Natural Resources Defense Council (NRDC) Comments to FTC on ENERGY GUIDE Labels for New Televisions

Consumer Electronics Labeling, Project No. P094201
RIN 3084-AB03

Noah Horowitz
Senior Scientist
Natural Resources Defense Council
nhorowitz@nrdc.org

May 14, 2009

On behalf of the Natural Resources Defense Council (NRDC) and its more than 1.1 million members and e-activists we respectfully submit these comments in response to the Federal Trade Commissions rulemaking for labeling televisions and other consumer electronic products. NRDC performed some of the first ever in-depth studies on the energy use and savings opportunities related to televisions, set top boxes, and video game consoles and is widely recognized as one of the leading experts in this field. Our consultant, Ecos Consulting developed the graphics contained throughout the document.

Televisions

1. **Need for Labeling** – The FTC has a long and successful history of requiring energy use labels to be displayed at the point of sale for a wide range of products including refrigerators, water heaters, dishwashers, etc via its yellow ENERGYGUIDE label. The 2007 federal energy bill (EISA) provides additional direction to FTC to add televisions and other consumer electronic products to its labeling program. We believe inclusion of this product category was essential as it is one of the fastest growing sources of energy use in the home and now represents 10 to 20% of a typical home's annual electricity use.

TVs by themselves represent roughly 1% of all national electricity use and this has been increasing due to the growth in screen size, operating hours, and the number of installed TVs. Some of the larger, less efficient models on the market consume as much energy each year as a new refrigerator.

Unlike other major energy consuming products, consumers are unable to easily compare the energy use or related operating costs of new TVs when in the store. As a result, many consumers are completely unaware of the fact that the model they just bought might use two to three times as much energy to operate as other similar sized models that were

available, or that the more efficient offering could cut their electric bill by as much as $300 over the 10 year life of the product.

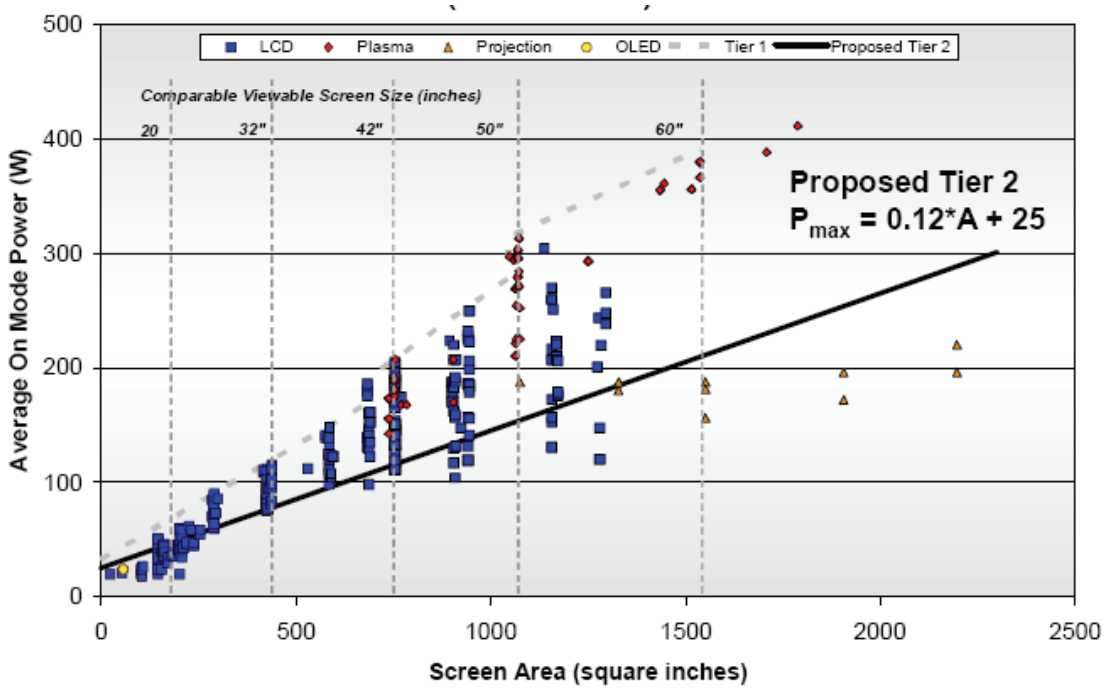
NRDC strongly supports FTC requirements for ENERGYGUIDE labels at point of sale. This requirement should apply both to retail, as well as web-based sales. We understand some stakeholders may suggest that placement of this information on the internet or some readily available database would be sufficient. We disagree. While some consumers do "pre-shop" for TVs on the web, the majority of individual purchases will continue to be made in a store. Consumers deserve at least the same level of information while shopping for a TV as they do for other products already in the FTC program such as refrigerators. If anything, the in-person shopping experience for televisions is even more comparative than for refrigerators, given the way retailers align dozens of televisions of various sizes and technology types side by side, all displaying the same program material simultaneously, to allow for fine distinctions in brightness, contrast, image blur, and detail.

While we also support manufacturer and retail efforts to make TV energy use and operating cost information easily available on the web, this should complement, not replace, mandatory, in-store TV labeling.

At a minimum the presence of the energy use and operating cost data will serve as a tie breaker when consumers are comparing two similar TVs. With increasing consumer awareness of global warming and concerns about growing electricity bills, we can expect the labels to have even greater impact in the future during the consumer decision making process.

2. **Energy Use Data** – According to a 2004 NRDC study, TVs by themselves represent roughly 1 % of all national electricity use and this has been increasing due to the growth in screen size, operating hours, and the number of installed TVs

Recent proceedings at the California Energy Commission (CEC) and the EPA Energy Star program have created extensive amounts of information on TV energy use. The plot below was presented by EPA at an April 24, 2009 stakeholder meeting and demonstrates the wide range of on-mode power use exhibited by currently available models and the need for labels to help consumers assess how much energy they consume.



3. **Reports, Studies or Research** – Many countries and regions around the world already require energy use labels for new TVs. All of these labels employ some form of categorical labeling scheme that provides consumers with a very easy to understand method for comparing the energy use of similar TVs. The main difference in these systems is the grading scale. Some use levels ranging from A to G, others use a numerical scale, etc. NRDC's prototype labels shown in section 5 also employ a categorical labeling approach based on one to five stars – the same approach NRDC, ACEEE, and PG&E proposed to the Federal Trade Commission in a prior rulemaking regarding lamp labeling.

