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## **FINAL STATEMENT OF REASONS**

### **Computers and Light-Emitting Diode Lamps Appliance Efficiency Rulemaking**

California Energy Commission  
Docket Number 17-AAER-15  
OAL Notice Number Z2017-0912-02

November 2017

### **INTRODUCTION**

Existing law requires the California Energy Commission to reduce the inefficient consumption of energy and water by prescribing efficiency standards and other cost-effective measures, including incentive programs, fleet averaging, energy and water consumption labeling, and consumer education programs, for appliances that require a significant amount of energy or water to operate on a statewide basis. Such standards must be technologically feasible and attainable and must not result in any added total cost to the consumer over the designed life of the appliance.

The Appliance Efficiency Regulations (Title 20, Sections 1601-1609 of the California Code of Regulations) contain definitions, test procedures, labeling requirements, and efficiency standards for state- and federally-regulated appliances. Appliance manufacturers are required to certify to the Energy Commission that their products meet all applicable state and federal regulations pertaining to efficiency before their products can be included in the Energy Commission's database of approved appliances to be sold or offered for sale within California.

In 2016 and 2017, the Energy Commission adopted definitions, test procedures, marking requirements, and energy efficiency standards for light-emitting diode lamps and computers, respectively. Subsequently, the Energy Commission determined that changes to the regulations were needed to carry out the intent of the regulations and initiated this rulemaking to do so.

### **PROCEDURAL HISTORY**

On September 22, 2017, the Energy Commission published a Notice of Availability, proposed Express Terms, Initial Statement of Reasons (ISOR), and an Economic and Fiscal Impact Statement and supporting analysis for amendments to the light-emitting diode lamps and computer energy efficiency regulations. The public comment period ran through November 6, 2017, and on November 8, 2017, after considering all

comments received, the Energy Commission unanimously adopted the proposed regulations.

**Local Mandate Determination** – Government Code Sections 11346.5(a)(5); 11346.9(a)(2)

The Energy Commission has determined that these regulations will not impose a mandate on local agencies or school districts.

**Consideration Of Alternative Proposals** – Government Code Section 11346.9(a)(4)

The Energy Commission has determined that no alternative would be more effective in carrying out the purpose for which the regulations are proposed, would be as effective and less burdensome to affected private persons than the adopted regulations, or would be more cost effective to affected private persons and equally effective in implementing the statutory policy or other provision of law.

With regard to changes affecting the LED efficiency standard, the only alternatives proposed were minor wording changes in the express terms to further clarify the regulations. The Energy Commission concluded that additional clarity to an already clear provision was not warranted and rejected the proposed changes. The changes would not have made the regulations more effective with regard to energy efficiency gains, would not have made the proposed regulatory text less burdensome, and would not have made the regulations more cost effective.

With regard to changes affecting the computer standard, the only alternative proposed was to maintain the regulations as-is with regard to the definition for discrete graphical processing unit (GPU) and not create an additional allowance for discrete GPUs. The concern expressed in support of this alternative was that the regulations as proposed may lead to the erosion of energy savings from the standards. This alternative, however, is not effective in carrying out the purpose for which the regulations are proposed; namely, to allow for new and innovative technology that was not available for consideration when the original computer energy efficiency regulations were adopted. Without a change to provide an adder for discrete GPUs packaged on the same die or substrate as the CPU, manufacturers may not be able to use new and innovative discrete GPUs in computers sold in California. The energy efficiency regulations are intended to obtain cost-effective energy efficiency improvements without curtailing innovation, something the alternative does not do. The concerns expressed regarding erosion to energy efficiency benefits can be handled through careful market monitoring and changes to the regulations if and when problems arise, as the Energy Commission has committed to doing.

**Discussion of Proposed Alternatives that would Lessen the Adverse Economic Impact on Small Businesses** – Government Code Section 11346.9(a)(5)

The proposed regulations will not have a significant adverse economic impact on small businesses and no alternatives were proposed that would lessen any adverse economic impact on small businesses.

