



NRDC Input on ENERGY STAR Version 8 TV Specification

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On behalf of the Natural Resources Defense Council we respectfully submit our feedback on the content from EPA's webinar on the ENERGY STAR revision process for televisions.

In summary, we believe that EPA has identified the right issues to investigate:

- Energy consumption of TVs in various picture settings
- Effectiveness of automatic brightness control
- Persistence (or lack thereof) of energy saving features
- Reassessing power adder for ultra high definition (UHD) TVs
- How to capture the extra energy use of TVs while playing high dynamic range (HDR) content?

We also encourage EPA to revisit how it treats standby power of smart TVs (i.e TVs connected to the internet)

I. Treatment of Automatic Brightness Control is Flawed and Needs to be Revisited

Recent testing by NRDC and EPA showed that:

- Some TVs had higher power use when ABC was disabled then the power reported at the brightest test point, 100 lux, which was intended to represent the brightest viewing condition for most users.

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- ABC has a very big impact on TV energy use. In [NRDC's 2015 report](#) on UHD TV energy use, we found that TV power use increased by roughly 50% for the TVs we tested and ranged from 17% to as high as 93%.
- Some TVs had very low screen brightness levels (luminance) at the two lower illuminance test points. This could cause consumers to be frustrated by the overly dim pictures they observe when viewing their TV in a room with low light levels, like night time viewing, and cause them to permanently disable ABC. Per the above bullet, this could result in a huge increase in a TV's annual energy use.
- Many TVs sold by LG, Samsung, and Vizio are programmed to automatically disable ABC whenever the main picture setting was changed. For some Samsung TVs a small change to the backlight setting would disable ABC.

Given the above, we urge EPA to revisit its treatment of ABC. Options to consider include: a) capping the credit a manufacturer can receive for ABC, and b) adding performance requirements that must be met in order to be able to have ABC enabled during the test. These requirements could include establishing minimum luminance levels at each illuminance test point and requiring ABC to remain on, except if manually disabled at a later time by the consumer. ABC may not, however, be automatically disabled due to another settings change, nor may the TV provide the user with a prompt that encourages the user to consider disabling ABC (e.g. for a brighter picture in all viewing conditions, consider disabling ABC).

When designed right, ABC can be a legitimate energy saving feature. For the savings from this feature to occur during actual usage and not just in the lab, we need to ensure that consumers will have a good experience when ABC is enabled and to lack motivation to go into the menu to disable ABC.

II. Motion Detection Dimming

The [2016 NRDC study](#) showed that the IEC test clip referenced by DOE in its test method, and which is also used by ENERGY STAR, has abnormally short scenes. Many TVs manufactured by LG and Samsung have a Motion Detection Dimming feature, which when enabled causes the TV's power to drop significantly when content with this characteristic is observed. Most real world content contains longer times between scene changes, and when more representative content was played during testing performed by NRDC's consultant the effect of Motion Detection Dimming was much lower.

We recommend EPA: a) add an on mode power test that uses the IEC test clip but with MDD disabled and to limit the “credit” manufacturers can take for this feature to 10%, and b) require MDD to remain on for all picture settings and subsettings in order to earn this credit. If MDD is the legitimate power saving feature that the manufacturers report it to be, then it should remain on not only during the “normal” or “standard” picture setting but when other setting such as sports or cinema are selected as well.

We believe this is an appropriate interim approach until a new consensus test method is adopted by DOE that has more representative scene lengths/frequency of scene cuts. At that point, capping the size of the MDD credit would not be necessary.

III. High Dynamic Range

There appear to be two issues that EPA must consider regarding high dynamic range (HDR). One is how to treat TVs that provide the ability to upscale or convert conventional content to deliver HDR like performance, sometimes called HDR Plus, and the other is how to address the additional power consumption when HDR10 encoded content is viewed.

Testing done by NRDC and CLASP show that TV power use for some HDR ready UHD TVs can as much as double while playing native HDR content compared to the power used when playing the IEC test clip. This is due to the fact that many TVs are designed to temporarily disable ABC and MDD when HDR content is being played, and that the highlights in HDR content are much brighter and therefore more power consumptive.

We recommend at a minimum EPA require manufacturers to test the power use of their TVs with the UHD HDR test clip developed by CLASP Europe and for EPA to make this data available to the public and to inform a future spec revision (Version 8.1 or 9.0). The test would be done with the TV as shipped, meaning if the TV automatically disables energy saving features such as ABC and MDD when HDR content is played, then these features should also be off during this test. Provided EPA has sufficient data it should consider establishing an adder for HDR ready TVs.

While we don't have a specific recommendation at this time, we encourage EPA to develop an approach for addressing TVs that automatically upscale content to look like native HDR content.

IV. The Power Adder for UHD TVs Needs to be Reassessed

During the specification development process for ENERGY STAR Version 7 there was a scarcity of publicly available data on the incremental energy use of

UHD TVs. In order to bring UHD TVs into the program and to prevent the least efficient models from qualifying, EPA created a generous power adder of 50% for UHD TVs compared to equivalent sized HD TVs. Now that we have second and third generation UHD TVs entering the market that are more efficient than the earlier models, we encourage EPA to carefully review the power delta between HD and UHD TVs and to eliminate the power adder if it's no longer needed or at a minimum, to greatly reduce it.

V. We Encourage EPA to Account for the Higher Power Levels that Occur When Other Picture Modes are Selected, Such as Vivid/Dynamic or Sports.

During its webinar, EPA presented on slide 18 the significant increases in power some TVs exhibited when the picture setting was changed from the default to other modes such as vivid/dynamic or sports. As a fair amount of consumers are believed to change their picture settings, the extra energy use of these other settings needs to be accounted for.

One approach would be for EPA to require an additional power test called Most Power Consumptive, whereby EPA would then base its specification on the average of the tests with the TV in its default setting and in its most power consumptive selectable pre-set picture setting.

VI. The Current Specification May Not Adequately Measure TV Standby Power For "Smart TVs"

In our 2015 report we found that the current standby power test may not capture the potentially sizable annual energy consumed by some TVs when they are not in use (i.e. turned off but still plugged in and connected to the internet). The current DOE test procedure does not require smart TVs to be connected to a live internet connection. While it requires the TV to be connected to a network, the network is not connected to the internet. As such the power consumed by those TVs that are constantly checking for software updates or downloading data will not be reported.

We also found that while many TVs have very low standby power as shipped, some have relatively long resume times (time that elapses after power button is turned on till user can watch TV). This might frustrate users and cause them to go into the menu and enable the Quick Start feature which shortens the resume time but can cause much higher standby power levels.

Some TVs we tested also had elevated standby power levels for 4 or so hours before stabilizing and going into a very low standby power state.

To address these concerns we recommend EPA create a supplemental standby

power test that measures TV standby power and includes:

- Measuring TV resume time;
- Connecting smart TVs to a live internet connection during the standby power test;
- If the TVs resume time is >10 seconds, a level which is believed to annoy many consumers, then the Quick Start feature, or its equivalent, should be enabled during this test.
- The test should be run for a period of 8 hours and the average standby power during this period should be reported. Testers could simply set the TV up for this standby test before they leave work and record the average power upon their return.

We appreciate the opportunity to provide this input to EPA's specification revision process and remain available to discuss any questions you might have.