NRDC collected examples from around the world and presents them along with a brief explanation of each in Appendix A. *Note that all of the countries that current require television energy use to be labeled do so on a categorical basis.*

4. **Test Procedures** – NRDC advocacy helped lead to the creation of an industry working group to create an up to date test method that can be applied to all TV technologies for measuring on mode power use. This work was done under the auspices of the International Electrotechnical Committee (IEC). NRDC supports use of this new test method, IEC 62087 provided:

- The on mode (average) power test shall be performed using the dynamic broadcast video signal according to section 11.6.1. This test uses a set of standardized images developed by the IEC committee and assures that all TVs are tested based on the same images. This provides a real world test of TV power use. The test method also provides users with the option to use outdated methods that rely on static test bars and patterns. As these methods do not require processing of moving images, their results are less predictive of real consumer

power use and are also subject to manufacturer gaming. Based on the above, we strongly recommend FTC to specify use of the dynamic signal and NOT to allow the other test options contained in 62087.

- FTC works with other stakeholders to provide guidance on how to test TVs that contain a forced menu (e.g. users is "forced" to select a mode such as home, eco, retail, vivid, etc) upon first using the TV. This menu selection determines the TV brightness level and has a significant impact on the TV's power consumption. Under some scenarios, manufacturers might be motivated to dim their TVs beyond an acceptable level as a means to produce much lower on-mode power levels. EPA, California and other stakeholders are in the process of potentially adopting measures to limit this occurrence. Options under consideration are to set minimum TV brightness levels, creating an allowable ratio between the power use of the retail to home setting, or a similar ratio for TV luminance (e.g. home mode must be at least x % of retail mode luminance).

- Provide standardized guidance on how to measure TVs that employ an automatic brightness sensor that adjusts TV brightness based on real-time changes in ambient light levels.

We are also supportive of using IEC 62301 for measuring standby power use.

Regarding usage patterns, we agree that a standardized usage pattern should be used and applied to the measured on and standby power levels to calculate each model's annual energy use. FTC should select the hours of use based on a review of available information. Federal sources and Nielsen data suggest a range of average operating hours between about 5 and 8 per day, although there is a need to distinguish between the average number of hours *household members* are watching a television in a typical day and the number of hours *an average television set* is operating per day. Given that most houses now have more than one TV, the second number will tend to be lower than the first. Ideally FTC and ENERGY STAR would use the same assumptions for calculating annual model energy use.

The EPA ENERGY STAR program and its international counterparts have already established standard test procedures and efficiency metrics for televisions. This allows them to compare televisions to each other on the basis of screen area and power consumption and determine which models are the most energy efficient (the highest values of square inches/watt).

Once a ranked list of square inches/watt efficiency data is available for all televisions (the ENERGY STAR data set currently consists of more than 600 models), the question becomes how to convey that information to consumers in a manner that will help them select the television that best meets their needs. In general, TV power use rises with screen size, but there are wide variations among models of a similar size, due to differences in the display and backlight technologies employed.

5. **Format, Content and Placement -** As we previously stated in our written testimony to FTC during its light bulb labeling proceeding, NRDC is a strong supporter of categorical labels. This approach is being used with great success throughout many parts of the world. In this section, we provide some prototype labels and a description of how a categorical labeling system would be applied to new televisions.

We believe these labels should be required to be displayed at retail in accordance with specific guidance set by FTC on the size, layout, content and location of the label. It is critical for this information to be prominently displayed on or next to the TV in brick and mortar stores. While we are sympathetic to concerns about interfering with the user experience while viewing a TV at retail, we are confident FTC can develop guidelines on acceptable placement of the label. NRDC is open to reasonable suggestions that might include allowing the label to be facing the consumer and affixed to the side of the consumer, or located on the shelf within x inches of the model, etc. As shown below, Japanese consumers already contend with a wide variety of government and manufacturer labels affixed to televisions on display, including working power meters displaying real time power use as the televisions operate. In the US, the TVs on display have less clutter and the FTC label would ideally be more prominent and impactful during the consumer's purchasing decision.

Rules governing internet based sales and catalog disclosures should also be developed by FTC.

In developing the layout for TV labels we took two approaches. The first started essentially with a clean slate, while the later was based on the existing yellow ENERGY GUIDE format. The key information we believe that should be conveyed on a label is:

- TV Type – Specify the type of TV technology – plasma, LCD, rear projection, OLED, etc.

- Screen Size – viewable diagonal, expressed in inches

- Energy Use – Annual energy use expressed in kWh/yr. This would be calculated based on the measured on mode and standby mode power levels, and the FTC duty cycle (x hours on per day, and y hours of standby power use per day).

- Operating Cost – Annual energy use multiplied by a national electricity rate (cents per kWh) supplied by FTC. NRDC supports the use of lifetime operating costs as this provides consumers with more useful information than simply first year operating costs. This concept is particularly relevant for TVs, which on average last 10 years and have high purchase costs. For example, a consumer that is considering two similar TVs with sales prices of $1000 and $1100 is less likely to think in terms of total lifecycle cost when shown annual electricity costs of $50 and $30, respectively. If however, they were shown total electricity costs of $500 and $300, respectively, they might be more inclined to buy the more expensive $1100 TV as it will save them $200 over the life of the TV.

- Resolution – expressed as x by y pixels (e.g. 1920 x 1080).

In developing this list we focused on picking the parameters/information that would be most relevant to consumers while shopping for a TV. While there are other parameters and features that might be of interest to some consumers, we did not include these in order to prevent cluttering the label with extraneous information. Manufacturers can continue of course to promote other features such as refresh rate, picture in picture, contrast ratio, etc via shelf tags, cling stickers, etc.