Rather, the changes made through this rulemaking may benefit small businesses. The proposed changes, which include modifications to the reporting requirements for LED lamps, modifications to the definitions for certain types of computers, a new adder for discrete GPUs that are packaged on the same die or substrate as the CPU, and new reporting requirements for computers to reflect these changes, allow for more flexibility for manufacturers to comply with the energy efficiency regulations. Manufacturers of LED lamps will be able to sell their products within California before lifetime testing has been completed. Manufacturers of computers with innovatively packaged discrete GPUs will have more flexibility in meeting the energy efficiency standards and will be able to sell these innovative products in California. The changes also ensure that entities, including small businesses, that purchase workstations, mobile workstations, or mobile gaming systems will not be obligated to purchase products with an expensive discrete GPU if they do not need one. Changes to the criteria for mobile workstations and mobile gaming systems increase flexibility for manufacturers to design products meeting the requirements and better capture the types of products intended to meet those definitions, ensuring that these products remain available to consumers and businesses, including small businesses. Minor changes to the reporting requirements adding a few fields do not appreciably change the time and effort required of manufacturers to comply.

**Studies, Reports, and Documents Relied Upon** - Government Code Section 11346.9(a)(1); 11347.1

No new studies, reports, or documents not already noticed in the Initial Statement of Reasons were relied upon.

**Incorporation by Reference** – Title 1, Cal. Code of Regulations, §20(c)

These regulations incorporate by reference 10 C.F.R. section 430.23(ee) (Appendix BB to subpart B of part 430, "Uniform Test Method for Measuring the Input Power, Lumen Output, Lamp Efficacy, Correlated Color Temperature (CCT), Color Rendering Index (CRI), Power Factor, Time to Failure, and Standby Mode Power of Integrated Light-

Emitting Diode (LED) Lamps”) (Jan. 1, 2017). This document is publicly available and spans five pages of very small print in the Code of Federal Regulations and consists of very technical information. Publishing this document in the California Code of Regulations would be cumbersome, unduly expensive, or otherwise impractical. Identifying this type of federal document outlining test procedures as a document incorporated by reference is consistent with the types of information currently incorporated by reference in Title 20, including many references to federal test procedures. Attempting to incorporate this test procedure verbatim into the Energy Commission’s regulations would congest the already heavily populated energy efficiency regulations and make it more difficult to navigate the Energy Commission’s requirements. Doing so for the myriad test procedures and other technical documents contained in the Energy Commission’s energy efficiency standards as a whole would be cumbersome, unduly expensive, and otherwise impractical.

Pursuant to California Code of Regulations, Title 1, Section 20, this document was available upon request from the Energy Commission, and was available for review at the Energy Commission at 1516 9<sup>th</sup> Street, Sacramento, California, 95814 during the rulemaking proceeding from 9:00 AM to 5:00 PM Monday through Friday. The document was additionally available online through the Energy Commission’s webpage for this proceeding and through various other online sources including the U.S Government Publishing Office’s webpage.

### **UPDATE OF THE INITIAL STATEMENT OF REASONS**

Government Code Section 11346.9(a)(1) requires the Final Statement of Reasons to include an update of the information contained in the ISOR. No changes to the proposed regulations were made after publication of the ISOR and no changes to the ISOR are necessary. The ISOR is hereby incorporated by reference.

### **UPDATED INFORMATIVE DIGEST** – Government Code Section 11347.3(b)(2)

Pursuant to Government Code section 11346.9(b), there have been no changes in applicable laws or to the effect of the proposed regulations from the laws and effects described in the Notice of Proposed Action.

### **RESPONSE TO COMMENTS**

#### *Written Comments Received During the 45-Day Comment Period*

#### **1. NRDC Comments on CEC Proposed Amendments to Computers Regulations, Nov. 6, 2017**

- a. These changes have the potential to erode savings from the standards. While NRDC understands and supports the fact that standards may need adjusting

when they might prevent the deployment of new technology or functionality, we believe this isn't the case in this situation.

*Energy Commission Response:*

Based on the best available information provided about the product and the Energy Commission's understanding of the discrete GPU's likely behavior, the Energy Commission concludes that these changes will not lead to the erosion of savings from the computer efficiency standards. The Energy Commission also concludes that these changes are needed to avoid obstructing innovation in this field. Please refer to 1-b through 1-h for responses to the specific changes and issues.

- b. Packaging a discrete GPU on the same chip as the CPU (which we'll refer hereafter as a "packaged discrete GPU") presents energy saving opportunities that are not readily available with conventional discrete GPUs packaged on a separate card: with packaged discrete GPUs, the display is plugged into the same port as the integrated GPU, instead of having to choose between separate ports on either the graphics card or the motherboard, and the integration of the discrete GPU enables switching between integrated and discrete GPU with no perceptible latency, and to only refresh the display when it changes. These two energy saving techniques are already widely implemented in notebooks and all-in-one computers and known as "graphics switching", "hybrid graphics", and "panel-self-refresh".

