June 29, 2018

Submitted Via Email: MHLF2017TP0053@ee.doe.gov

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U.S. Department of Energy
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Mail Stop EE-5B
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NEMA Comments on Energy Conservation Program: Request for Information Test Procedure for Metal Halide Lamp Fixtures

Docket Number: EERE–2017–BT–TP–0053

Dear Ms. deButts,

As the leading trade association representing the manufacturers of electrical and medical imaging equipment, the National Electrical Manufacturers Association (NEMA) provides the attached comments in response to the Request for Information on Test Procedure for Metal Halide Lamp Fixtures. These comments are submitted on behalf of NEMA Lighting Systems Division Member companies.

The National Electrical Manufacturers Association (NEMA) represents nearly 350 electrical equipment and medical imaging manufacturers that make safe, reliable, and efficient products and systems. Our combined industries account for 360,000 American jobs in more than 7,000 facilities covering every state. Our industry produces $106 billion shipments of electrical equipment and medical imaging technologies per year with $36 billion exports. Please find our detailed comments attached.

Our Member companies count on your careful consideration and we look forward to an outcome that meets their expectations. If you have any questions on these comments, please contact Alex Boesenberg of NEMA at 703-841-3268 or alex.boesenberg@nema.org

Sincerely,

Joseph Eaves
Head (Acting) NEMA Government Relations
National Electrical Manufacturers Association

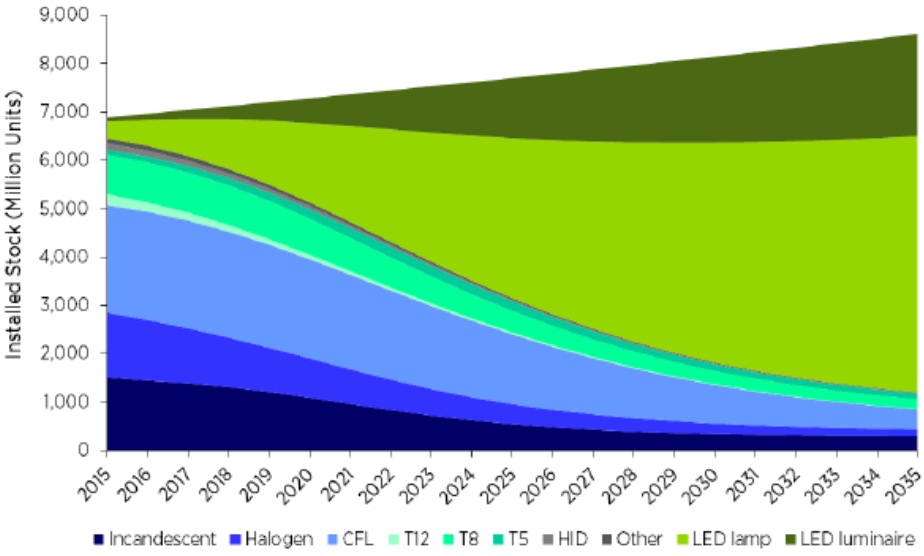
NEMA Comments on Energy Conservation Program: Request for Information Test Procedure for Metal Halide Lamp Fixtures

General Comments:

1. The data displayed below indicates a significant decline in Metal Halide and High Intensity Discharge lighting products in the coming years. This begs the question of whether further investment in this sector is warranted and whether any non-trivial energy-savings potential remains.

   DOE current LED energy savings forecast (Penning, Stober, Taylor, & Yamada, 2016) indicates that the overall use of HID light sources is already minimal. See Figure 1.

Figure 1, Installed Light Sources Projection showing HID lamps as the less used light source



Note, adopted from figure 4.1, Penning, J., K. Stober, V. Taylor & M. Yamada (2016) Energy Savings Forecast of Solid-State Lighting in General Illumination Applications.

A trend to rapidly replace Low bay, High Bay, and Roadway Metal Halide Luminaires by LED luminaires is already occurring (Penning et al., 2016). See Figures 2 and 3.