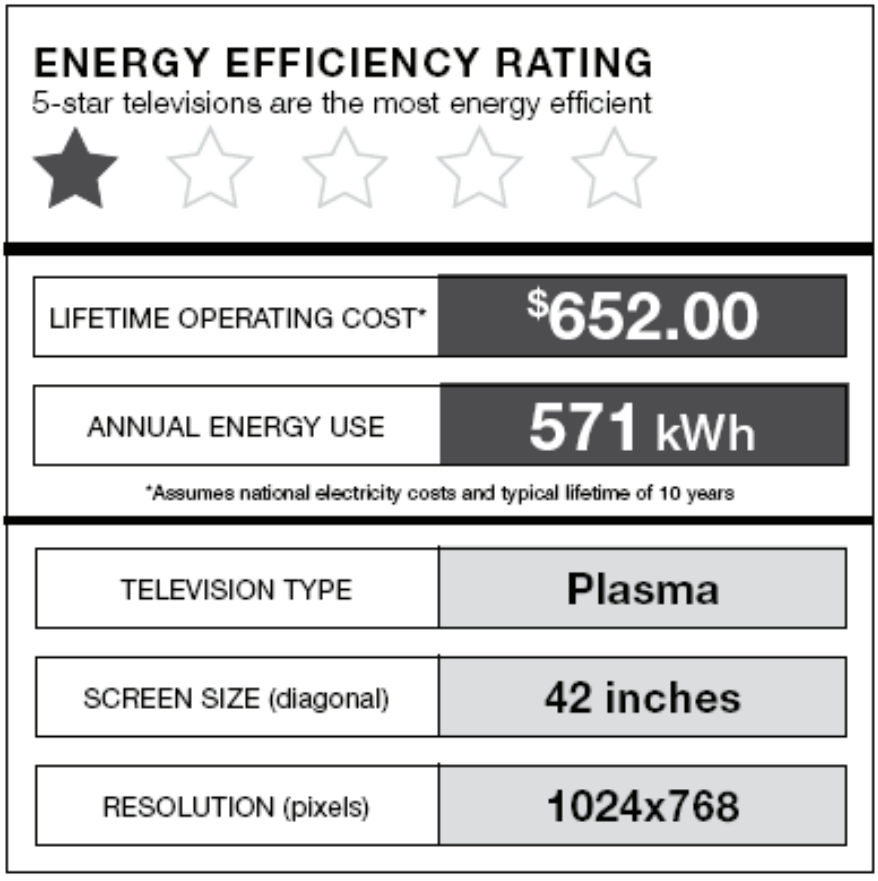
NRDC worked with its consultant Ecos Consulting to develop a prototype label intended to best communicate the information listed above. Our goals were to provide a visually simple label that provides the user with the information needed to make an informed decision about what TV to purchase in terms of its energy use/efficiency. The labels shown below represent mocked up labels for two TVs, the first being a less efficient one, with considerably higher operating costs. These labels include:

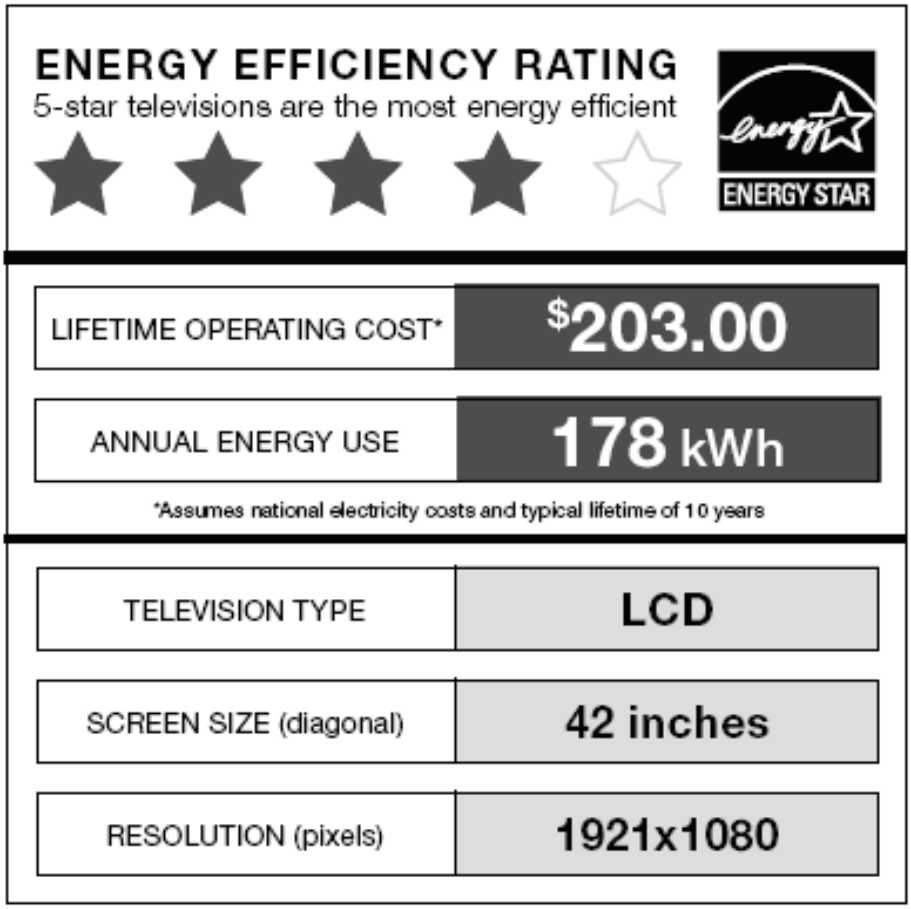
a) A 1 to 5 star energy efficiency rating, with 1 star models being the least efficient and 5 stars being the most efficient (Below we provide additional clarification on how the 1 to 5 star efficiency levels would be established).

b) A lifetime operating cost. We assumed a 10 year operating cost for all TVs.

c) Includes the ENERGY STAR logo for qualifying models.

