



November 7, 2007

Mehernaz Polad  
ICF International  
9300 Lee Highway  
Fairfax, VA 22031-1207

cc: Katherine Kaplan, U.S. EPA

RE: LG Comments on U.S. EPA Draft 2 ENERGY STAR Program Requirements for  
TVs: Version 3.0

Dear Ms. Polad:

On behalf of LG Electronics USA, I am submitting comments on the proposed U.S. EPA ENERGY STAR specification for TVs, version 3.0, Draft 2. LG Electronics USA, Inc. is the North American subsidiary of LG Electronics, Inc., a \$48.5 billion global force in consumer electronics, appliances and mobile communications. LG Electronics is a leading developer and manufacturer of Liquid Crystal Display (LCD) and Plasma flat panel televisions and is a long-standing partner in the EPA ENERGY STAR program.

The EPA has invited comments on its "Draft 2 ENERGY STAR Program Requirements for TVs: Version 3.0", due November 7, 2007. LG Electronics welcomes this opportunity and hopes that collaboration and consultation will result in the best ENERGY STAR specification for all involved. As a stakeholder in the development of this standard, LG Electronics offers the information and opinions on the following pages in order to aid in the development of fair criteria for evaluation and comparison of the energy efficiencies of televisions. LG Electronics wholeheartedly supports the goals of the ENERGY STAR program and believes that energy efficiency improvements for all electrical and electronic products benefit the consumer and society as a whole. Please feel free to contact us with any comments or questions regarding this information.

Sincerely,

Timothy McGrady  
Environmental Manager  
LG Electronics USA

## LG Electronics' Comments on DRAFT 2 ENERGY STAR Program Requirements for TVs: Version 3.0

### 1. Referring to the file ENERGY\_STAR\_TV\_Dataset\_09\_24\_07, the EPA's dataset includes televisions without tuners as well as televisions with tuners.

Televisions represented by Index numbers 7, 8, 9, 10, 14, 15 and 16 do not have tuners. In addition, there is no information on whether televisions represented by Index numbers 11, 12 and 13 do or do not include tuners. Tuners require energy in order to operate. To compare the energy consumption of televisions incorporating tuners to those that do not incorporate tuners is inappropriate and will skew the proposed equations toward lower energy consumption per screen size. It is recommended that either: 1) data representing televisions without tuners and televisions without information concerning tuners be excluded from the dataset; OR 2) an offset is added to each proposed equation to account for the incorporation of tuners in televisions. Otherwise, the dataset will include a significant bias.

### 2. Referring to Table 1 "On Mode Power Level Requirements for TV Products": the proposed equations are technically incorrect.

Evaluation of Proposed equations, Maximum On Mode Power Consumption, (From Table 1, Page 5, Draft 2)

$$P_{max} = mA + b$$

Display Power only

Power other than Display Power

$P_{max \leq 480 \text{ VR}} = 0.13 \cdot A + 25, A = 0, P_{max \leq 480} = 25 \text{ W}$

$P_{max \leq 768 \text{ VR}} = 0.20 \cdot A + 40, A = 0, P_{max \leq 768} = 40 \text{ W}$

$P_{max > 768 \text{ VR} \leq 650 \text{ in}^2 \text{ SS}} = 0.20 \cdot A + 40, A = 0, P_{max > 768 \leq 650} = 40 \text{ W}$

$P_{max > 768 \text{ VR} > 650 \text{ in}^2 \text{ SS}} = 0.24 \cdot A + 14, A = 0, P_{max > 768 > 650} = 14 \text{ W}$

Therefore, non-display power for VR > 768 screen size > 650 in<sup>2</sup> = 14 W, compared to non-display power for VR > 768 screen size ≤ 650 in<sup>2</sup> = 40 W. Implication: 1080p TV screen size > 650 in<sup>2</sup> uses less power for non-display items than do other televisions of lower VR or smaller screen size. That statement is false. VR and screen size do not impact the power used for tuners and other non-display items.

The offset of 14 W given in the proposed equation for televisions with >768 Vertical Resolution and Screen Area >650 inch<sup>2</sup> does not make sense when compared with the offsets of 40 W and 25 W given for the other equations. In the equation representing televisions of All Screen Areas but ≤ 480 Vertical Resolution, the offset is 25 Watts. In the equation representing televisions of All Screen Areas but ≤ 768 Vertical Resolution, the offset is 40 Watts. The same 40 Watt offset is given for Vertical Resolution > 768, Screen Area ≤ 650 inch<sup>2</sup>. Note that the power consumption related to screen resolution is attributed to display power; in other words, the offset (y-intercept) in Watts should have no relationship to screen resolution or screen area.

