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February 26, 2009

Mr. Richard H. Karney, P.E.
Energy Star Program Manager
U.S. Department of Energy
Washington, DC 20585

Re: Energy Star Stakeholders letter, Jan. 16, 2009

Dear Mr. Karney,

Ledtronics greatly appreciates the opportunity to respond to your referenced letter. Your queries regarding Key Issues are very timely and welcomed by Ledtronics as well as other industry leaders in the Lighting field. Please review our responses, observations and predictions to your questions:

1. Dimming:

- a) We believe it is not yet possible to define a common protocol for LED products to ensure acceptable dimming performance with the currently installed, low cost, residential dimming controls.

Each Manufacturer of LED lighting products have designed power supplies to most efficiently interface with the LED lighting cluster. Power supply requirements differ widely among even similar products from a given Manufacturer. Designing an economical dimmer which would effectively interface with a wide variety of manufacturers of LED products would be impractical at this time.

It is expected that in the near future, LED power supply microcircuits will be available which will facilitate compatibility with the existing or a new generation of low cost dimmers.

- b) Yes, a more standard LED compatible dimmer would be beneficial to the LED lighting industry.
- c) The DOE and Energy Star should interface with the major power supply microcircuit

manufacturers to expedite the development of both, standard power supply/ LED driver and standard dimmer devices which will be globally compatible with each other.

2. Non-Standard Lamps:

3.

- a) Non-Standard lamps are designed to meet a wide variety of lighting applications. It is not possible for an agency to be cognizant of each user's requirements. Thus blanket requirements should not be imposed. However, non-standard lamps must be clearly identified with key operational parameters, such as input power, total lumens, color temperature and angle of illumination, to aid the end users in selecting the ideal product for their unique application.
- b) Non-Standard lamp performance may be communicated to the user by offering the parameters listed above in 2,a (input power, total lumens, color temperature and angle of illumination). An equivalency, as suggested: "Replaces a 60-Watt bulb", allows a user friendly guide for the non-technical user.
- c) Again, non-standard lamps address unique lighting applications and are not meant to fulfill standard lamp forms. Ledtronics offers over 3000 different lamp configurations, each designed to target a unique application. It should be the manufacturers responsibility to clearly identify the non-standard lamp's specifications and application in a clear, concise and convenient manner as outlined in 2a and 2b above.

3. Low-Voltage MR16s

Thanks to the rapid development of MR16 lamps, power requirements have been expanded to include both AC and DC operation at voltages ranging from 12V and higher. The AC compatibility negates the need of a customer DC power supply, whose efficiency is dependent,

to a great deal, on the loading. AC operation of lamps merely requires a transformer.

Transformer efficiencies are generally very high compared to AC to DC power supplies, thus not really a factor. It is expected that LED compatible MR16 lamp fixtures will be available which supply only 12 VAC, thus offering substantially higher efficiencies.

4. Reliability Testing:

LED life is very dependant on LED die temperature. The manufacturer of LED based lamps must monitor the thermal management system of the lamp to provide life parameters meeting Energy Star requirements. Manufactures must maintain and make available such thermal data.

- a) To support operational life claims, the Energy Star Program Requirements for Integral LED Lamps, Draft 1-16-09, suggests 6,000 hours with at least 10 samples to be tested under elevated conditions.

HAST (Highly Accelerated Life Testing) is commonly used to accelerate life tests.

Acceleration factors can be found in MIL-HDBK217X or component manufacturer's data sheets. HAST testing is certainly preferable to low temperature testing when MTBF parameters may be 50,000 hours (5.7 years) at 25 degrees C ambient temperatures.

We thank you once again for this opportunity to give our input to the Energy Star Stakeholders letter.

Very truly yours,
LEDTRONICS, INC.

Adil S. Gandhi
Vice President & Gen. Manager