Figure 2, Low and High Bay LED adoption forecast showing MH usage reduction

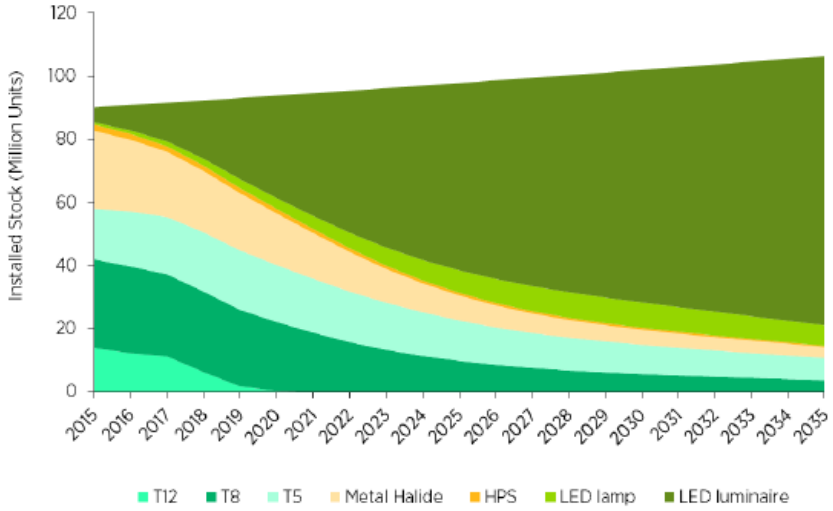
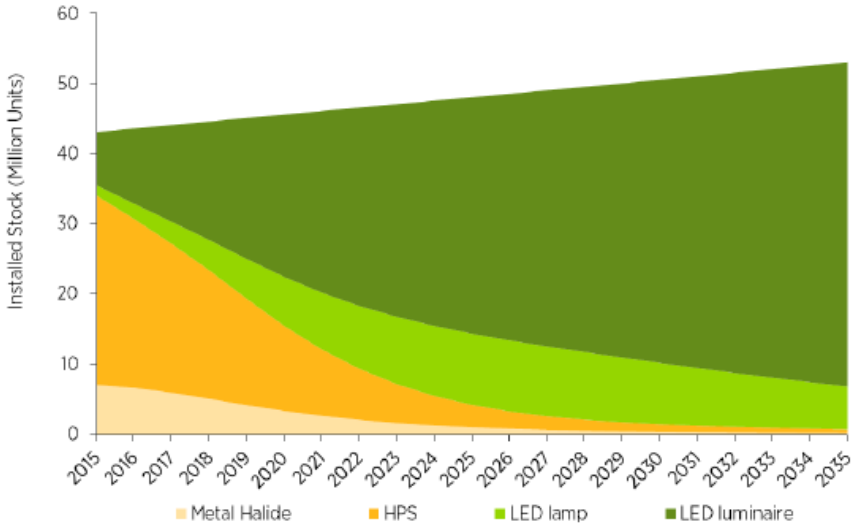


Figure 3, Area and Roadway LED adoption forecast showing MH usage reduction

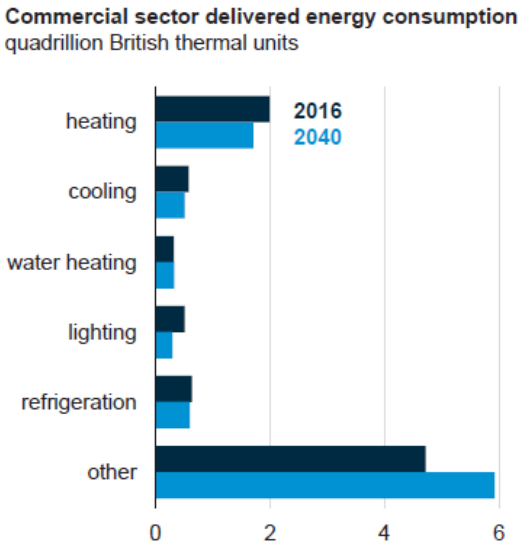


Note, adopted from figures 4.16, and 4.32, Penning, J., K. Stober, V. Taylor & M. Yamada (2016) Energy Savings Forecast of Solid-State Lighting in General Illumination Applications.

DOE LED adoption data indicates a fast reduction of Metal Halide Luminaire stock; correspondingly, NEMA members have observed a fast reduction of Metal Halide lamp ballast orders. It seems reasonable to assume that the current regulation is one of the forces driving the displacement of Metal Halide Luminaires by LED Luminaires.

The overall displacement of traditional Luminaires (including Metal Halide Luminaires) by LED luminaires is leading to substantial energy savings from lighting applications in commercial installations (Energy Information Administration (EIA), 2017b). Specifically, Lighting has become the smaller energy consumer application in the commercial space (EIA, 2017a, p. 108). See Figure 4.