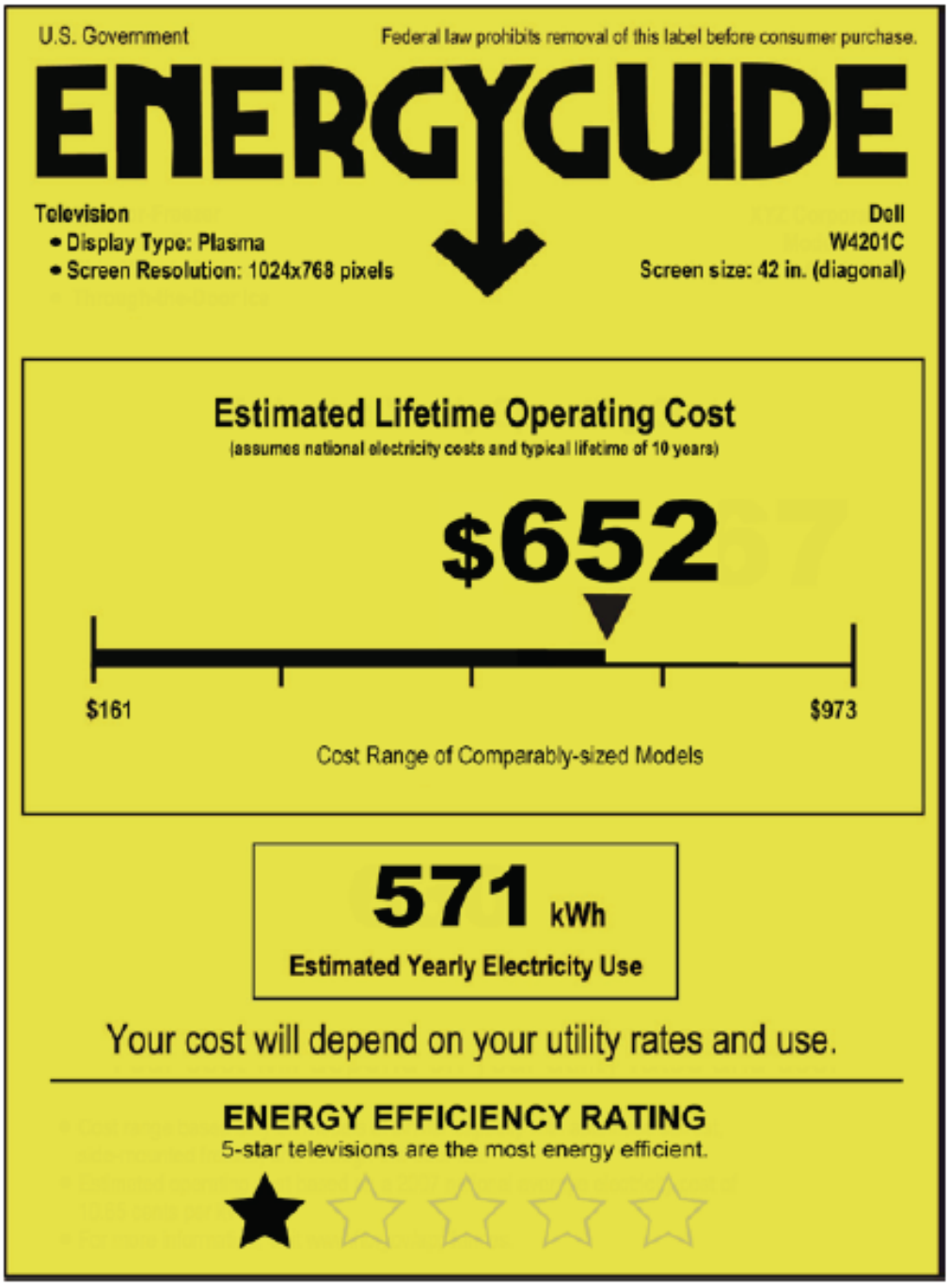
This label design relies on the 1 to 5 star efficiency rating system and the lifetime operating costs as the primary means to help consumers distinguish between the efficiency of comparable sized models. It is currently shown as a black and white design, but could be readily converted to a more eye-catching full color format similar to that employed in other countries (see Appendix A). We believe the categorical, stars-based approach will yield superior results to the operating cost slider currently contained in the FTC ENERGY GUIDE label.