*Energy Commission Response:*

The new technology at issue in these regulations, a packaged discrete GPU, provides more opportunities to save energy as compared to traditional discrete GPUs. For this reason, the proposed new energy allowance, or "adder," for the packaged discrete GPU is aligned with tier-2 values of the non-packaged discrete GPUs. This results in a substantially smaller allowance for packaged discrete GPUs beginning in tier 1 of the regulations. Allocating an adder for the packaged discrete GPU is similar to how hybrid graphics are treated under the existing standards: hybrid graphics currently receive an adder for their discrete GPU part.

- c. When these power management best practices are implemented, packaged discrete GPUs don't need any extra allowance. Conversely, unwarranted allowances provide manufacturers opportunities to opt out of implementing energy efficiency best practices, thereby reducing savings from the standards.

As packaged GPUs are not yet commercially available, we cannot predict how aggressively manufacturers will push this technology and how quickly the market will adopt it. A slow adoption would have a limited impact on savings, but a rapid

adoption would significantly reduce energy savings from these computer standards.

*Energy Commission Response:*

No change is necessary in response to this comment. NRDC argues that by providing an adder for packaged discrete GPUs, the Energy Commission will inadvertently reduce savings from the standards. However, this conclusion is without evidence. Packaged discrete GPUs are likely to be used in place of traditional discrete GPUs, as the products have similar functionalities in providing high-end graphic representations. The adder for packaged discrete GPUs in tier 1 is *less* than the adder for traditional discrete GPUs in tier 1; thus, using a packaged discrete GPU would result in larger short-term energy savings than using a traditional discrete GPU. The adders for both products align in tier 2, so long-term energy savings should be equivalent. The Energy Commission based its decision for an appropriate adder on the best information available about the product and the Energy Commission's understanding of its likely behavior compared to a traditional discrete GPU.

- d. NRDC appreciates that manufacturers need a long lead time to make the necessary engineering changes to implement energy efficiency best practices in their products, and that the two years between standards adoption in December 2016 and effective date in January 2019 may not be sufficient to scale these practices across their entire product lines. We are therefore open to some reasonable allowance, as proposed by CEC, for tier 1 levels. However, the tier 2 effective date of July 2021 leaves manufacturers 4.5 years from adoption, which is more than sufficient to expand the use of technologies that are already used in some products today to their entire product portfolio.

*Energy Commission Response:*

As discussed above, NRDC has not provided evidence to demonstrate that a lower adder is appropriate for tier 2 levels, and the staff estimate of the appropriate level, commensurate with tier 1, is reasonable based on the best available information provided about the product and the Energy Commission's understanding of its likely behavior.

However, the Energy Commission agrees that it is important to remain vigilant against unintended consequences, and to protect energy savings. In the original computer rulemaking adoption in December 2016, the Energy Commission directed staff to monitor the market and consider proposing revisions to the computer and monitor regulations if the market monitoring demonstrates that products utilizing the adders, allowances, and exemptions for computers and monitors are obtaining rapidly increasing market share and may significantly reduce the energy savings projected

during the original rulemaking. If this occurs generally or as a result of the changes made in this rulemaking, staff may consider proposing changes to the computer regulations that will close unintended loopholes in this rapidly evolving market.

- e. Keeping strong standard levels over the long-term (such as the tier 2 timeframe of July 2021) is particularly important because it sends manufacturers a clear signal to invest in the engineering necessary to achieve these long-term levels. These long-term investments drive most of the savings from the standards.

NRDC therefore urges CEC to provide an allowance for packaged discrete GPUs only for tier 1, and to keep tier 2 levels as adopted in 2016. Should CEC proceed with its proposed weakening of tier 2 levels, it will be critical to closely monitor the market to ensure that this allowance does not become a major loophole in the standards.

*Energy Commission Response:*

No change is needed. As explained above, the Energy Commission's adders for packaged discrete GPUs is reasonable and based on the best available information in the record and the Energy Commission's understanding of the product's likely behavior. The Energy Commission intends to vigilantly monitor the market for any shifts and any potential impacts to energy savings to ensure that no parts of the standards create a major loophole.