Figure 4, 2017 Commercial sector energy consumption

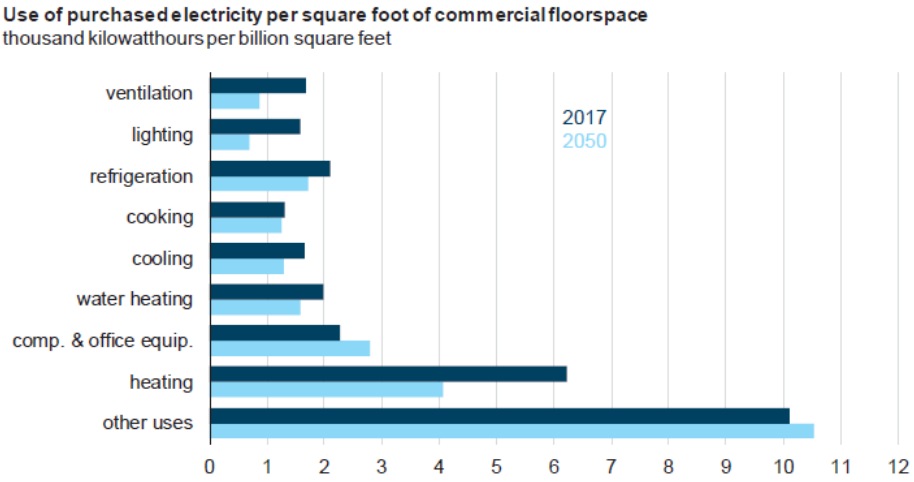


Note; adopted from Annual Energy Outlook 2017.

Figure 4 displays an estimated drop in lighting energy consumption by 50% without any changes to current regulations. Therefore an other-than-regulatory action is already dropping lighting as a significant consumption area for the commercial sector.

The commercial space lighting energy consumption reduction from the preceding estimates was recently reaffirmed/confirmed (EIA, 2018). See figure 5.

Figure 5, 2018 Commercial sector energy consumption



Note, adopted from Annual Energy Outlook 2018.

Similar to figure 4, figure 5 shows a greater than 50% decrease in electricity consumption in terms of commercial floorspace.

Figures 4 and 5 evidence a trend whereby lighting is becoming the smallest energy consumption factor compared to other energy consuming services.

2. The available data for trends in the lighting market indicates a decrease in energy consumption from Metal Halide and HID products coming from a market shift more than any other factors. This is the other-then-regulatory action that DOE is obliged to look for in a rulemaking, and this evidence indicates the "other" action will decrease energy consumption in this sector without government involvement.
3. NEMA believes DOE should not update the MHLF test procedures or the associated standards. This position is based on the diminishing returns on potential energy savings, the burdens associated with implementing new standards and test procedures and the unnecessary costs that would carry to consumers. As the market continues to decline, it is clearly less burdensome to industry and consumers to let market forces continue the trend until major manufacturers have exited the market on their own schedules while managing any burden locally in the meantime.

Responses to Issues for Comment:

1. DOE requests information on the availability of reference lamps
   NEMA Comment: To the best of our knowledge reference MH lamps are not available for purchase as such. However a certain (small) percentage of regular MH lamps meet reference lamp specifications. At this time sufficient quantities exist, particularly given the decreasing need for testing of new products (*e.g*. few if any new products are being developed).

2. DOE requests comment on the potential impact of incorporating by reference the updated industry standard ANSI C82.6-2015 in the Federal test procedure. Specifically, DOE requests information on any potential differences in testing under the 2015 version, as compared to the 2005 version currently incorporated by reference.
   NEMA Comment: No adverse effects are expected from the adoption of the latest edition of the ANSI HID lamp ballast test methods (ANSI_C82.6, 2015). This latest edition builds upon previous editions. Its scope was enhanced, encompassing low-frequency square wave electronic ballasts. Enhancements include: a different description of alternative stabilization method used for electronic HID ballasts, it requires only digital instruments to be used for electronic ballasts, and it has a formula for ballast efficiency calculation the same as the current DOE standard (the 2005 version does not have an efficiency calculation formula at all).

3. DOE requests comment on the potential impact of incorporating by reference the updated industry standard ANSI C78.43-2013 in the definition of "ballast efficiency." DOE also requests comment on whether the term "nominal system" in the definition of "ballast efficiency" requires further clarification.
   NEMA Comment: It is not clear how ANSI C78.43 can be used in definition of "ballast efficiency". ANSI C78.43 (all editions) refers to ANSI 82.9 for definitions. The latest edition of ANSI 82.9 does not have a definition of "ballast efficiency".

