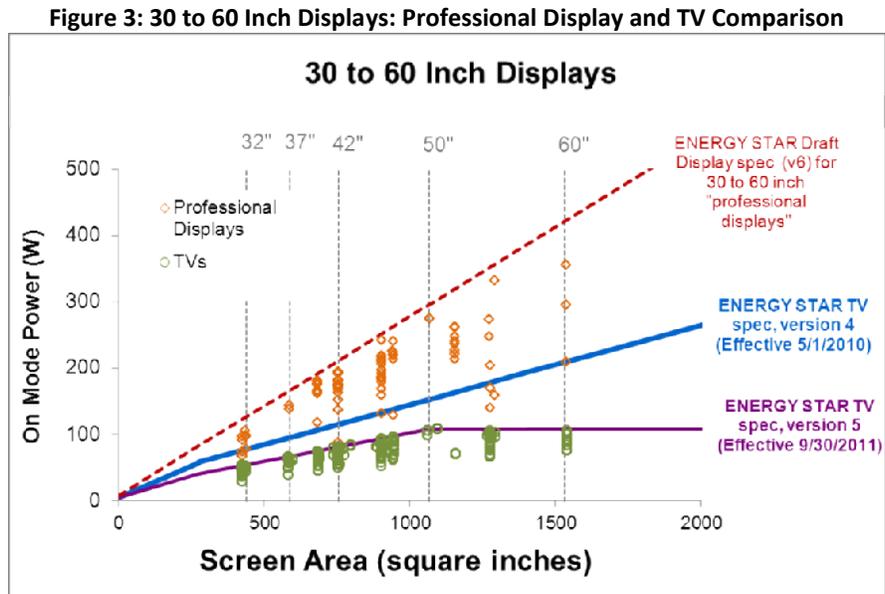
Roughly 22% of our dataset meets our proposed Version 6 requirements, with a wide variety of screen sizes and resolutions being able to qualify. In addition, twenty different manufacturers are represented in the products that meet our proposed requirements. In the popular 18-24" size category, roughly 20% of the dataset qualifies. Although resolution is no longer included in the equation, there is an average pass rate of 24% across the four most prominent resolution types, including a 22% pass rate for models with the popular resolution of 2.07 MP.

4) EPA should consider increasing the stringency level for 30 to 60 inch displays, primarily targeted towards the “professional display” category. We also recommend EPA conduct further study to better understand the underlying reasons for low ENERGY STAR adoption in this category thus far.

The Draft 2 document states the following:

*“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 any additional data that stakeholders would like to share.”*

Based on a review of the 80 professional displays between 30 and 60 diagonal inches on the October 2011 ENERGY STAR list, we think there is room to increase the stringently level for Version 6. Figure 3 shows a plot of the professional displays relative to the proposed specification level for Version 6. On average, the 80 professional displays are 23% more efficient than V6 levels and some 60% more efficient. For comparison, Figure 3 also plots the 552 30 to 60-inch TVs that already meet ENERGY STAR’s Version 5 TV specification levels, and the levels for Version 4 and Version 5. We note that this isn’t an “apples-to-apples” comparison given the different usage characteristics and the fact that the credit for automatic brightness control (ABC) is treated differently for both specifications. However, given that the underlying panel technologies are the same, we think the comparison can be helpful for considering a more stringent specification level. We recommend considering the ENERGY STAR Version 4 TV level as a starting point for the Version 6 Display specification.



Given the rapid adoption of the ENERGY STAR specification for computer monitors and televisions over the past few years, we think that EPA should conduct a more detailed study into why ENERGY STAR professional signage products only represent less than 10% of the market. For example, how confident is the EPA that the remaining 90% of the market doesn't meet the On Mode power requirements? Given the increased adoption more efficient panel technologies—and the relatively lenient specification level—it's not unreasonable to conclude that a significant portion of the non-ENERGY STAR displays may already meet the on mode requirements. If this is the case, what are the other hurdles for qualification?

**5) We recommend EPA establish future Tier 2 qualifying level as part of the Version 6 specification.**

We believe that setting a future Tier 2 target helps drive significant innovation in the market and provides a clear target for industry to base their future designs on.

**6) We support EPA's proposed 0.5 W sleep requirement.**

We support EPA's proposed 0.5 W Sleep Mode requirement, as well EPA's efforts to further characterize the effect of networking capabilities on power in Sleep Mode.

**7) We support the use of IEC 62087 for testing of On Mode Power.**

As mentioned in Comment 2 above, we encourage EPA to harmonize the specification requirements between displays and televisions, where possible. Adopting IEC 62087 for testing On Mode Power for displays 12 to 30 inches will continue to further these goals.

**8) We encourage EPA to monitor changes to the TV test procedure on Auto Brightness Control for incorporation in the next revision of the Display specification.**

Thank you for this opportunity to provide comments. We look forward to working with EPA throughout this process.

Sincerely,



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Pierre Delforge  
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Center for Energy Efficiency Standards  
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