Consider the equation of a line:  $y = mx + b$ . The EPA's proposed equations are simple line equations, where  $y = P_{\max}$  = Maximum On Mode Power Consumption in Watts;  $m$  = slope = Watts/inch<sup>2</sup>;  $x$  = Screen Area = inch<sup>2</sup>; and  $b$  = y-intercept = Watts. At  $A = 0$  (no screen area),  $P_{\max}$  = y-intercept. That means that there is additional power required for items other than the display, represented by the offset or y-intercept. The term "mx", or slope times A, represents the power required for the display. What the proposed equation for televisions with Screen Area >650 inch<sup>2</sup> is saying is that televisions with greater than 768 lines of vertical resolution and screen area greater than 650 inch<sup>2</sup> *do not require the same amount of energy to power tuners and other items as televisions with lower resolution and/or screen size*. Conversely, the proposed equations are saying that *televisions with lower resolution and smaller screen size need more power for tuners and other items than televisions with larger screen size and higher resolution*. Those statements are false, but are a direct result of the EPA's proposed equations. The EPA and its consultants need to address this problem, because it is a major flaw with the proposed specification. The proposed equations for On Mode Power Consumption are technically incorrect.

Note that this issue was brought up during the November 6, 2007 conference call with the EPA. Several comments were made as to why the above is not true. In response to the suggestion that the lines for >768 VR, >650 in<sup>2</sup> and >768 VR ≤650 in<sup>2</sup> intersect at  $A = 650$  in<sup>2</sup> such that both equations yield  $P_{\max} = 170$  W, that suggestion contradicts the criteria being imposed on the two equations. That is, the equation for >768 VR ≤650 in<sup>2</sup> includes  $A = 650$  in<sup>2</sup>, while the equation for >768 VR, >650 in<sup>2</sup> excludes  $A = 650$  in<sup>2</sup>. In other words, these lines do not intersect by definition, so there is no need that they produce equal results at  $A = 650$  in<sup>2</sup>. Therefore, there is no need to assign a lower y-intercept value to compensate for the change to the slope of the curve. Also note that the stipulation for the >768 VR, >650 in<sup>2</sup> curve that  $A > 650$  in<sup>2</sup> means that the curve does not intersect the original y axis (at  $A = 0$ ). If the EPA's consultant's insist that the y intercept of the >768 VR, >650 in<sup>2</sup> equation is 14 W, then they must allow  $A = 0$  and the arguments above hold. (By the way, equations are to be read as language – there are distinct things being claimed when equations are written, and those claims are either true or false. If the claims are false, the equation is not correct. In this case, the equations are not correct; the equation for >768 VR, >650 in<sup>2</sup> claims that other than power required for the display, there is only needed 14 W for items such as tuners, regardless of how many tuners are present – that is false, particularly when compared to the equation for >768 VR, ≤650 in<sup>2</sup>.)

It is recommended that either: 1) the offsets for all screen sizes and resolutions be made the same, as was done in the EuP specifications; AND/OR 2) specific features not related to display power should be assigned specific power consumption values, in Watts. For example, tuners should be assigned a specific power allowance, in Watts. That way, if a television has two tuners, it gets 2 x the allowance for Watts per tuner (some televisions have no tuners, some have one tuner and many have two tuners). Such offsets must be independent of display resolution and screen area.

**3. The EPA states in the Draft 2 specification, page 6, that “irrespective of technology-type, all TVs serve the same fundamental purpose”. This argument holds no water.**

In Draft 2 of the ENERGY STAR Program Requirements for TVs: Version 3.0, page 6, the EPA states “Irrespective of technology-type, all TVs serve the same fundamental purpose”. This statement is presented as an argument for not developing separate Energy Star requirements based on television technology. The argument is logically flawed and contradicts other Energy Star programs and is therefore an unacceptable rationale for not

considering classes of televisions when developing Energy Star requirements. LG submits the following counter-arguments to the EPA:

- 1) A side-by-side refrigerator/freezer has the same fundamental purpose as a refrigerator/freezer with a bottom freezer configuration, yet the DOE Energy Star program for refrigerators and freezers considers these two different configurations as separate classes. The EPA Energy Star program requirements for televisions state that television technologies “serve the same fundamental purpose”; that statement directly contradicts the DOE’s decision to separate refrigerator/freezer configurations for its Energy Star program. This leads to inconsistency within the ENERGY STAR program concerning specification development.
- 2) Set-top boxes for delivering cable, satellite and non-HD digital signals (“Terrestrial” category) have the same fundamental purpose: receiving, decoding and delivering television signals for televisions. Yet the proposed specification for Set-top boxes separates the boxes into four categories: IP, Cable, Satellite and Terrestrial. The reason for the separation, presumably, is that different technologies are required to deliver the different types of television signals. The EPA’s refusal to separate television technologies is in direct contradiction to the separation of technologies in the Set-top boxes specification.
- 3) A plasma or an LCD flat panel television may be purchased for a different purpose than an RP or CRT television, so the statement that television technologies “serve the same fundamental purpose” is false. If the purpose of buying a flat panel television is so that it may be hung flat against a wall, the consumer will not consider Rear-Projection or CRT television models. So the various television technologies do not serve the same fundamental purpose. Consider that government agencies and commercial enterprises often purchase flat panel televisions for media rooms. RP and CRT televisions are rarely purchased for that purpose in today’s market.
- 4) A motorcycle and a passenger car have the same fundamental purpose: to provide transportation. But motorcycles and passenger cars are never considered in the same class when comparing energy consumption. Besides, there are significant differences between motorcycles and passenger cars, just as there are significant differences between television technologies. To further extend this analogy, if the EPA decided to lump cars and motorcycles together and develop an energy consumption specification based on miles per gallon, all motorcycles would presumably gain Energy Star status and many cars would not. But a decision to promote the more energy efficient motorcycle would not have much impact on the buying public (they would still buy cars) and thus nothing would be gained from such a decision. This is a good analogy for what will happen if the EPA continues their technology-biased approach to televisions: the Energy Star label will not result in a large increase in the sales of RP televisions, and will not result in significant energy savings.

**4. According to the U.S. EPA ENERGY STAR website, The ENERGY STAR program is “designed to identify and promote energy-efficient products to reduce greenhouse gas emissions.” The website goes on to say that “these products deliver the same or better performance as comparable models while using less energy and saving money.”**

RP, LCD, CRT and Plasma television technologies do not offer the same performance at comparable screen sizes. Plasma and RP technologies directly compete at screen sizes from about 50 – 60” diagonal measurement (soon LCD flat panel TVs will also compete at this screen size). While a plasma flat screen may be hung flat against a wall, generally, an RP television cannot be hung on a wall (they are designed to be free-standing or to sit on a stand). This difference is a direct function of the technology employed, and it represents a significant performance characteristic. Consider that in commercial and government applications, flat panel televisions of all sizes are purchased simply because they may be hung flat against a wall. This is particularly true for the large screen sizes.

Furthermore, in the typical family residence, given consistent lighting conditions, a plasma television will provide a better picture than an RP television. The reasons are 1) a plasma television has better viewing angles than RP and 2) a plasma television will provide the same high-quality picture when viewed up- close as when viewed from far-away, while an RP television will provide a poor picture when viewed up close, from the side or at mid-distances. Those differences are a direct function of the technologies employed and are significant performance characteristics. The same considerations are true of televisions purchased for board rooms or media rooms.

RP television technology currently uses less energy and saves money relative to the use of plasma television technology, but if the EPA allows Energy Star comparison of plasma versus RP technologies, they will be contradicting the Energy Star program statement that “these products deliver the same or better performance as comparable models”. As plasma televisions out-sell RP models even though plasmas are sold at significantly higher prices, the market (and thus the consumer) indicates that the performance of these technologies is not the same. The performance of the different television technologies cannot be compared directly – there are advantages and disadvantages of each television technology. It just so happens that RP technology is low in energy consumption, but there are performance tradeoffs associated with this beneficial characteristic.

**5. By developing separate On Mode specifications for different technology types, the EPA has an opportunity to significantly reduce power consumption of all television types, thus significantly reducing greenhouse gas emissions.**

If the current EPA On Mode specification goes forward, there is unlikely to be any positive change in energy consumption due to a surge in sales of RP televisions. The EPA’s own research shows that sales of RP televisions is on the decline, and leading market research supports an even steeper decline in RP sales. Likewise, there is unlikely to be a surge in buying of CRT televisions.