   The current edition of the ANSI Single Ended Metal Halide Lamps (ANSI_C78.43, 2017) is the 2017 edition. It will be better to adopt this latest edition because it includes various lamp types included in the DOE regulation of reference. No negative impact from adoption of this new edition is expected.

We could not locate the term “nominal system” in the Code of Federal Regulations, Title 10 Part 431, Subpart S, Metal Halide Lamp Ballast Fixture sections 431 and 324 test methods, neither in section 431.326 Energy Conservation Standards (CFR-431, 2014).

We located the term “nominal system” in Title 42, Chapter 77, Subchapter III, Part A Energy Conservation Program for Consumer Products Other Than Automobiles, Sec 6291 Definitions, item 59 (B) (iii), which reads, “*the lamp, and the capacitor when the capacitor is provided, shall constitute a nominal system in accordance with the ANSI Standard C78.43–2004*”. However, we could not locate the term nominal system in the ANSI Single Ended Metal Halide Lamps standard (ANSI_C78.43, 2017), or in its 2004 edition.

The term nominal system may be enhanced by the following: “MH lamp ballast efficiency shall be measured according to the test methods described in (ANSI_C82.6, 2015). This standard requires the use of

- A stable, low impedance input voltage. See Section 4.1,
- a nominal (electrical) system voltage as described in the Metal Halide Luminaire rule (such as 277V),
- a stable lamp. See Section 4.4.1 and 4.4.2, and
- the capacitor (if provided) shall not deviate more than 3% from its nominal value”

4. DOE requests information on the prevalence of metal halide ballasts capable of operating more than one lamp wattage and how this equipment should be tested.
   NEMA Comment: These ballasts constitute a disappearing, small fraction of the market; there is no merit in adding them to scope of regulations. HID lamp ballasts are tested with their intended lamps of operation. A multi-lamp ballast (multi-wattage lamps) would be tested with multiple lamps using the latest edition of the ANSI HID lamp ballast test methods (ANSI_C82.6, 2015).

5. DOE requests comment on whether it is common industry practice to test metal halide dimming ballasts at 100 percent light output.
   NEMA Comment: Most HID lamp ballasts are not dimmable. However, it is common to test the limited offering of dimming HID lamp ballasts when operated at their maximum light output.

6. DOE requests comment on the potential impact of incorporating by reference IEC 62301: 2011 in its standby mode test method for MHLFs.
   NEMA Comment: The IEC appliances standby power test methods (IEC 62301, 2011) are not applicable for HID lamp ballasts. Furthermore, HID lamp ballasts with standby power capabilities are uncommon.

   It is our belief that no strong interest for HID standby exists.

   NEMA sees no need for, and proposes no modifications to, standby mode test methods for MHLF ballasts.

7. DOE requests comment on the availability of MHLFs that can operate in standby mode and if they exist, their power consumption in standby mode.
   NEMA Comment: See comments to item 6.

8. DOE requests comment on the potential impact of incorporating by reference ANSI C82.17-2017 in the Federal test procedure. Specifically, DOE requests comment on whether newly published ANSI C82.17-2017 provides a repeatable and reproducible method when paired with ANSI C82.6-2015 for the testing of all HFE metal halide ballasts as defined by DOE.
   NEMA Comment: The ANSI standards represent the most effective and most repeatable test procedures the ANSI committees can produce. The burden associated with these standards lies in their administrative implementation. There are several burdens associated with incorporating C82.17:
   - Few if any high frequency reference ballasts exist and no design standard exists today.
   - Industry resources necessary to develop HF Reference ballast design requirements are all focused on Solid State Lighting product development. Diversion of engineering resources for the more-efficient LED technology is contraindicated.
   - Cost would be added in the form of obtaining and maintaining additional NVLAP certifications.
   - Repeatability would not be assured unless HF reference ballasts became commonly available, which is not expected. Manufacturers today have sufficient ability to test high frequency ballasts using in-house procedures as part of their due diligence with respect to product performance claims. The requirements for NVLAP and DOE certified claims is more burdensome that today's practices.