- f. However, market monitoring only allows to react to the market, not to shape it. And when reacting to loopholes, there are limited options available to regulators because it takes industry several years to update its technology and engineering roadmaps and scale the use of energy efficiency best practices across its entire product portfolio. Therefore sending a clear and strong long-term policy signal is so much more effective, from both an energy and a cost perspective, than setting short-term, reactive standards.

*Energy Commission Response:*

NRDC is requesting that the Energy Commission not create adders for new technologies or innovations, because the standards are already flexible enough, and because manufacturers should incorporate new technologies or innovations by decreasing energy consumption in other parts of the computer. While the Energy Commission agrees generally that the computer and computer monitor standards are flexible enough to accommodate many new technologies and innovations without the need for repeated, time-consuming, and resource-intensive rulemakings to create new adders or categories, this was not the case for the packaged discrete GPU. A packaged discrete GPU is a new, not-yet-to-market product that has similar functionality to a traditional discrete GPU. Under the existing regulations, the adder applicable to this



product would have prevented it from being eligible for sale in computers in California, despite using less energy than a traditional discrete GPU. This absurd result is not the intent of the regulations, which are to reduce energy consumption in computers. Therefore, the Energy Commission opted to provide a new adder, albeit a lower one than for traditional discrete GPUs, to ensure that this new technology would be eligible for sale in California. Each new innovation or technology is evaluated on its own merit and based on the best information available to determine whether or not changes to the regulation are needed. In this case, changes were needed and made to accommodate the new technology.

- g. NRDC also urges CEC to consider the unintended consequences of expanding the definition of discrete GPU, as this definition is used in other definitions and requirements such as workstations, mobile workstation, mobile gaming systems, and alternative sleep mode. Broadening the definition of discrete graphics also broadens these categories, allowing more products to comply under these more generous requirements, and reducing overall savings.

*Energy Commission Response:*

No change is needed. The intent of the definitions for workstation, mobile workstation, and mobile gaming system is to distinguish low-volume, high-end products that require more energy allowance to meet the needs of the consumers buying these products, while requiring more mainstream computer products to reduce their overall energy consumption. The presence of a discrete GPU, whether traditional or packaged, is one way to distinguish a low-volume, high-end product from more mainstream products. The functionality of that discrete GPU does not change based on whether it is packaged with the CPU or not. Moreover, the presence of a discrete GPU is just one element for each of these types of computers. The computer must also meet the other requirements to qualify as a workstation, mobile workstation, or mobile gaming system.

For alternative sleep mode, the additional 2 watt allowance for a computer with a discrete GPU, as provided in the existing regulations, should not be different when the discrete GPU is packaged on the CPU. This is because the graphic data is refreshed or stored in the discrete GPU memory in the same manner during an alternative sleep mode whether the discrete GPU is or is not packaged together with the CPU.

Workstations, mobile workstations, and mobile gaming systems are very likely to remain low-volume, high-end products whether they utilize a traditional discrete GPU or a packaged discrete GPU because both forms of discrete GPU will remain more expensive than an integrated GPU. If the Energy Commission starts to see a significantly increased number of computers certifying as workstations, mobile workstations, or mobile gaming systems, staff will consider proposing revisions to the computer regulations.

- h. Lastly, monitoring market adoption of the new packaged discrete graphics technology, requires changes to data submittal requirements in Table X. We support the changes proposed by the California investor-owned utilities (IOUs).

*Energy Commission Response:*

No change is requested, as the Energy Commission did not receive any comments requesting changes to Table X for computers. The Energy Commission included some changes to Table X to accommodate the new packaged discrete GPUs. Product testing, test reports, and specification sheets should provide sufficient additional information to identify how products are qualifying for specific exemptions, and will be used as a part of the market monitoring that the Energy Commission is committed to doing.

**2. ITI/TechNet Comments on Express Terms (45-Day Language), Nov. 6, 2017**

- a. Industry supports the proposed changes in the 45-day language. We also appreciate the opportunity to contribute Frequently Asked Questions (FAQs) to CEC staff, and look forward to seeing the FAQs published on the CEC website. This additional guidance will enable successful implementation of CEC's computers and displays standard.

We reiterate our commitment to continued engagement with CEC and other stakeholders to support the implementation of the rule.