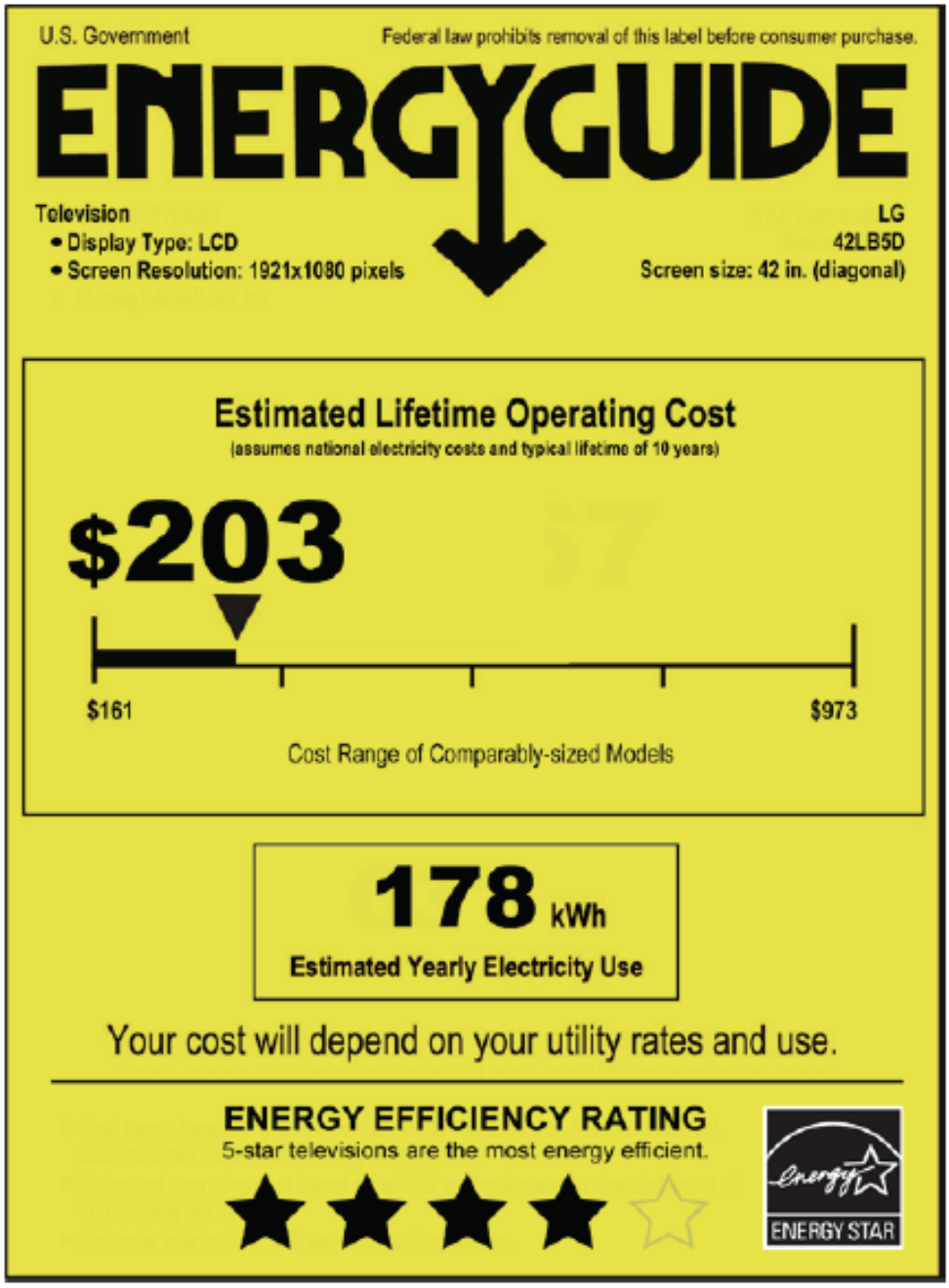


The above example clearly demonstrates the big difference that exists in the lifetime operating costs between similar sized models. We are hopeful that FTC will consider shifting to lifetime operating costs for the other product categories contained in its program.

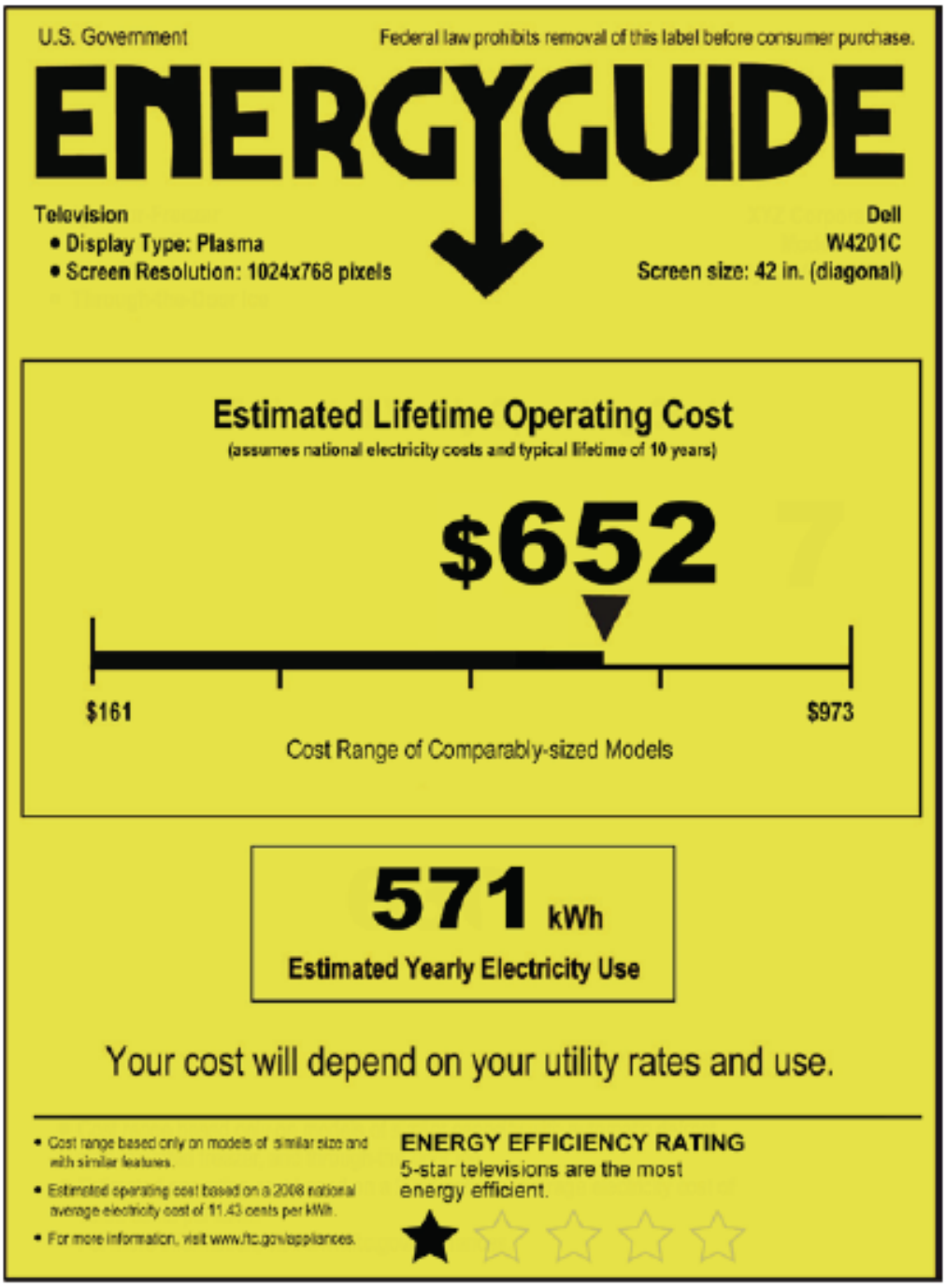
Should FTC be unable to consider entirely new label formats, we provide the following prototypes based on the current ENERGY GUIDE layout.



Improvements we made to the current ENERGY GUIDE label include: reporting of lifetime operating cost and insertion on the bottom the 1 to 5 star energy efficiency rating. Below is another label that was developed for a similar sized model that is more efficient and also qualifies for ENERGY STAR.