9. DOE requests comment on whether manufacturers and laboratories test HFE metal halide ballasts using the same instrumentation as electronic fluorescent lamp ballasts.
   NEMA Comment: While some similarities exist; the two instruments are not a good overlap. Because the two technologies operate at very different levels of power consumption, major differences in the capacity of the test equipment also exist. Similarities in *how* the data is gathered lead to similarities in the design of the test equipment, but differences in the frequency bands, current, voltage, power ranges, and starting modes mean that often totally separate, high-capacity test equipment is needed for HFE products than electronic fluorescent. Accordingly, the burden of purchase of separate test equipment cannot be dismissed. The equipment is *similar*, it is not *identical*. Based on NEMA member experience, a high frequency power analyzer from companies such as Xitron or Yokogawa might cost on the order of $45K. This is a non-trivial price for any manufacturer concerned about supporting a product in a declining market, and especially for a small business.

10. DOE seeks information that would assist DOE in assuring that the test procedure accurately reflects the energy use of the products during a representative average use cycle, and information that would improve the repeatability and reproducibility of the test procedure.
    NEMA Comment: The use of (ANSI_C82.6, 2015) ensures repeatability and reproducibility of test results. However, no studies of energy efficiency/consumption over time have been conducted that we are aware of.

11. DOE requests information that would help DOE create a procedure that would limit manufacturer test burden through streamlining or simplifying testing requirements. Comments regarding the repeatability and reproducibility are also welcome.
    NEMA Comment: The current test procedures are well-implemented and well-understood. Furthermore they are adequate to the needs of their environment. There is

no benefit to changing the test procedures, and doing so would only cause increased burden through test process provisions, requalification in NVLAP and training of laboratory personnel.

A review of NEMA member laboratory information provides the following rough estimates for NVLAP related costs related to certifying labs to new versions of standards for the purpose of reporting to DOE, should the MHLF Test Procedure be updated as proposed. These costs should be inserted into manufacturing impact analyses and multiplied by the number of manufacturer labs estimated to be involved, not only in NEMA but through all affected manufacturers, consistent with other industry analyses.

a. NVLAP certification costs per each new standard across several ballast/lamp wattages and product types - $15,000
b. Increased administrative costs associated with training personnel on a new DOE test procedure - $50,000
c. Added personnel costs due to new/revised TPs - $100,000
d. Manufacture or procurement of HFE reference ballasts - $5,000

We ask the DOE to recall our comments to the High Intensity Discharge Lamps rulemaking regarding testing costs[1]. The cost of testing high wattage products is not trivial, given their heat output, electricity costs and personnel safety considerations. While the length of testing of ballasts will be shorter than those for lamp lifetime, the energy consumption of these products under test is non-trivial. Our previous comments can be reverse-engineered down from the lamps sample size of 21 and multiplied to the sample size designated by the DOE. A whole-cloth revision to MHLF testing requirements would see this non-trivial cost pushed throughout the product inventory. This is an unacceptable and unnecessary burden on a market declining as demonstrated in our introductory remarks.

12. DOE requests feedback on any potential amendments to the existing test procedure that could be considered to address impacts on manufacturers, including small businesses.
NEMA Comment: Please see our comment to item 11.

13. DOE comment on the degree to which the Federal test procedure should consider and be harmonized with the most recent relevant industry standards for MHLFs, and whether there are any changes to the Federal test procedure that would provide additional benefits to the public.
NEMA Comment: Please see our comment to item 11.

14. DOE also requests comment on the benefits and burdens of adopting any industry/voluntary consensus-based or other appropriate test procedure, without modification. One topic for consideration, for example, is the specification of input voltage and stabilization criteria for ballasts of high-intensity discharge lamps beyond what is required by ANSI C82.6. Another topic for consideration is the clarification of testing direction pertaining to the types of metal halide lamps to pair with metal halide ballasts under test, or control devices to be used, during standby mode testing beyond the requirements of IEC 62301: 2011. DOE requests comment on whether the addition of these types of requirements is worth the additional burden on manufacturers.
NEMA Comment: See our responses to items 3 and 6.

[1] https://www.regulations.gov/document?D=EERE-2010-BT-TP-0044-0006

15. DOE requests comment on whether the existing test procedure limits a manufacturer's ability to provide additional MHLF features to customers. DOE particularly seeks information on how the test procedure could be amended to reduce the cost of new or additional features and make it more likely that such features are included in MHLFs. NEMA Comment: we refer to our preceding comments regarding the lack of growth and development in this market. There are no additional features being sought by customers, and therefore no need to update test procedures for them.

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