*Energy Commission Response:*

Thank you for your supporting comment and for your contribution.

**3. MaxLite support for change in lifetime testing requirements for LED lamps, Oct. 24, 2017**

- a. MaxLite would like to add our strong support for the latest proposal to allow manufacturers to report estimated lifetime for state-regulated LED lamps to the Commission pending completion of lifetime testing. We support any changes such as these that will reduce time-to-market for lamp manufacturers and availability of product for California consumers. Procedures that take such long testing procedures into consideration and allow "early certifications" have proved successful for many years in the ENERGY STAR lighting programs and we commend the Commission's efforts to take similar approaches with this proposal.

*Energy Commission Response:*

Thank you for your supporting comment and for your contribution.

**4. NEMA Comments on CEC Title 20 45-Day Language Docket 17-AAER-15, Nov. 6, 2017**

- a. New Exception 5. To Section 1606(a)(3)(C): NEMA recommends the addition of clarifying text at the end of this new exception paragraph. Our suggested addition is shown below in **bold**.

“Manufacturers shall update the certification in the database upon completion of the required test procedures for rated lifetime **according to Appendix BB of 10 CFR 430 Subpart B .**”

*Energy Commission Response:*

No changes to the exception are necessary. Section 1604(k)(4) already requires Appendix BB to Subpart B of Part 430 to be used as the test procedure for rated lifetime.

- b. We note that the 45-day language did not include changes to Title 20 Appendix X submission template for LED lamps. When this template is issued, it should allow for the submission of estimated lifetime results.

*Energy Commission Response:*

No changes to section 1606 Table X are necessary. The data submittal instructions will allow for submission of estimated lifetime results in the field for “rated lifetime,” consistent with these regulations.

- c. New Exception 5. To Section 1606(a)(3)(C): the middle of this new passage includes the words “the certification report shall describe the prediction method, which must use statistical projections consistent with the methods specified in 10 C.F.R. section 430.23(ee)”. It is the position of the Members of the NEMA Light Source Section that testing and lifetime projection using IES Standards LM-80 and TM-21 is “consistent with” the requirements of 10 CFR 430.23ee and Appendix BB. NEMA members intend to use these methods, in addition to those in IES LM-84 and TM-28 (from the DOE Test Procedure for LED Lamps) as their situation dictates.

*Energy Commission Response:*

No changes are required. Manufacturers have flexibility to determine the specific methods used to estimate values for rated lifetime. Staff agrees that use of IES standards LM-80 and TM-21 to determine an estimated value of rated lifetime is appropriate in some situations. Final values of rated lifetime must be determined using

IES standards LM-84 and TM-28 as required by the test procedure specified in section 1604(k)(4).

- d. Although the 45 day language uses the term 'rated life', for the purposes of certification, we interpret this term to mean the same as 'time to failure' in 10 CFR 430.

*Energy Commission Response:*

No changes are necessary. NEMA's interpretation of this term is correct.

**5. Philips Lighting Comments on 45 Day Language, Nov. 6, 2017**

- a. Philips Lighting greatly appreciates the Energy Commission's efforts with regard to this rulemaking. We support the comments submitted by NEMA on this subject.

*Energy Commission Response:*

Thank you for your comment and for your contribution. See response to comments 4-a, 4-b, 4-c, and 4-d.

- b. Philips Lighting is a global leader in lighting products, systems and services. Our understanding of how lighting positively affects people coupled with our deep technological know-how enable us to deliver digital lighting innovations that unlock new business value, deliver rich user experiences and help to improve lives. Serving professional and consumer markets, we sell more energy efficient LED lighting than any other company. We lead the industry in connected lighting systems and services, leveraging the Internet of Things to take light beyond illumination and transform homes, buildings and urban spaces.

*Energy Commission Response:*

No change required. This portion of the comment does not request changes.

*Oral Comments Received at the November 8, 2017, Adoption Hearing*

**6. Alexandria McBride, ITI/TechNet Comments**

- a. ITI/TechNet made comments in support of the proposed regulations for computers.

*Energy Commission Response:*

Thank you for your supporting comment and for your contribution.

**7. Charles Kim, Comments from Southern California Edison on behalf of the California investor-owned utilities**

a. The California investor-owned utilities made comments in support of the proposed regulations for computers.

*Energy Commission Response:*

Thank you for your supporting comment and for your contribution.