A variant of the first label that also includes some of the fine print currently contained on the existing ENERGY GUIDE label is presented below:



These approaches treat televisions like white goods and water heaters and simply provide a traditional Energy Guide-style continuous scale indicating how the annual energy use of a particular model compares to other models with similar size and features. However, if LCD models were compared only to other LCD models, buyers would have no sense of how their utility bill might change if they bought a plasma or CRT model instead. Note,

although plasma TVs deliver essentially the same performance as LCD TVs, they historically have consumed more power than similar sized LCDs. As such it would be inappropriate to create separate LCD and plasma subcategories and provide comparisons simply between competing plasma models. Under this scenario, the more efficient plasmas would appear to the left hand side of the scale and the consumer might incorrectly conclude that they are buying an efficient model even though this model consumes significantly more power than many similar sized LCD models.

Likewise, if TVs were divided into a small number of "bins" of different screen sizes for the purposes of setting the endpoints of those continuous scales, the TVs clustered near the top end of each bin would have an automatic power consumption disadvantage relative to smaller TVs within that bin. Similarly, consumers would have no immediate sense of what it would cost them to move up or down to the next bin of screen sizes. As such, we propose that any power use comparisons be made to all TVs within +/- 5% of the screen area of the model in question, regardless of display technology employed. Such comparisons can be generated automatically from a continuously updated database of available television models.

6. **Comparative Information** – Our label prototypes provide a few different means to compare the performance of models. All of these use a "technology neutral" approach. By this we mean all TVs of similar size are compared across the board, regardless of their technology type or other features.

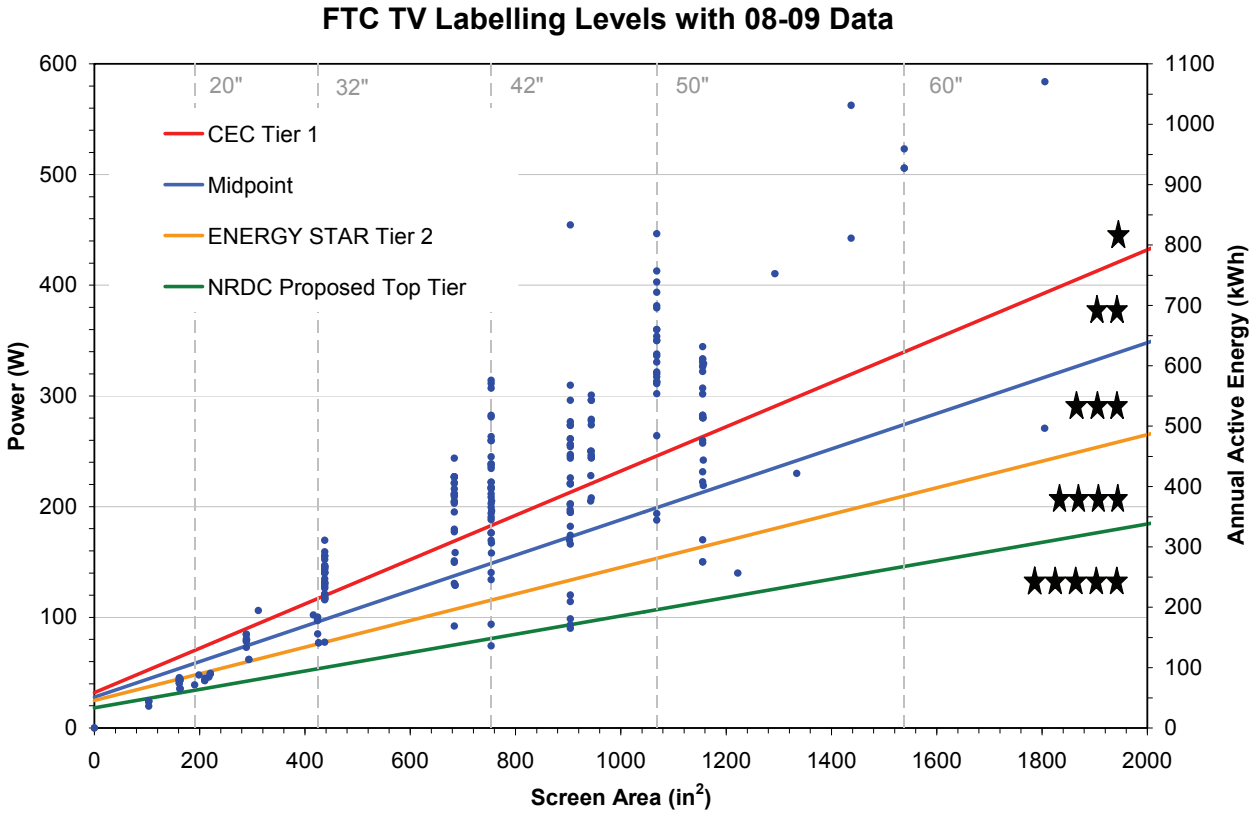
In our proposed five-category rating system, the natural temptation may be to devise qualification levels that allow approximately 20% of available models to fall within each category. Such an approach has proven unwise when tried in other countries, in part because the act of creating a mandatory energy efficiency labeling system for products itself helps to shift consumer preference, rapidly causing the majority of the available models to cluster within the most stringent categories. Similarly we think it is prudent to establish a top tier that when set may have few models on the market today and would help motivate the introduction and greater sales of the most efficient models.

Another categorical approach is to look for natural "breaks" in the data set that correspond to major technology differences. Such an approach attempts to avoid situations where products whose power use differs minimally end up in different categories. This is a laudable goal, but is quite difficult to do with a product category like televisions. The various screen sizes, display options, backlight and diffuser technologies, control systems, power conversion circuitry, and ultimate brightness levels can be combined in so many permutations that every conceivable power consumption value between a few watts and 600 or more is possible.

A third categorical approach (the one we propose) employs smooth, continuous equations (lines or curves when graphed) already proposed for various state level mandatory efficiency standards and ENERGY STAR voluntary specifications as the various

category boundaries. As needed, we have proposed additional category boundary equations to ensure that each is roughly a similar distance apart on the graph.