Conversely, the sales of plasma and LCD flat panel televisions are expected to rise dramatically (again, the EPA's own research supports that statement). The current ENERGY STAR specification is so skewed due to inclusion of RP technology that plasma televisions with the latest, best technologies are not likely to meet the specification; the EPA will not be able to claim much energy savings due to purchases of Energy Star plasma TVs. Additionally, the EPA's market research shows that sales of larger television screens are on the rise. But given the bias of the large screen On Mode specification due to inclusion of RP televisions, even large screen LCD televisions will have difficulty meeting the proposed specification.

The point is that the EPA appears to be bucking the trend of what the market research shows by insisting on a "one-size-fits-all" approach. The current draft of the On Mode specification will not significantly change market trends when implemented, so there is little hope that the projected sales of television types will change. But if the EPA embraced the results of their own market research, they would find an opportunity to reduce the energy consumption of the vast majority of televisions, including LCD and plasma flat panels.

LG Electronics continues to believe that development of On Mode specifications for each technology type is the fairest, most appropriate approach for a TV On Mode specification. Such an approach would be consistent with other specifications (developed by both DOE and EPA) and would provide an opportunity to reduce the overall energy consumption of televisions in a predictable, measurable manner. For example, a tier one approach could be designed to reduce overall energy consumption for all televisions by 15% - 20% between 2009 and 2012. A tier two approach for 2012 - 2015 would result in further savings, say another 10 -15%. Given that approach, overall TV energy consumption could be reduced 30% in 6 years. ACEEE reported an average per unit yearly energy consumption for televisions at 185 kWhr/yr based on EPA figures; the EPA has stated that there will be 226.6 million sets sold worldwide by 2010. A total energy consumption for 226.6 million sets at 185 kWhr/yr would be 41.9 billion kWhr/yr. A 30% savings on that total in one year would be a reduction of 12.6 billion kWhr. Over a six year period, staggering the savings 5% per year from 5% to 30%, the total savings would be approximately 44 billion kWhr. This would result in a carbon dioxide emission reduction of about 31 million tons. These are likely conservative estimates, so the expected energy savings could be much higher (NRDC estimates overall TV energy consumption to be 71 billion kWhr/yr by 2009; 30% of 71 billion is 21.3 billion kWhr/yr compared to the 12.6 billion kWhr/yr calculated above).

**6. The proposed effective date of September 1, 2008 is much too soon and will not allow manufacturers time to gear production toward meeting the new specification.**

Television production for 2008 is already planned and being implemented. These production cycles cannot be changed in order to meet a September 1, 2008 effective date. This is not just for LG; all manufacturers are in the same boat. A much more reasonable date would be April 1, 2009.

**7. The EPA has repeatedly stated that the ENERGY STAR program is voluntary, but this is understating the case.**

**President Bush's Executive Order**

Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, requires that federal agencies "when acquiring an electronic product to meet [agency] requirements, meets at least 95 percent of those requirements with an Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic product." A copy of the complete text of the executive order is available on the White House website at <[www.whitehouse.gov/news/releases/2007/01/20070124-2.html](http://www.whitehouse.gov/news/releases/2007/01/20070124-2.html)>.

EPEAT is developing a television specification. EPEAT requires ENERGY STAR compliance. In order to sell large flat panel televisions to the U. S. government, manufacturers will have to get those televisions registered with EPEAT. But manufacturers cannot do so if no large screen LCD or plasma televisions meet the ENERGY STAR requirements. In addition, many other governments require ENERGY STAR compliance and/or EPEAT registration in order to sell to consumers, let alone the government agencies. Furthermore, both consumers and government agencies want to buy large screen flat panel TVs. The EPA's stance will make the buying or selling of large screen flat panel televisions exceedingly difficult, to the point of being punitive toward LCD and plasma large screen television manufacturers.

As has been stated by other stakeholders, LG believes that flat panel television technologies are in an immature development state and that progress in lowering energy consumption is possible and will be forthcoming. But LG also believes that the EPA should afford these technologies an opportunity within the world electronics markets instead of acting as a barrier to sales. LG again asks that the EPA relent on their "technology neutral" stance and reconsider development of On Mode specifications based on television technologies.