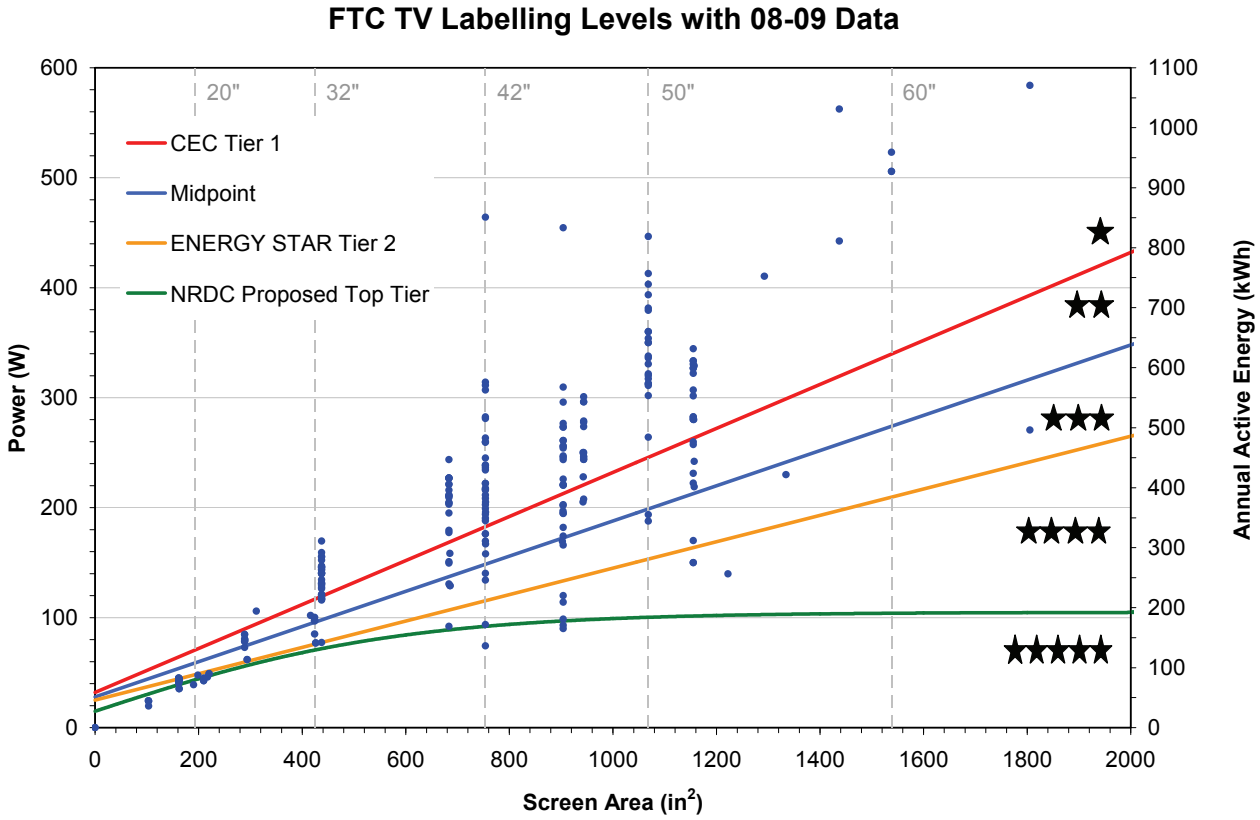
PLEASE NOTE THE PLOTS SHOWN BELOW ONLY INCLUDE ACTIVE/ON MODE POWER. THE ACTUAL PLOTS CREATED BY FTC COULD BE BASED ON TOTAL ANNUAL ENERGY USE. This would be calculated by applying the duty cycle specified by FTC and the model-specific reported on-mode and standby power levels.



The proposed boundaries can be characterized as follows:

- One star products are those that are not energy efficient enough to meet the least stringent mandatory television specification currently under consideration in California (Tier 1). Such products would continue to be legal to sell in the rest of the country, even if California prevented their sale within the next one to two years.
- Two star products are those that meet California's Tier 1 requirement, but are less than half-way toward meeting California's proposed Tier 2 requirement.
- Three star products are those that are more than half-way toward meeting California's proposed Tier 2 requirement, but do not yet surpass it.

- Four star products are those that already meet California and ENERGY STAR's proposed Tier 2 requirement, but do not yet meet ENERGY STAR's proposed Tier 3 requirement.
- Five star products already meet ENERGY STAR's proposed Tier 3 requirement, and represent the most energy efficient models currently being sold. Such a requirement may be linear with respect to screen size or shaped like a curve, requiring progressively higher efficiencies as screen size gets larger to ensure that consumers still save energy, even if they replace their present television with something significantly larger. The linear example is shown above and a corresponding version with a progressive curve shown for the most efficient level is provided below:



By scaling the categories according to various existing policy and program levels, the FTC would ensure that each category corresponds to a meaningful distinction in the lifetime energy usage of a television model, and its ability to meet the requirements of various programs already in development to encourage the sale of more energy efficient models. While the majority of current television models would initially fall in the one- and two-star categories, the existence of ENERGY STAR labeling and utility incentive programs would rapidly drive design changes that increasingly migrate those products to higher ratings.

For reference, the equations that were used to generate the four lines and curves shown above for the 1 to 5 star levels were:

- W> CEC Tier 1: 0.20 * Screen Area (in^2) + 32
- W< CEC Tier 1 and > Midpoint: 0.16 * Screen Area (in^2) + 28
- W< ENERGY STAR Tier 2 and > NRDC Proposed Top Tier:
- W< NRDC Proposed Top Tier: If linear: 0.083 * Screen Area (in^2) + 18.34. If curved: 90*TANH (0.0017 * Screen Area (in^2))+15 (the linear equation is the same as EPA's April, 2009 Tier 3 proposal)

The FTC would create similar shaped lines based on the total annual energy use, not just the on-mode energy use. In most cases, the difference will be small. Once the FTC establishes a duty cycle, NRDC would be glad to re-plot the data acknowledging total annual energy use and generate the associated equations for FTC's use.

7. **Reporting Requirements** – At a minimum we believe FTC should request the following information for each model:

- Manufacturer and Model Number
- Viewable screen diagonal (in) and area (in2)
- On mode power (W) - Forced Menu (Y or N?), If yes, report the power consumed in the most consumptive mode and home mode. If no, then report the out of the box power.
- Standby power (W)
- Automatic brightness control (Y or N?)

Manufacturers should be required to supply this data for all new models and for changes made to models that have an annual energy use that varies by more than approximately 2% from the prior version of the same model number.

FTC should review the data and consider making changes to the 1 to 5 star system on an annual basis. This proposal is reasonable, as the 1 to 5 star levels will be in place for at least a year while at the same time providing FTC with a mandate to ensure the levels do not become out of date.

Other Consumer Electronics

EISA requires FTC to add computers, monitors, cable/satellite set top boxes, stand alone DVRs and potentially other consumer electronics products to its labeling program. Each of these products consumes significant amounts of annual energy and there is/will be a

wide range of efficiency within each product family. For all of these product categories the consumer is unable to assess the energy use or operating costs of the available models while shopping. The EPA has addressed many of the test method issues for several of these products and we encourage FTC to reach out to them for guidance..

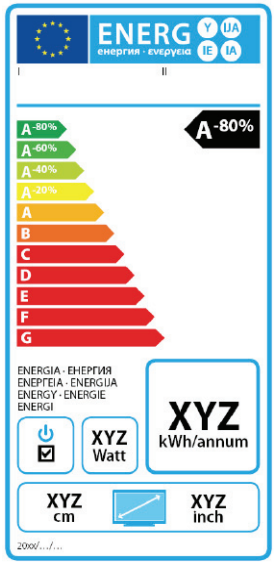
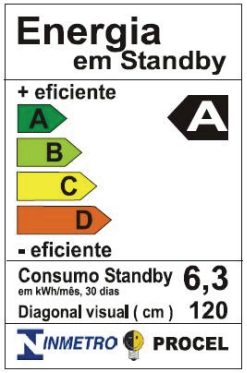
NRDC welcomes the opportunity to provide input to FTC on issues related to developing labels for these products. As the usage patterns of some of these products (e.g. computers, monitors and video game consoles) can vary widely, assuming a single duty cycle and generating a single annual energy use number might be problematic. It might be appropriate to base the initial ENERGY GUIDE label for some of these products on its active mode power use, standby power use and whether or not the device is shipped with an enabled auto power down feature.

In addition to the products listed in EISA, we recommend FTC include video game consoles in its labeling program. NRDC performed an in-depth survey of the power consumption of the three leading video game consoles on the market (go to: http://www.nrdc.org/energy/consoles/contents.asp). There was a wide spread between models in the on mode power use during game play between the Nintendo Wii, and the Microsoft Xbox 360 and Sony Playstation 3. Some of these models consume 100 to 150 W in on mode and if the user fails to turn it off, it can draw roughly 1000 kWh/yr which is equivalent to the annual energy use of two new refrigerators.

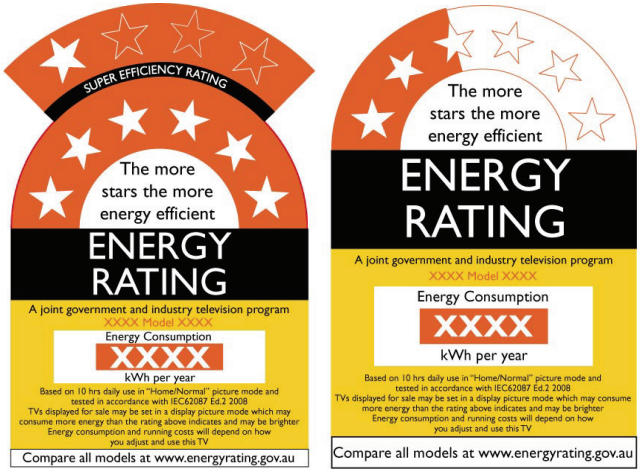
For video games, the reporting metrics might include:

- On mode power during game play (W)
- On mode power during movie play (W)
- Existence of enabled auto power down (Y or N)

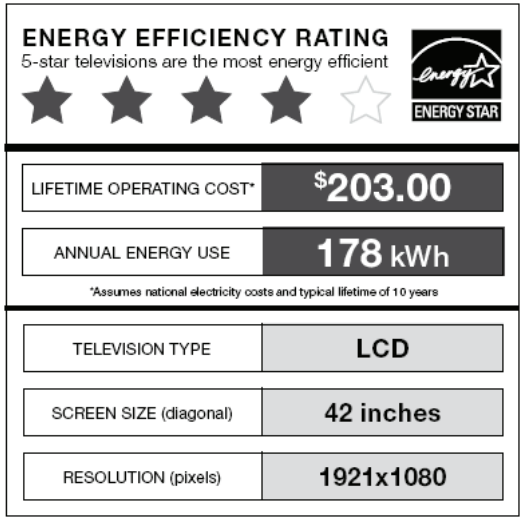
Appendix A

TV Energy Labels	Annual energy use	Power	Cost of energy	TV Specs (screen size, resolution, etc.)	Categorical or Continuous?	Comparison of Levels
	EU lists the annual active energy use in kWh/year.	Lists the active power to the left of energy use.	No (wide variance in energy costs among EU member countries)	EU lists the diagonal screen size in cm and in.	Categorical	The EU compares each level using the percentage of energy used relative to a specified reference that is given in a percentage next to the letter rating.
	Brazil only incorporates the monthly **standby** energy use in kWh/month.	No	No	Brazil lists the diagonal screen size in cm.	Categorical	No

Appendix A

TV Energy Labels	Annual energy use	Power	Cost of energy	TV Specs (screen size, resolution, etc.)	Categorical or Continuous?	Comparison of Levels
	Australia lists the annual active energy use in kWh/year.	No	No	No	Categorical (though the extra stars may prove confusing to consumers)	No
	If compliant with the Top Runner Program as signified by the green circle with the "e", the annual active energy use in kWh is listed on the right side.	No	The cost of energy is the largest number on the bottom in the red box.	No	Categorical	In the smaller Top Runner rectangle, a percentage is given representing the "energy standard achievement percentage". If the TV did not meet Top Runner standards the percentage would be less than 100%.

Appendix A

TV Energy Labels	Annual energy use	Power	Cost of energy	TV Specs (screen size, resolution, etc.)	Categorical or Continuous?	Comparison of Levels
	Prominently shown	TVs operate in multiple modes; label focuses instead on annual or lifetime energy use using a standard duty cycle.	Shows lifetime instead of annual operating cost to emphasize long-term impacts of purchase decision.	Display type, screen size, and resolution listed closer to the bottom of the label.	Categorical	No